

# **Capital, Time Preference, and Entrepreneurial Action**

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## **Abstract**

The paper serves as a complement to modern versions of capital-based macroeconomics by developing an approach that links features of standard macroeconomics with the Austrian theory of the business cycle by modeling roundaboutness. This model puts entrepreneurial action at the center of the analysis. We elaborate the subjectivist nature of capital and the role of the entrepreneur as the creator of the capital structure based on expectations *ex ante* and on imagination and draw conclusions for the conduct of economic policy.

## **Introductory Remarks**

The analysis presented here serves as a complement to modern versions of capital-based macroeconomics. Garrison (2001) and others (Horwitz 2000) developed models that study the business cycle and the role of credit expansion in its impact on the capital structure (Lewin 1995 and 1999) and the role of money (Salerno 2010, Selgin 1994). Garrison has advanced the Austrian theory of the business cycle by developing an approach that links features of standard macroeconomic modeling with Hayek's theory of the business cycle. The Mises-Hayek's business cycle theory (Mises 1912, Hayek 1931, 1941) was advanced considerably by Garrison (2001), yet he did not incorporate fully subjectivism and entrepreneurship. The present paper advances these approaches by modeling roundaboutness. The model presented here puts entrepreneurial action at the center of the analysis. We elaborate the subjectivist nature of capital and the role of the entrepreneur as the creator of the capital structure based on expectations *ex ante* and on imagination.

Hayek once wrote that it is "is probably no exaggeration to say that every important advance in economic theory during the last hundred years was a further step

in the consistent application of subjectivism.”<sup>1</sup> Once it is recognized that capital is heterogeneous, a subjectivist approach to capital and roundaboutness is warranted as the unity of the existing capital structure is no longer objectively given but will only exist in the imagination of the entrepreneur in the form of a plan. Such a perspective opens up the theory of capital to acknowledge uncertainty and “makes room for the creativity and autonomy of individual choice” (O’Driscoll and Rizzo 1985:1). The subjectivist perspective leads to a view of the economic process that is fundamentally different from the objectivist position. The objectivist definition of capital can do no other than postulate homogeneity and throw out uncertainty and entrepreneurship, while the subjectivist theory of capital leads to a view of capital where uncertainty, choice and entrepreneurial action not only receive due attention, but become constitutive elements of the theory of capital.

A well-founded theory of capital is still absent in modern conventional macroeconomics. Capital is relegated to growth theories where it is mathematically simplified as the homogeneous blob  $K$  that expands and shrinks according to the rates of investment and depreciation. In this objectivist view capital exists independent from human action and entrepreneurial imagination. Maybe it is no exaggeration to say that almost all difficulties of modern macroeconomics to come to grips with reality have their roots in the lack of a theory of capital. It is mainly by ignoring capital that the theoreticians of modern macroeconomics have been deluded to follow pipe dreams and construct models like sand castles.

## Two Concepts of Capital

Although capital and entrepreneurship play an essential – maybe *the* essential – part in the everyday workings of the modern economy, the role of capital and entrepreneurship are almost entirely absent in the mainstream version of modern macroeconomics. It is only in Austrian economics that capital and entrepreneurship play a prominent role. The capital structure in terms of the stages of production has provided the foundation for the formulation of the Austrian theory of the business cycle which continues to be a major topic in the Austrian research program. Yet there are also deficiencies in the Austrian concept of capital. The problematic status of the Austrian capital theory is partly the result of conceptual problems that have their origin in an objectivist view of capital and roundaboutness and furthermore that the stages of production are conceptualized as a macroeconomic phenomenon. A subjectivist re-interpretation of capital and a microeconomic view of the stages of production may help to shed new light on the role of profit and loss, investment, savings and the emergence of malinvestment.

Despite the effort that Hayek (1941) put in his “Pure Theory of Capital”, a concise theory capital has not been achieved. Hayek made decisive steps forward to purify the

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<sup>1</sup> F. A. Hayek, *Scientism and the Study of Society*, in: *The Counter-Revolution of Science*. Indianapolis: Liberty Press, 1979

concept of capital from some of the objectivist attributes but failed to integrate entrepreneurship into his theory, probably because his main focus was oriented towards macroeconomics in order to obtain a foundation of his business cycle theory.

Since the publication of Hayek's treatise, neither the Austrian nor the neoclassical theory of capital has made much progress. On the one hand there is the neoclassical concept of capital as a homogenous entity devoid a structure and time, while in the Austrian view capital is heterogeneous and is intimately linked to time. From this major difference, all other differences between the two concepts of capital do follow. Keynesian economics has only expenditures in sight and abandoned capital theory, and in monetarism the real economy and its capital structure has vanished completely. Almost any branch of economics outside of Austrian economics defines investment ( $I$ ) as simple addition to capital through gross investment ( $I = sY$ ) minus depreciation ( $\partial K$ ). This approach presumes the existence of a macroeconomic production function whose mathematical form includes the production elasticities of labor ( $\alpha$ ) and capital ( $\beta$ ) as the relationship between the input factors capital ( $K$ ) and labor ( $L$ ) with total factor productivity ( $A$ ) and the final aggregate output ( $Q$ ) and aggregate income ( $Y$ ).

$$(I) \quad K_{t+1} = (1 - \partial)K_t + I_t$$

$$(II) \quad I_t = sY$$

$$(III) \quad Q = Y = AL^\alpha K^\beta$$

In this theory, capital is stylized as a temporary stock. Once when capital is defined as a stock, the replacement and maintenance of capital becomes a problem of addition ( $I$ ) and depreciation ( $\partial K$ ), which can take place discontinuously or periodically. Non-Austrian economics treats capital (if it is mentioned at all outside of growth theory<sup>2</sup>) as something that can be increased by capital additions without changing the structure of the existing capital stock. From this it follows that there is no need for an entrepreneur. The decision to increase or not to increase or – when technical progress is included – which technology to apply vanishes from the analytics and the existing capital stock could be managed by an automaton or any authority including a central government. Such a conception, as it is inherent in the economic growth theory of modern macroeconomics, eliminates the essential properties of capitalist production. In this model, the structural aspect of capital and with it the specifying function of the entrepreneur remains in the dark. It is in this context, with the concept of capital as a measurable unit – supposedly representing the aggregate of capital goods – erroneous propositions such as that the demand for capital and labor were determined by aggregate expenditure could emerge.

By neglecting capital, modern mainstream macroeconomics has lost its access to discern one of the most fundamental problems of the business cycle: the built-up of malinvestment in the excessive boom and the rebalancing (or “re-coordination”) of the capital structure in the bust.

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<sup>2</sup> A recent textbook, for example, that carries the promising title “Recessions and Depressions. Understanding Business Cycles”, there is no entry for “capital” in the index, and the few times “capital” is mentioned at all, it is in the meaning of “capital flows”. See Knoop (2004)

The central problem of non-Austrian theory of capital is the assumption of a homogenous and quantifiable capital stock. Such a theory is “bound to ignore important features of reality” (Lachmann 1956:6) and in particular as it disregards the heterogeneity of capital, “the true function of the entrepreneur must also remain hidden” (ibid. p. 16). In such a theory “investment becomes merely a question of changing the absolute quantity of this homogeneous capital stock. Its *composition* does not interest the economist whose theory of investment is bound to be somewhat fragmentary.” (ibid. p. 49)

It is different with the Austrian approach<sup>3</sup>. The Austrian position holds that non-permanence is the characteristic attribute of capital goods and thus the problem of continuous reproduction and re-structuring of capital receives attention. In Austrian economics it is “not the individual durability of a particular good but the time that will elapse before the final services to which it contributes will mature that is regarded as the decisive factor. That is, it is not the attributes of the individual good but its position in the whole time structure of production that is regarded as relevant”<sup>4</sup>.

As to the choice of technology, neoclassical economics assumes that the choice about which of the many known technological methods will be employed depends on current supply and demand conditions, and the technique employed in production is supposed to be unalterably determined by the given state of technology. Likewise in this theory, it is supposed that capital is being increased in the sense of a lateral expansion of production, as a simple duplication of the kind of capital already in existence. The homogeneity assumption provides the indispensable foundation of this approach.

In sharp contrast to the homogeneity thesis, it is stressed in the Austrian capital theory that additional capital is used to make changes possible in the technique of production. Additional capital leads to structural changes of capital, and as such investment is not a mere addition or subtraction in relation to an existing capital stock, but new investment will transform the original capital structure. The relative changes in the demand for consumer and production goods guide the entrepreneur to manage the changes in the capital structure and thus it is not aggregate demand as given by the total money expenditure that accounts for the direction of capital accumulation. Therefore, in this model, it is not necessary to assume that expansion of production requires the existence of unemployed resources. The structural changes of capital allow for the assumption of full employment. As a major consequence of these different views emerges the distinction that in non-Austrian economics the demand for investment goods and consumer goods will move in the same direction on an aggregate basis, while in the Austrian perspective the demand for capital goods will occur in the opposite direction from the demand for consumer goods.

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<sup>3</sup> Hayek denotes the opposing paradigm to his theory the “Anglo-American” concept of capital in contrast to the “Austrian” concept of capital. But the designation “Anglo-American” capital theory is rather ambiguous as Hayek himself makes it clear when he states that the classical English economists were in many aspects much more “Austrian” than their followers. Yet it is easy to avoid this notion because almost any branch of economics other than the Austrian theory has adopted the neoclassical or “Anglo-American” variant of capital theory. Therefore it is legitimate to differentiate in the following between “Neoclassical” and the “Austrian” capital theory in an effort to highlight some of the major differences.

<sup>4</sup>Ibid. p. 48

## **The Subjectivist Nature of Capital**

In contrast to labor and land, capital has no objective physical dimension. Capital exists in the form of heterogeneous capital goods whose unified representation exists in the mind of the entrepreneur in the form of expectations and imagination. The capital structure of a business venture is the result of plans and comes into being by bearing uncertainty and the cost of time and money. Even in a highly advanced economy where all kinds of tools are readily available and an almost permanent stream of new technologies is at hand, production will take time and will happen in stages according to the causal demands of the structure of production. One cannot bake the bread before harvesting the grain. Like all extended human action, entrepreneurial action requires to abide the causal logic of production and the conscientious application of time in order for the product to run through the production process towards maturity. Production does take time and gaining productivity through roundaboutness implies sacrifice in the sense that immediate satisfaction must be postponed in the pursuit of the exploitation of a trade-off to get more or better goods in the future by abstaining from potential consumption now.

Capital appears empirically as heterogeneous production goods, but as such they do not represent capital. Capital emerges when the heterogeneous capital goods are combined as tools in the context of an entrepreneurial plan and realized as a production process. Capital goods become capital, one can say, only after they are arranged according to the logic of the production process. The heterogeneity of capital goods becomes only capital proper when these production goods become tools, when they receive a specific position in a production process that is ordered for the purpose to achieve economic progress and as such capital exists as intention in the human mind of the entrepreneur who directs the enterprise.

For economic growth to happen, capital accumulation is not enough. The quintessential form of capitalist production is not capital expansion but managing changes of the capital structure. Any such change, as it comes with investment, implies that some parts of the capital structure will become obsolete. The final result of roundaboutness will only show up after some period of time. It is here that the role of the entrepreneur comes into play as the agent to specify the capital structure under the guidance of expected profit and losses. This view clarifies the role of “technological progress” and avoids the troubles that modern macroeconomics has with increases of productivity due to new technologies or improvements of human capital. In this perspective, a change of the capital structure is always an act aimed at increasing output per capita and thus implies the search for what is otherwise called “technological progress”.

Capital in contrast to labor has no natural physical dimension. It is only by the entrepreneurial plan that the capital structure will gain its coherence as capitalist logic. Capital as a homogenous entity exists only as financial capital and thus, in its monetary representation, serves as an accounting tool (Mises 1998:231 et passim). It is only in its financial representation that capital can be thought of as being homogenous, and as

something from which additions and subtraction could be made without affecting its structure. Yet in the process of production, capital exists as heterogeneous capital goods, and in this form capital has no natural unit of measurement other than entrepreneurial valuation based on intention, imagination, expectation, and plan. “The idea of capital has no counterpart in the physical universe of tangible things. It is nowhere but in the minds of planning men.” (Mises 1998:511)

Different from the common assumption in conventional macroeconomics, investment, too, lacks an objective criterion as it refers to the specificity of which goods to apply. As such, investment is based on speculation in the form of entrepreneurial appraisal that not only refers to the “quantity” of investment, but also and sometimes even more so to which kind of goods to apply, i.e. in which form technological advancement should occur. Investment requires judgment that goes beyond enlargement or reduction, because investment will have an impact on the existing capital structure. Entrepreneurship in this sense is not so much “alertness” (Kirzner 1973) – a concept, which would imply basically costless profits from discovery -- or mainly technical and administrative progress (Holcombe 2003), investment rather shows up as the pursuit of productivity gains, i.e. it appears as purposive action in the move towards economic progress. This means that technical progress and the improvement of human capital is embedded in the act of investment itself in so far as the activity of investing is guided by the entrepreneurial intention to apply changes to the capital structure as a tool in order to gain profit as its aim.

The entrepreneur is the essential link between the market signals and the capital structure. The task of the entrepreneur is quite different from how it is modeled otherwise in conventional economic theory where an “investment function” is said to describe the relation between the interest rate and the amount of investment flow that would happen accordingly. This approach eliminates the entrepreneurial function and at best it provokes the caricature of the entrepreneur as a mindless automaton on the one side or an equally mindless creature ruled by animal spirits on the other side. In such a world, no visionary roundabout production can happen.

Investment in new equipment requires time until the results will show up. It is in this sense that plans and purposeful action are required to bring it about. As such, investment cannot be modeled as simple additions to existing capital, but attention will be drawn to the fact that for some prolonged time the output that is expected from the investment in new equipment will be below the level of the standard production procedures currently in place. It is the inherent characteristic of roundabout production that the *expected* later result has to outpace standard production and that in this calculation the formation of expectations and the interest rate will play a decisive role. In terms of the *ex ante* expected result, as it is given by the entrepreneurial expectations, future *expected* results have to outpace conventional production methods by a considerable margin in order of even being merely an option to be taken into consideration. Expected results of roundabout production must be substantially higher than those that are given by the currently applied production methods, and one might add they need by illusionary higher, because roundabout production requires waiting

time and involves a transformation of the existing capital structure, the management of process that is full of obstacles and finally incalculable.

### **Capitalist Production**

Böhm-Bawerk's major contributions consist in the causal explanation of the interest rate as the result of time preference and his explanation that the unique form of "capitalist production" exists in the use of roundaboutness. For Böhm-Bawerk, the specific "capitalist production" consists in roundabout production<sup>5</sup>, and has the advantage of greater technical productivity while its disadvantage consists in a "sacrifice of time".

Doing business consists in the realization of entrepreneurial plans by way of a trial and error procedure that is guided by the criterion of profitability. Entrepreneurial action consists in coming up with an idea, transforming the idea into a plan and realizing the plans in a continuous process of adaptation to constantly emerging new circumstances. Doing business consists in maintaining the stream of goods by incessant adaptation to local and temporary conditions and as such it includes the revision of plans and expectations in the face of the changing market condition. The appraisal and re-appraisal of the changes of relative prices is only one of the guides in the process of allocation, while the availability of savings is the major signal to provide orientation as to the *intertemporal* allocation of available funds.

The attention paid to capital in its relation to time and its characteristics as being the concomitant of roundaboutness lies at the heart of Austrian economics. The realistic recognition that capital is heterogeneous brings with it a fundamentally different perspective compared to the neoclassical unrealistic assumptions. Heterogeneity of capital implies that the capital structure is built up as combinations consisting of complementary elements that are arranged by entrepreneurial plans (Lachmann 1978:12). The unifying focal point of capital is the imagination of the entrepreneur who arranges the capital goods in a way that he deems appropriate to meet future demands

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<sup>5</sup>Böhm-Bawerk provides this instructive example to explain the character of roundaboutness: "A peasant requires drinking water. The spring is some distance from his house. There are various ways in which he may supply his daily wants. First, he may go to the spring each time he is thirsty, and drink out of his hollowed hand. This is the most direct way; satisfaction follows immediately on exertion. But it is an inconvenient way, for our peasant has to take his way to the well as often as he is thirsty. And it is an insufficient way, for he can never collect and store any great quantity such as he requires for various other purposes. Second, he may take a log of wood, hollow it out into a kind of pail, and carry his day's supply from the spring to his cottage. The advantage is obvious, but it necessitates a roundabout way of considerable length. The man must spend, perhaps, a day in cutting out the pail; before doing so he must have felled a tree in the forest; to do this, again, he must have made an axe, and so on. But there is still a third way; instead of felling one tree he fells a number of trees, splits and hollows them, lays them end for end, and so constructs a runnel or rhone which brings a full head of water to his cottage. Here, obviously, between the expenditure of the labour and the obtaining of the water we have a very roundabout way, but, then, the result is ever so much greater. Our peasant needs no longer take his weary way from house to well with the heavy pail on his shoulder, and yet he has a constant and full supply of the freshest water at his very door. (Böhm-Bawerk, *The Positive Theory of Capital*, 1884, p. 18)

with the intention to earn profits. With the concept of roundaboutness and the heterogeneity of capital it is brought to light that the outcome of investment requires time and waiting and as such investment is confronted not only with risk but with uncertainty in the sense of unknown distributions of the results. In this perspective, the role of the entrepreneur comes into play as to his specific function as the anticipator of unknown future demand and prices and therefore as the preeminent economic agent whose prime specialization lies in the ordering of the capital structure under the conditions of uncertainty by way of his imagination.

The postulate of the heterogeneity of capital in terms of production goods draws attention to the stages of production and the complexity of capital structures. Quite different from the modeling that investment decisions receive in modern macroeconomics in terms of functional relationships, a realistic view puts entrepreneurial activity in the context of uncertainty and contingency.

Beginning with Carl Menger (1871) and followed-up by Böhm-Bawerk (1884), the heterogeneity of capital as an ordered production structure forms the starting point for the Austrian theory of capital:

“... capital is the sum of heterogeneous concrete capital goods. To aggregate them, one needs a common denominator. This common denominator cannot be found in the number of capital goods ... nor their length or width or volume, or weight or any other physical unit of measurement. ... The only measuring rod that does not lead to contradictions ... is the value [of these capital goods].”<sup>6</sup>

Lachmann (1978, p. XV) asks what it is that unites capital in its concrete representation such as it shows up as “(b)eer barrels and blast furnaces, harbor installations and hotel-room furniture” other than the entrepreneurial plan and the valuations that are derived from this plan? The arrangements that take place are arrangements in terms of an order guided by a purpose. It is a process of valuation that extends from the expectations, the plan, and the vision of the future, to the present. The valuation of capital is not causal but teleological and intentional, and it is grounded in human action with its basic elements of time, stages, and purpose.

Capital is a tool of human action. The purpose of capital accumulation is in the mind of the entrepreneur as an instrument to gain returns. In this sense capital is a “praxeological concept” (Mises 1989:512), a concept of human action. The realization of the entrepreneurial plan takes time and thus all entrepreneurial action is speculative

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<sup>6</sup> Translated quotation from Böhm-Bawerk’s “Capital and Interest” in Hennings (1997, p. 132). Interestingly enough, Piero Sraffa, one of the major intellectual forerunners of what is now called “post-Keynesian” economics, put the problem quite succinctly in a letter to Joan Robinson of October 1936, although even his belated recognition after what Böhm-Bawerk had already said almost 40 years earlier seems to have met deaf ears not only by Joan Robinson regarding Sraffa’s reminder that “(if) one measures labor and land by heads or acres the result has a definite meaning; subject to a margin of error .... On the other hand if you measure capital in tons the result is purely and simply nonsense ... If you are not convinced, try it on someone who has not been entirely debauched by economics. Tell your gardener that the farmer has 200 acres or employs 10 men - will he not have a pretty accurate idea of the quantities of land & labour? Now tell him that he employs 500 tons of capital & he will think you are dotty - (no more so, however, than Sidgwick or Marshall).” Quoted in King (2002: 80/1)

because the plan is directed towards remote results whose exact outcome is uncertain. Capital has an inescapable futuristic dimension and thus it is constantly exposed to uncertainties and contingencies.

Human well-being requires a continuous stream of consumption goods, and thus time preference poses a limit to the potential degrees of roundaboutness. The problematic nature of roundabout production lies in the uncertainty about the determination of adequate degree of roundaboutness. On the one hand roundaboutness is the way to increase productivity; on the other hand this pursuit may become over-extended in face of the necessity of having sufficient savings available for the time it takes to realize the project. Without roundaboutness there is no economic progress because roundaboutness is the way how technological progress happens; but if the degree of roundaboutness is too high, incompatibilities between the urgent needs for consumption goods and the capital structure to deliver this stream of consumption goods will occur (Strigl 2000:6-14).

At the micro level, the rejection of roundabout production involves the risk of losing out to the competitor and to disappear from the market, while the pursuit of a too high degree of roundaboutness is confronted with the risk of over-extension relative to savings and to face bankruptcy. This decision about the adequate degrees of roundaboutness constitutes the essence of entrepreneurship. It is also so that this problem is being completely neglected by modern macroeconomics. What makes a good entrepreneur, we may ask. And the answer would be that a good entrepreneur would be one who has the skills to invest in the right kind of capital goods at the right dimensions.

### **Time Preference and Interest Rate**

Economics as the theory of human action deals primarily with a monetary economy based on the division of labor. Direct exchange and Robinson Crusoe-models may serve as theoretical points of reference, but their fictitious character must be kept in mind. By focusing on money, Austrian economics contrast strongly in relevance when compared to other models of economics. When applying its methodological principles to money, Austrian economics regards such a phenomenon as the interest rate or the demand for money as the results of human valuation. The central focus of the Austrian theory of money is directed at the theory of interest, as it reflects most clearly the aspect of subjective valuation.

In its originary form, the interest rate is the discount that human action must give to later available goods compared to earlier available goods, which may render the same service but at different points in time. If it were otherwise, man would not act. Human action implies by necessity a preference for the immediate. To put it in another way: In an imaginary world without an originary interest rate, savings would become infinite.<sup>7</sup>

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<sup>7</sup> On the other hand, an unlimited rise of this rate would finally eliminate saving. The difference between the originary rate and monetary rate of interest becomes obvious when thinking about the elimination of interest income (by expropriation or taxation). Then, saving would stop and cause the consumption of

The central thesis of Mises' (1998, pp. 521) monetary theory consists in the proposition that the monetary rate of interest may deviate from the neutral rate due to money creation (or its contraction) in the credit markets.<sup>8</sup> If the money rate falls below the neutral rate and thus deviates from the ordinary rate of interest, the monetary rate will deviate from the original valuation between present and future goods, and, as future goods have become relatively cheaper the demand for them will increase.

By using sequential analysis instead of the fiction of an immediate or "all at once-adaptation", Misesian theory points out that money affects economic agents heterogeneously. Money cannot be neutral because it enters the economy not at once nor in the same quantities for all economic agents. While money may or may not change the price level, it will always change relative prices and with it the relative fortunes of individual economic agents.

In the words of Mises (1998, p. 552):

"The essence of monetary theory is the cognition that cash-induced changes in the money relation affect the various prices, wage rates, and interest rates neither at the same time nor to the same extent. If this unevenness were absent, money would be neutral; changes in the money relation would not affect the structure of business, the size and direction of production in the various branches of industry, consumption, and the wealth and income of the various strata of the population."

The monetary rate of interest cannot be a neutral rate of interest in the sense that it would be the monetary expression of the original rate of interest, because changes in money affect prices not homogeneously and instantly. Money enters the economy at specific points of economic activity and gets into the hand of specific economic agents first and from there on spread to other economic activities and other economic agents and affects the rest of the economy.<sup>9</sup> Only perfect foresight could transform the monetary rate of interest into a neutral rate by applying a price premium. But the formation of expectations about a certain direction of prices is disparate and must remain uncertain.

This monetary theory is based on individual valuation and sequential analysis and leads to the Austrian theory of the business cycle, which holds that credit expansion and contraction bring about deviations of the monetary rate of interest from the ordinary rate and thus transmits false signals and leads to misallocation between the production of immediate and future goods. Easy money creates an illusion of wealth and instigates disruptions of production process while consumers aspire for the acquisition of goods

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accumulated capital as its consequence, precisely because the ordinary rate of interest cannot be removed from human valuation (Mises 1998, pp. 524).

<sup>8</sup> A somewhat different starting point is given by Hayek as his theory also contains elements of the „real business cycle“, making his approach in this regard „un-Austrian“, see his „Pure Theory of Capital“, London 1941; for Mises, in contrast, the central point is prolonged growth of credit creation, which may also be the result of reduced risk perception, when government or central bank bailout guarantees are presumed to exist.

<sup>9</sup> Even if the change in the quantity of money could be known in time, and if it were known for which kind of activities it enters the economy, it is impossible to know ex ante how this will affect the different prices. It is principally impossible to foresee how, when and to what degree individual valuations will change.

that rank higher in their time scale.<sup>10</sup> Because the real wealth of the economy cannot be increased by money, misallocations occur in the economy, which later will require reversals brought about by a recession.

### **Roundabout production**

Any capital enhancement requires time. In this sense, roundaboutness entails “active waiting” and the extent to which waiting is possible for the extended production process in order to deliver a higher output of consumption goods depends on savings.<sup>11</sup> The demand for capital is not determined by the absolute expenditure going into consumption goods, but is dependent upon the relative demand for consumption and production goods. Therefore, demand for capital does not vary directly with the demand for consumption goods, but in fact moves in opposition to it (Hayek 1931 and Garrison 2001).

There is a trade-off between present consumption and capital accumulation, between changes in the rate of current consumption and the degree of roundabout production. More roundaboutness means moving along the stages of production axis to higher degree of waiting and the implementation of more stages of production that are required for the production process to deliver the rise of consumable output later on.

The term “stages of production” has the basic praxeological meaning that production is not a continuous process but consists in a series of distinct steps, such as it happens when producing a meal or writing a book. One cannot put the meal on the table before it is cooked and one cannot read the book before it is written. Production takes place in time, but it is not only chronological time or averages of chronological time that count, but “economic time”, i.e. time defined in terms of the arrangement of production stages. Putting the meal on the table is a stage of its own as it the case when a book is put into the showcase of the bookstore. Stages are distinct and have their own characteristics. In almost all cases of production specialization is defined and develops in terms of specific stages of production be it the baker or the farmer or the writer and the publisher.

A specific production good does not have a value *per se*, but receives its valuation through the entrepreneur’s judgment as to the position of this specific production good within the overall time-consuming process of production. The definite position that is assigned to the assemblage of specific production goods within the chain of the stages of production is the origin of the value of this specific production good and is derived by entrepreneurial judgment about the estimated future demand for the final product. The various stages of production will have different durations measured by chronological time, as it happens, for example, with the time that it takes to grow a tree as opposed to felling it or transporting the good to the store and its exposition in the showroom waiting for this product to be sold and exit from the world of production to enter and finally disappear in the world of consumption. The value of production goods

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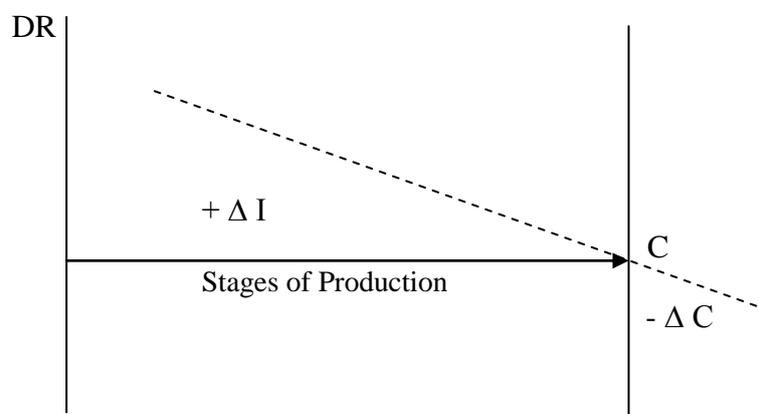
<sup>10</sup> In the boom period, goods that were regarded as “luxuries” now appear to be within one’s reach.

<sup>11</sup> A hungry cook is not be the right man to prepare an elaborate meal.

that are physically similar or seemingly identical attain their specific value by their position within the chain of production which in turn is the result of the entrepreneurial plan guided by the appraisal of current relative prices and the expectation as to the future price structure. For a good to go through the stages of production takes time, and these stages will have different chronological durations, but in the economic perspective each phase represents a different and distinct stage of production whose relevance comes from its position within the arrangement. Like in language, meaning is not derived from the word but from its position within the sentence, while the context is derived from the purpose of communication.

A negative change of consumption represents a decrease in consumption in relation to the existing production structure. In a growing economy such a change need not signify less consumption in absolute terms but would signify reductions of consumption potential. The stages of production are represented in relation to the point where the production process results in the output of the consumption good, i.e. the final good. In order to accomplish more roundabout production, investment has to shift from consumption to investment.

Figure 1  
*Investment-Consumption trade-off*

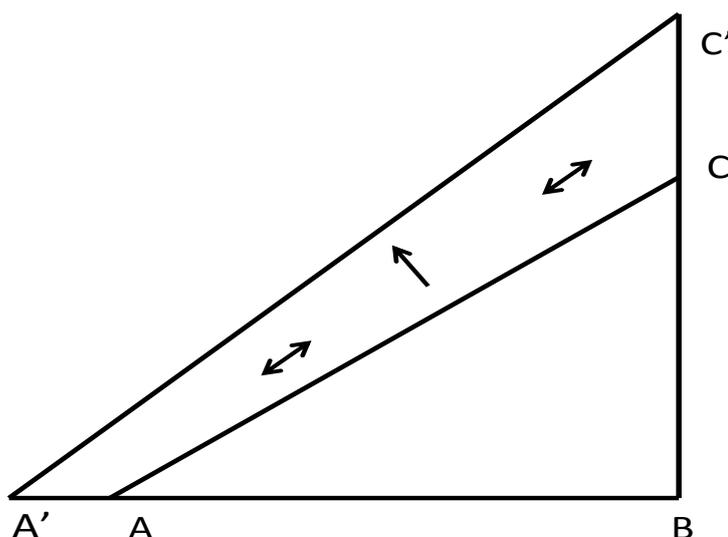


More investment and thus more roundaboutness will take place at various stages of production and in order to accomplish a harmonious expansion should affect all stages of production in order to accomplish an overall extension of roundaboutness. In the form of a graphical representation we can depict this process as an enlargement of the Hayekian triangle (see fig. 2).

In this figure (figures 2) a Hayekian triangle is shown (ABC) which represents the stages of production (A to B) at the horizontal axis and the increase in value (BC) on the vertical axis. The good becomes more valuable as the fabrication of the product moves closer to the stage when it becomes a final good. Assuming that time preference allows foregoing present consumption so that resources can move to investment, an

extension of the Hayekian triangle takes place towards the new production structure (A'B'C').

*Figure 2*  
*Enlargement and change of shape of the Hayekian triangle*



The move towards the new production structure takes place as an expansion (arrow pointed to upper left) and as process of substitution and complementation (arrows pointing to lower left and higher right). The Keynesian framework, for example, regards only the move towards expansion and neglects the function of relative prices and of entrepreneurial action to manage the shape of the structure (curved line) in a continuous process of adaptation. The shaped line represents what is commonly called “business fluctuations”.

Relative price signals alarm and incentive the entrepreneur about bottlenecks that need to be removed and excess capacity that need to be reduced to move on with the expansion towards its final position. Such a “final position”, of course, does not exist in real economic life because the economic process will go on and thus the shape of the Hayekian triangle itself is in constant flux. In the case depicted here (figure 2) the representation shows the shift of resources from consumption to investment in order to expand the production capacity and get a higher value (expansion of the Hayekian triangle). Additionally, preferences indicate a relatively higher share closer to

consumption (difference in shape between original triangle ABC and final triangle A'B'C').

In the figure shown here (figure 2), the move from the original to the final triangle happens in the context of

- a) Change of time preference
- b) Reduction of potential consumption
- c) Increase of savings
- d) Lower interest rate
- e) Change of relative prices

Relative prices of goods and services together with the price for labor and the interest rate as the price for giving up temporarily instant satisfaction serve as the essential tools of information as to how the entrepreneurs should arrange the production structure in a market economy, and it is these signals that also provide the incentives in the ongoing process of capital structuring and restructuring.

Roundaboutness implies a re-shifting of the existing capital structure and as such the process will be accompanied by profound uncertainty of the outcome of the investment in terms of the future consumption demand. The entrepreneurial plan has no other basis than the *expected* profits seen from the *ex ante*-perspective. It is the unexpectedness of specific circumstances when the realization of plans takes place that where the managerial function comes into play. In this sense management is the adaptation to the new circumstances as they emerge *hic et nunc*, as the peculiar circumstances of place and time. Management consists in the transformation of the entrepreneurial into reality as a trial and error procedure under the guidance of the result as it is measured by profit and loss. Business in this sense does not begin or end with “a project”, but is a never-ending process of adaptation of existing capital structures to new circumstances and the revision of expectations and the creation of new visions.

### **Micro- and macroeconomic malinvestment**

Malinvestment takes place in two forms. On the individual business level, wrong investment decisions happen when the entrepreneur misreads the potential demand for his product. This kind of failed investment can be called “*microeconomic malinvestment*”. Competition serves to eliminate those businesses that will commit this kind of misjudgment. Competition serves as a process of selection whereby the successful entrepreneur earns profits and can go on, while the unsuccessful entrepreneur, as determined by the market participants, suffers losses and is forced to retrench or move out of the market. In this respect, market competition works as a

selection mechanism that favors successful action and eliminates unsuccessful entrepreneurial action according to the final judgment by the consumers.

A different case, however, arises with an economic recession or depression, when it is not individual business errors that are the reason for losses, but that the macroeconomic environment has misled entrepreneurial action. The resulting “*macroeconomic malinvestment*” has a different origin and a different phenomenology than *micro-malinvestment*. These macroeconomic malinvestments arise from a systematic falsification of the signals of time preference and of the availability of resources, when a monetary policy has set an interest rate to transmits erroneous information and sends misleading signals about the macroeconomic conditions, and particularly about the feasibility of the degrees of roundaboutness to the entrepreneur.

It is appropriate to differentiate between management errors and entrepreneurial errors. Management errors are failures as the result of bad administration, while entrepreneurial errors have their origin in failed roundaboutness. Failures of miscalculation of roundaboutness can be both of a micro- and of a macroeconomic nature. On the individual business level wrong investment decisions happen when the entrepreneur misreads the potential demand for his product. This kind of failed investment can be called “*microeconomic malinvestment*”. Competition serves to eliminate those businesses that will commit this kind of misjudgment. Competition serves as a process of selection whereby the successful entrepreneur earns a higher profit and can go on, while the unsuccessful entrepreneur, as determined by the market participants, with the consumer as the final arbiter, suffers losses and is forced to retrench or move out of the market. In this respect, market competition works as a selection mechanism that favors successful action and eliminates unsuccessful entrepreneurial action according to the final judgment made by the consumers.

At the micro level these errors are inherent to the competitive process. A typical microeconomic failure of this kind occurs when the competitor comes out ahead with a superior product or beats the lagging company in having selected the better time frame for roundabout production. The successful company beats its competitors by coming out ahead of the losing business by choosing the more effective way of roundabout production. For the losing business which innovated this means that the result may be worse than if it had adhered to the standard production because failed new roundaboutness involves higher costs than the continuation with standard production.

In the long run of economic development, the higher degrees of roundaboutness will bring about productivity gains, but in the day to day operations, the continuation of standard production methods may be less costly and therefore superior to a roundabout production that fails to get out in time ahead of the competitors. If business decisions were simply of the kind to use ever more capital and to apply the latest technology, one could do away with entrepreneurial judgment. Yet it is exactly this specifying decision as to the kind and extension of roundaboutness where entrepreneurial appraisal comes fully into play. Making the right decision on whether to innovate or not to innovate and when to innovate to which degree to innovate sets the good entrepreneurs apart from the rest.

Malinvestment of the macroeconomic kind are the result of policy changes. These may affect only certain sectors of the economy or the economy as a whole. Errors that affect certain sectors of the economy involve all those policy changes that come with regulation, taxation and changes in government spending. These kinds of malinvestment will cause smaller or larger disruptions of the economy and affect the economy's growth potential. Macroeconomic errors proper, however, lie at the heart of economic contractions, when it is not individual business errors that are the reason for losses, or when not only specific sectors of the economy are affected, but when the macroeconomic environment has misled entrepreneurial action in a large scale. The resulting "*macroeconomic malinvestment*" has a different origin and of a different phenomenology than *micro-malinvestment*. These macroeconomic malinvestments arise from a systematic falsification of the signals of time preference and of the availability of resources, when monetary policy translates into an interest rate that transmits erroneous information and produces misleading signals about the macroeconomic conditions and particularly about the feasibility of the degrees of roundaboutness.

While micro-malinvestment business errors tend to cancel each other out and make for an improvement of overall economic efficiency, because the mechanism of selection is also a device of learning and as such serves to promote economic progress, business decisions that are misled by erroneous *macro signals* will result in collective entrepreneurial errors and it is in this sense that "any business cycle theory is essentially a theory of error" (Hülsmann 1998:1). Here the miscalculation of time is the result of an interest policy that has deceived entrepreneurs across the board about the availability of savings. In so far as the interest rate affects any investment decision, the overall business community is enticed to embark upon roundaboutness to a degree that later on to turn out to be too high. This is the case when there is at first a massive boom that will be followed by a massive bust. In this regard the monetary interest rate plays a central role in the entrepreneurial decision if and to what extent roundabout production will be initiated and to what extent it will result in success or failure.

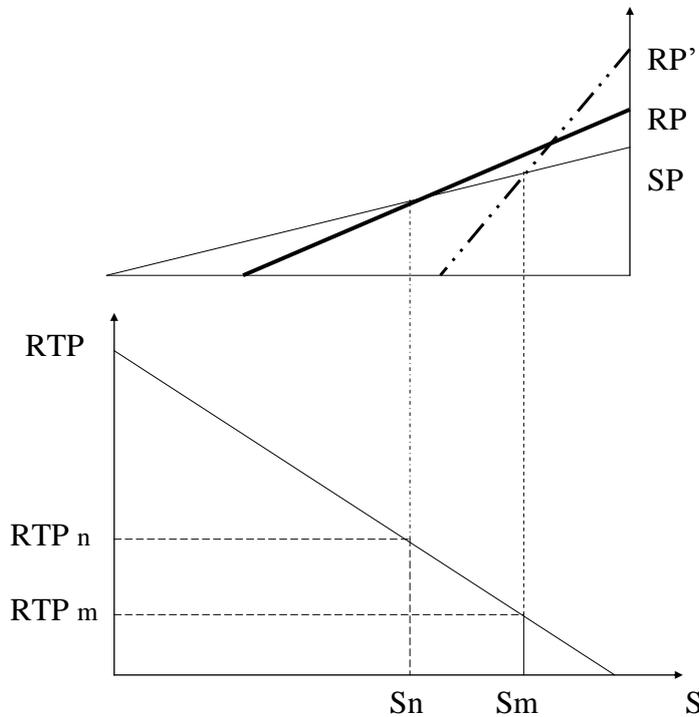
It is typical for the occurrence of macroeconomic malinvestment that a monetary interest rate is brought into existence that does not reflect the availability of savings but the supply and demand for credit. In the modern monetary system, such a divergence is more the rule than the exception because it is not only by monetary policy decisions that such a deviation will be brought about, but such a divergence between the monetary interest rate and the natural rate is also inherent to the workings of a fractional reserve banking system (de Soto 2006). An interest rate that is set too low in relation to a rate which would equilibrate authentic saving and investment induces business to initiate roundaboutness to a degree that is not sustainable given the availability of authentic savings, i.e. that amount of savings that reflects the state of time preference (RTP<sub>n</sub> in figure 1).

The consequence of an additional money supply is equal to an apparent increase of savings ( $S_m - S_n$ , as shown in figure 1), an increase that is not based on the prevailing rate of time preference. In such a case, entrepreneurs are enticed to pursue projects that cannot be finalized (project RP' in contrast to project RP) because consumers are

unwilling to give up part of their demand for consumption goods (as given by  $S_n$  in figure 1).

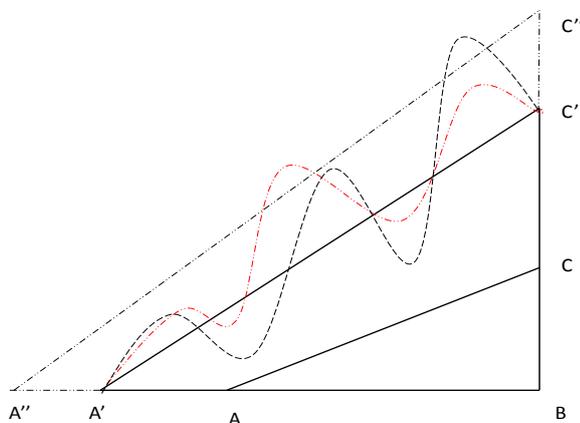
The result on the incongruence will be the emergence of unfinished projects when the expansionary policy has to be abandoned as the economy runs into bottlenecks or creditors begin to panic. In the bust phase “idle resources” will emerge, both in the form of unusable capital and unemployable labor. Yet it is not the existence “idle resources” per se which constitute the economic policy problem, but the underlying causes that point to projects of failed roundaboutness for which the idle resources stand as a symptom.

*Figure 3*  
*Unsustainable Roundaboutness*



With the illusion in place that more recourses were available than there are, business activity would be exposed to extreme fluctuations (see curved lines in figure 4).

*Figure 4 Malinvestment*



In the graphical representation (figure 4) the real availability of resources allows an extension of the Hayekian triangle up to  $A'BC'$ . Yet given that monetary policy has implemented expansionary policy measures and lowered the interest rate below its natural level, businessmen are seduced to expand the structure of production to  $A''BC''$ . In such a case the allocation along the hypotenuse which is guided by relative prices is in conflict with the relative price signal of the interest rate in terms of the relation between present and future goods. In such a case business activity will suffer from heavy fluctuations (curved lines in figure 4) because economy is pushed into a state of disorientation.

As it is the case with other policy interventions, when the price system gets manipulated by policy or distorted institutions have emerged (as it is the case with central banking in the context discussed here) the policy interest rate tends to transmit false signals and provide false incentives. A deviation of the monetary interest from its natural level, from that level which would result from the unhampered interplay between foregone consumption and investment, produces errors that show up in the structure of production. The degree of the implementation of roundaboutness has to be in tune with time preference, the availability of resources in the form of authentic savings and the purchasing power and tastes of the consumers. This coordination gets disrupted when false signals are provided by the interest rate. Central banking falsifies both to the upside in the boom and to the downside in the bust information about the availability of authentic savings. While in the phase of the credit boom, central banks tend to deceive the entrepreneurs with the illusion of an abundance of savings, the opposite happens in the phase of the credit crunch where authentic savings in fact are available but the financial intermediaries hold back lending.

## Entrepreneurial Action

While classical economics focused on the division labor and therefore almost exclusively on the specialization of labor, and identified labor as the main origin of productivity, the approach taken here identifies the creation of the capital structure as the source of increases in productivity. Indeed, capital goods are “crystallized labor”, but the capital structure is the work of the cooperation through completion of the business entrepreneurs. While the workman gets his pay in the form of a salary for working and the capitalist gets interest for waiting, the entrepreneur gets his reward in the form of profits. Profits depend on the degree how well the entrepreneur was able to erect a capital structure that is in tune with the prevailing consumption demands when the structure is ready to produce output. It is quite obvious in this perspective that there can be no certainty about the value of the capital structure *ex ante* and thus for profit. By its very nature, profits are a residual remuneration and must necessarily be so.

The capitalist process that leads to more productivity consists in a process of increasing division of capital and thereby to move the economy towards higher degrees of capital specialization. The increasing division of capital implies a rising level of “structural complexity” (Lachmann 1978:54). At least at this point it must become fully clear to the that a process like that cannot be understood by way of a model that presupposes that capital is homogenous.

Schumpeter (1942) characterized the capitalist process as “creative destruction” because new methods make earlier procedures obsolete. However, the emphasis should be laid more on creativity than on destruction. It is not so much destruction that happens but creative reconstruction because many if not most of the “old” capital parts will be used to create the new structure.

Given that all entrepreneurial activity is directed towards and unknown future, the occurrence of error is essential and cannot be eliminated how elaborate or sophisticate the tools of “prognosis” ever should become. This condition of inescapable speculation is the root of entrepreneurial profit and loss. Speculation implies the uncertainty of success or failure. Even more so, in economic speculation, the actors do not play against machines whose “class probability” (Mises 1998, ch. 6) can be mathematically established, but operate in the context of a social environment of unexpected change where not only the future is unknown but also current price information is incomplete (Lachmann 1957: 22) and where estimates of probability are irrelevant not only because of the uniqueness of decisions (Shackle 1949) but also because of the heterogeneity of the situations (Lachmann 1957:26). The closed character of non-Austrian capital theory has not only expelled the role of the entrepreneur, but with this elimination this theory has also blocked its approach towards an adequate understanding of malinvestment and business failure.

A specific production good does not have a value *per se*, but receives its valuation through entrepreneurial judgment as to the position which the specific production good is to have within the overall process of production and where it is to make, so to speak, “sense”. Production goods with the same physical properties can

have different functions depending on their position in the production process. The various distinct stages of production will have different durations measured by chronological time, as it happens, for example, with the time that it takes to grow a tree as opposed to felling it or transporting it to the factory where a stool is made and from where the piece goes to a store and is exposed in the showroom waiting for this product to be sold and at that very moment to turn into a consumption good.

The value of production goods that are physically similar or seemingly identical attain their specific value by their position within the chain of production which in turn is the result of the entrepreneurial plan guided by the relative prices and the expectation as to the future price of the resulting consumption good. For a specific good to go through the stages of production requires time, and these stages will have different chronological durations, but in the economic perspective each phase represents a different and distinct stage of production whose relevance comes from its position within the arrangement. The definite position that is assigned to a specific production good within the chain of the stages of production is the origin of the value of this specific production good and is derived by entrepreneurial judgment about future demand for the final product. Like in language, meaning is not derived from the individual letter but from its position within a word, and where likewise a word derives its meaning from the context in which it stands, with all of that linked to the purpose of communication.

The concept of capital as roundaboutness based on entrepreneurial plans provides the starting point of distinct theory of the business cycle as it emerged with the contributions of Ludwig von Mises and Friedrich von Hayek. The main contrast between the Austrian approach and other theories is that in the Austrian tradition, capital expansion and its contraction are seen as changes in its longitudinal structure, and expansions and contractions imply a restructuring of the *present* state of the capital structure. “Investment decisions determine not merely, as Keynes would have it, the ‘rate of investment’, but also determine the concrete character of each new capital good ... Each new capital good forms part of a whole and has to fit into a capital combination.” (Lachmann 1953: 117) Thus, in the perspective of Austrian economics, industrial fluctuations are not just the result of a maladjustment between planned savings and planned investment, “but also the result of structural maladjustment caused by the first type of maladjustment.” (Lachmann 1953: 114)

The concept of the stages of production is represented in relation to the point where the production process results in the output of the final good. A natural process of economic expansion occurs as it is given by the sequence of lower time preference first and consequently an increased readiness to sacrifice time. More waiting time allows a shift of resources to the more remote stages of production where roundaboutness is being applied. As its consequence, the production frontier will expand allowing for a higher output later on which by then allows a higher level of consumption. In other words: roundaboutness of this kind means the recognition that before a good can be consumed, it has to be produced at first, and given that time preference has been decreased, higher degrees of roundaboutness can be applied to the earlier stages of production.

## Economic Policy Conclusions

Outside of Austrian economics the subjective, structural and time-consuming aspect of capital formation gets neglected and with it comes the view that it is purely quantitative additions or subtractions to an existing capital *stock* that would count in the process of capital accumulation. Along with this view, many other aspects also get lost such as that capital formation is highly vulnerable to detrimental policy interventions. It is widely accepted that negative legal surprises would induce the entrepreneur to cut back on the degrees of roundabout processes or refrain altogether abstain from initiating them. However, monetary policy changes also will distort the basis of economic calculation. The interest rate plays a central role in the entrepreneurial decision if and to what extent roundabout production will be initiated and to what extent the project will result in success or failure. Typically for the occurrence of macroeconomic malinvestment is a policy interest rate that was set too low in relation to available savings and which later on tends to be set too high by the monetary authorities in order to correct their earlier mistake. The artificially low interest rate induces business to initiate roundaboutness while in the correction phase the higher interest rate now signals that the process has become overextended. The consequence will be that unfinished projects show up whose visible side are “idle resources” both in the form of unusable capital and unemployable labor yet whose hidden nature exists in earlier malinvestments.

An unfavorable business climate will discourage the undertaking of roundaboutness and even if that property rights should be guaranteed, roundabout production will be discouraged when strict anti-monopoly laws and excessive levels of taxation limit the realization of pioneer profits. It is characteristic of new production techniques that they become the standard over time and thus the advantages from innovation will have a limited life span. As much as there is competition between firms regarding to find the right product and product mix, the other major competitive factor is the question what kind of capital to apply. Within an unfavorable business climate mainly in standard production will be invested and more roundabout production procedures will be avoided. When this is the case the economy will suffer from low productivity levels. The application of new forms of new capital is accompanied by uncertainty about the outcome of the investment. These uncertainties extend beyond future demand and include changes of the overall business climate during the process of maturation until the higher productivity will show up in goods production and until the profits can be realized. In an unfavorable business environment productivity will stagnate because more roundabout production procedures will be avoided and standard production methods tend to be maintained. The entrepreneurial plan has no other basis than the *expected* profits seen from the *ex ante*-perspective and as such an essential part of entrepreneurial action exists in imagination.

## Bibliography

Böhm-Bawerk, (1884) *The Positive Theory of Capital*. Auburn, Ala.: The Ludwig von Mises Institute 1971

Garrison, R. W. (2001): *Time and Money. The macroeconomics of capital structure*. London and New York: Routledge

Garrison, R. W. (2005): The Austrian School. Capital-Based Macroeconomics, in: Brian Snowdon and Howard R. Vane: *Modern Macroeconomics. Its Origins, Development and Current State*: Aldershot. Edward Elgar

Hayek, F. A. (1929): *Geldtheorie und Konjunkturtheorie*. Wien 1929 (English version: *Monetary Theory and the Trade Cycle*. New York 1966: Augustus M. Kelley

Hayek, F. A. (1931): *Prices and Production*. New York: Augustus M. Kelley

Hayek, F. A. (1941): F. A.: *The Pure Theory of Capital*. Chicago: University of Chicago Press

Hayek, F. A. (1984): Intertemporal Price Equilibrium and Movement in the Value of Money, in: *Money, Capital and Fluctuations. Early Essays*. Chicago: The University of Chicago Press, pp. 71-117

Hennings, K. H. (1997): *The Austrian Theory of Value and Capital*. Studies in the Life and Work of Eugen von Böhm-Bawerk. Cheltenham and Brookfield: Edward Elgar

Herbener, J. M. (2002): After the Age of Inflation. Austrian Proposals for Monetary Reform. *Quarterly Journal of Austrian Economics*. Vol. 5. No. 4 (Winter 2002): 5-19

Holcombe, R. G. (2003): Progress and Entrepreneurship. *Quarterly Journal of Austrian Economics*. Vol. 6. No. 3 (Fall 2003): 3-26

Horwitz, S. (2000) *Microfoundations and Macroeconomics*. An Austrian Perspective. London and New York: Routledge

Hülsmann, G. (1998): Toward a General Theory of Error Cycles. *Quarterly Journal of Austrian Economics*. Vol. 1, No. 4 (Winter 1998): 1-23

Knoop, T. A. (2004): *Recessions and Depressions*. Understanding Business Cycles. Westport and London: Praeger

King, J. E. (2002): *A History of Post Keynesian Economics Since 1936*. Cheltenham and Northampton: Edward Elgar

Lachmann (1978): *Capital and Its Structure*. Kansas City: Institute for Humane Studies

Lewin, P. (1994): *Capital Theory*, in: The Elgar Companion to Austrian Economics, ed. by Peter J. Boettke. Cheltenham, UK and Northampton, Mass: Edward Elgar, pp. 209-215

Lewin, P. (1999): *Capital in Disequilibrium. The role capital in a changing world*. London and New York: Routledge

Menger, C. (1871): *Principles of Economics*. Auburn, Ala. The Ludwig von Mises Institute 1994

Mises (1912): *Theorie des Geldes und der Umlaufsmittel*. Auburn, Ala.: Ludwig von Mises Institute 2010

Mises, L. v. (1998): *Human Action. A Treatise on Economics*. Auburn. Ala.: The Ludwig von Mises Institute

O'Driscoll and Rizzo (1985): *The Economics of Time and Ignorance*. London and New York: Routledge

Salerno, J. (2010): *Money. Sound and Unsound*. Auburn. Ala.: The Ludwig von Mises Institute

Schumpeter (1942): *Capitalism, Socialism and Democracy*. London and New York: Routledge 1994

Soto, H. de (1998): *Dinero, Crédito Bancario y Ciclos Económicos*. Madrid: Unión Editorial. English translation: *Money, Bank Credit, and Economic Cycles*. Auburn: The Ludwig von Mises Institute. 2006

Strigl, R. (1934): *Capital and Production*. Auburn, Ala. The Ludwig von Mises Insitute. 2000