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"Monetary Policy and the Business Cycle in the Perspective of Capital-based Macroeconomics" by *Antony P. Mueller*

ABSTRACT

In this paper the notion is challenged that when an economy achieves high rates of economic growth along with price level stability, monetary policy would be at an optimal stance. It is demonstrated how active central banking will initiate boom-bust cycles by fostering the emergence of unsustainable production structures and why central bank authorities tend to be misled by their data analysis of the price level, of economic growth and if employment.

At the theoretical level, the paper is a contribution to the integration of capital theory into monetary and macro theory. Based on the stages of production model it is shown how business cycles emerge and develop and how misleading interest signals as the result of central bank policies bring about unsustainable production structures. This approach allows bridging the gap between micro- and macroeconomics and between the short run and the long run analysis.

Putting Capital back into Macroeconomics

Based on Böhm-Bawerk's concept of capital (Böhm-Bawerk 1884) and the Mises-Hayek's business cycle theory (Mises 1912, Hayek 1931, 1941) the following expositions are an extension of the modern versions of capital-based macroeconomics. Garrison (2001, 2005), Selgin (1997), Salerno (2002), de Soto (1998), Lewin (1999), Cowan (1997) and Horwitz (2000) have presented studies of the role of monetary policy as the promoter of the business cycle using some of the analytic tools that are common in neoclassical economics and have put the Austrian approach into the context of Keynesian, monetarist and rational expectations theories. Garrison (2005) in particular has advanced the Austrian theory of the business cycle by developing an approach that links standard macroeconomic modeling with the Mises-Hayek theory of the business cycle.

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 macroeconomics. Modeling capital as heterogeneous represents a fundamentally different perspective compared to standard neoclassical synthetic modeling. 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 dealing with uncertainty. The realist postulate of the heterogeneity of capital in terms of production goods draws attention to the stages of production and the complexity of capital structures.

Most economic theories treat capital (if it is mentioned at all[1])as something that has been already produced and exists in a homogeneous form that can be simply increased by more capital investments in order to compensate for depreciation and to expand the capital *stock.* While this approach reduces the economic problem mainly to exchange, the Austrian tradition treats capital not as a homogeneous entity, but as a process that is ordered and structured by entrepreneurial plans and refers to heterogeneous production goods. The heterogeneity of capital implies that the capital structure is built up as combinations consisting of complementary elements that are arranged by an entrepreneurial vision (Lachmann 1978:12). The logic of capital is the vision of the entrepreneur who arranges the capital goods in a way that he deems appropriate to meet future demands. Capital in contrast to labor has no natural dimension. It is only by the entrepreneurial or managerial plan that the capital structure will gain its coherence (logic) and thus its valuation.

Only in its monetary representation, as an accounting concept (Mises 1998:231 et passim), could capital be thought of as being homogenous, and as something from which additions and subtraction could be made without affecting its *structure*. As real capital, in its existence as heterogeneous capital goods, capital has no natural unit of measurement other than entrepreneurial valuation based on vision and expectation. Beginning with Böhm-Bawerk (1884), the heterogeneity of capital as an ordered production structure forms the starting point for the Austrian theory of capital. Many fruitless disputes have emerged because the critics of the Austrian theory of capital did not recognize this point of departure and

[1] 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)

instead have continued using a concept of capital as if it were homogenous and as such measurable in real terms simply by deflating the nominal aggregate.

As Böhm-Bawerk explained, "… 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]."[2]

What is it, so Lachmann (1978, p. XV) asks 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, a vision of the future, to the present. The valuation of capital is not causal but teleological and volitional, and it is grounded in human action with its basic elements of time, stages, and purpose.

In contrast, neoclassical macroeconomics puts the capital structure in a black box called K from where the output Q emerges. From this the divide between micro- and macroeconomics has emerged that relegates production and cost analysis to microeconomics and elaborates the exchange features, while macroeconomics deals with the large aggregates – consumption, investment and government expenditures – or the price level and real and nominal national income aggregates. In this respect there is little difference between the "economics of Keynes" and the hyphen-Keynesian and the new hyphen-classical economists and monetarism.

In neoclassical economics, capital is a variable K, and investment (I) is seen as an simple addition to capital ($I = \Delta K$), while the production function is a black box between the input factors such as nature (N), labor (L), capital (K) and technology (T) and the final real output (Q). It is assumed that it would be possible to make a clear separation between the

[2] 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)

different factors of production as to their specific contribution to output. In this framework, it is assumed that these factors could be neatly separated and that there is no connection between capital and the human entrepreneurial mind. This approach is incapable of recognizing that the production of capital requires first of all an entrepreneurial idea, and that production comes into existence through human action based on an idiosyncratic and on anex ante improvable view about future market conditions.

What nowadays is called "macroeconomics" can be condensed as to its basic structure into a production function (equation I), and the Keynesian aggregation (equation II) with its sub-aggregates consumption I, investment (*I*) and government expenditure (*G).*

(I) $Q = A(\tau)\theta(K, N)$

(II) $M \times V = P\,(Qc) + P\,(QI) + P\,(QG) = Y$

The monetarist aggregation (equation III and IV) largely disregards the composition of output by concentrating on the relationship between the money stock (*M*) and the prices level (*P*), and puts emphasis on partially disaggregating the various monetary aggregates as to their degrees of liquidity, ranging from money zero maturity (*MSM*) to higher aggregates (*M1* to *Mn*), and in terms of their relation to the monetary base (*MB*) and to the monetary multiplier (m).

(III) $M \times V = P \times Q = Y$

(IV) $M = m \times MB$

(V) $M = (MZM, M1, ..., Mn)$

Böhm-Bawerk's concept of capital provided the starting point of a distinct Austrian 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.

In modern textbook macroeconomics, capital investment and depreciation are regarded as simple additions and subtraction from a given a-historical capital stock. This view amounts to more than only a specific analytical device, because it systematically excludes the structural aspect of capital. Through this convention the essential elements of capital get lost in over-abstraction and over-simplification. With the concept of capital as a homogeneous

unity, the erroneous idea emerges that the demand for capital and labor would be determined by aggregate expenditure.

In the Austrian version, the stream of goods is maintained by incessant adaptation to local and temporary conditions – guided by the purposive human action to avoid losses and gain profit. The stabilizers of this system are the individual economic agents guided by relative prices (Hayek 1984:18) as they observe (information) and heed (incentive) the signals. The interest rate is the major signal to provide orientation as to the *intertemporal* allocation of available funds. Probably the most important insight of Hayek's contribution to the Austrian theory of capital is that capital is scarce in the specific sense that there exist more opportunities (including technological options) than can be realized given the present state of funds as they come from savings. There is a basic trade-off in place between the demand for consumption goods and investment goods, i.e. between consumption and savings or between lower consumption now in favor of higher consumption later on and higher consumption now at the cost of consumption that could otherwise have been higher in the future.

Relative prices of goods and services together with the price for labor and the interest rate as the price for waiting serve as the essential tools of information as to how the entrepreneurs should arrange the production structure, and it is these signals that also provide the incentives in the ongoing process of capital structuring and its restructuring. As it is the case with other policy interventions, when the price system gets manipulated by policy and thereby distortions of supply and demand are brought about, monetary interventions will falsify the interest rate and produce a deviation from its natural level, as it would otherwise result from the unhampered interplay between foregone consumption – authentic savings – and investment. The production of capital goods has to be in tune with intertemporal preferences, the availability of resources (authentic savings) and the tastes of the consumers. This coordination gets disrupted when false signals are provided by the policy interest rate.

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 is being applied that 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, because the policy rate is set higher or lower than the unhampered interest rate would be.

As to the micro-malinvestment, individual business errors tend to cancel each other out and make for an improvement in efficiency, because the mechanism of selection is also a device of learning and thus entails likewise a mechanism for economic progress. However, when business decisions are misled by erroneous *macro signals*, entrepreneurs will fail collectively, and it is in this sense that "any business cycle theory is essentially a theory of error" (Hülsmann 1998:1).

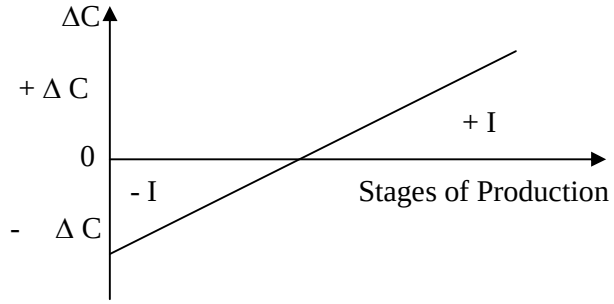
The effects of erroneous macro signaling are asymmetrical: while the false signals from monetary policy in the expansionary phase induces an avalanche of incompetent entrepreneurs, the consequent slump also affects the competent entrepreneurs and along with the loss of jobs and capital, the correction phase brings about a loss of entrepreneurial talents.

Roundabout Production and Productivity Gains

Any capital enhancement requires time. In this sense, roundaboutness entails 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. 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. Modifying the Hayekian triangle (Hayek 1931 and Garrison 2001), this process can be diagrammed in a way that highlights the element of waiting and the sequential and time-consuming process of roundabout production (see figure1).

Figure 1

Trade-off between present consumption and roundabout production



In this graphical representation (figure 1) the trade-off between present consumption (change in the rate of current consumption ΔC) and more raoundabout production (movement along the stages of production line to the right) is shown. The graph represents the changes of consumption – or in a non-stationary economy the changes in potential consumption – on the vertical axis, and depicts the stages of production on the horizontal axis. In this figure, more roundaboutness means moving along the stages of production axis to the right signifying a higher degree of waiting and more stages of production that are required for the production process to deliver the increase 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 likewise whether producing a simple meal or a book or a high-tech product. Production takes place in time, but it is not chronological time or averages of chronological time that counts, but "economic time", i.e. time defined in terms of the arrangement of production stages. 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 the specific production good within the overall time-consuming process of production. The definite position that is assigned to the 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 his estimated future demand for the final product. 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 the good to the store and expose it in the showroom waiting for this product to be sold. 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 vision guided by the relative prices and the expectation as to the future price of the resulting consumption

good. 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 individual letter but from its position within a word, and a word derives its meaning from the context in which it stands, while the context is derived from the purpose of communication.

In the graph above (figure 1) the negative change of consumption (- Δc) represents a decrease in consumption in relation to the existing production structure as represented by the horizontal line in the graph. In a growing economy the ΔC therefore signifies increases or reductions of consumption potential. In contrast to consumption, investment in the various stages represents not changes, but represents investment as a flow. Investment flows along the straight line to the right that represents the stages of production show increasing degrees of roundaboutness or a move towards the so-called higher stages of production.

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 and those investments closer to consumption to investment in the higher stages of production. Accordingly, investment that is closer to the consumption point (left side of the stages of production line) will experience a decline of potential investment together with the reduction of potential consumption.

Investment decisions require an entrepreneurial vision. It is not only “alertness” (Kirzner 1973) that is needed which would imply basically costless profits from discovery, but the pursuit of productivity gains demands purposive action towards technical and administrative progress (Holcombe 2003). In the mechanistic view of non-Austrian macroeconomics, investment responds automatically to demand and the entrepreneur is eliminated or reduced to either an automaton or a non-human being ruled by animal spirits. In such a world, no visionary roundabout production can happen. In the perspective of Austrian economics, the entrepreneur is the essential link between the market signals and the capital structure. This task is quite different from that as it is modeled otherwise in 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.

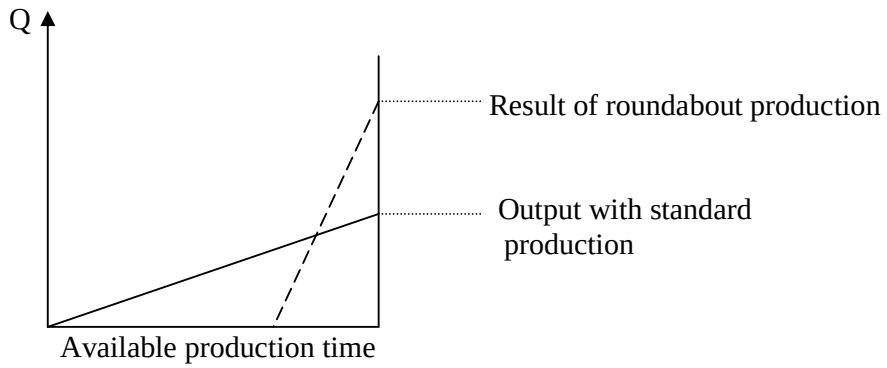
Investment in new equipment requires time until the results will show up. It is in this sense that vision and purposeful action is required to bring it about. In the Austrian view,

therefore, 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 as it is guided by economic calculation 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. Expected results of roundabout production must be substantially higher than those that are given by the currently applied conventional production methods, because roundabout production requires waiting time, a re-shifting of the existing capital structure, and because it will be accompanied by the profound uncertainty of the outcome of the investment in terms of the future consumption demand not to speak of all the other uncertainties as to the changes of the overall business environment during the process of maturation until the higher productivity shows up in goods production and until the profits can be realized. The entrepreneurial vision has no other basis than the *expected* profits seen from the *ex ante*-perspective. Any action of this kind will also bring about unexpected results and it is then when the managerial adaptation comes into play. Management then is the adaptation to the new circumstances as they emerge *hic et nunc* that consist in the transformation of the vision into a trial and error procedure under the guidance of the result as they are measured by profit and loss and as these show up only step by step in a never-ending process of adaptation and the revision of expectations and the creation of new visions.

In the following graph (figure 2) roundabout production is graphed in its relation to standard production results. The graph shows the consequence of roundaboutness in terms of productivity that results from the application of better capital. In relation to an existing standard production procedure or recipe, investment in roundabout production implies a waiting time when the output from the new procedure is below the standard production. In the graph as shown below (figure 2) the break-even point in relation to the standard production comes only after an extended period of time until the output of the new procedure exceeds those that come from the application of the standard production. In order to embark upon such a venture, the subjectively expected profits must be considerable higher than those that come with the application of the standard production procedure.

Figure 2

Roundabout production results versus standard production results



While classical economics focused on the division and therefore of the specialization of labor, and identified it as the main origin of productivity, the approach taken here in the Austrian tradition identifies capital as the other major source of increase in productivity. The capitalist process that leads to more productivity consists in a process of increasing division of capital or rather to higher degrees of capital specialization. One can also say that the increasing division of capital implies an increasing level of "structural complexity" (Lachmann 1978:54) of capital. A process like that cannot be grasped by a model that presupposes that capital is homogenous.

Schumpeter characterized the capitalist process as "creative destruction" because new methods make the predecessor procedures obsolete. However, the emphasis should be laid more on creativity than on destruction. It is not so much destruction that happens but creative restructuring because many if not most of the "old" capital parts will be used to create the new structure. As it shows up in the graph above (figure 2), the elapse of time that is involved with implementing the roundabout process implies that for a time, the output of the new method will be below the standard procedure, and it is only once the roundabout process of production comes on-stream when the standard production forms will be eclipsed.

In this perspective, it also shows up that an unfavorable business climate will discourage the undertaking of roundaboutness and that even if property rights are guaranteed, roundabout production will be discouraged, when strict competition laws and excessive levels of taxation limit the realization of higher profits. It is characteristic of new production techniques that they become the standard over time, and thus market advantages from innovation invariably have a limited life span. As much as there is competition between firms regarding the right product, 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. This way, increases in productivity cannot be achieved.

Outside of the Austrian economics approach 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. Along with this view, many other aspects also get lost such that capital formation is highly vulnerable to detrimental policy interventions. This is widely accepted as it refers to legal surprises that induce the entrepreneur to cut back on the degrees of roundabout processes or refrain altogether from entrepreneur to cut back on the degrees of roundaboutness or altogether abstain from initiating them. However, monetary policy changes, too, will distort the basis of economic calculation. The interest rate, as the price for waiting, will play a central role in the entrepreneurial decision if and to what extent roundabout production will be initiated and to what extent they will result in success or failure. Typically for the occurrence of macroeconomic malinvestment is a policy interest rate that was set to low in relation to available savings and which later on will be set too high by the monetary authorities in order to correct their earlier mistake. The artificially low interest rate induces business to embark upon 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 abound whose visible side are the emergence of "idle resources" both in the form of unusable capital and unemployable labor.

Money in Capital-Based Macroeconomics

Economic models do not represent reality, but are constructed in order to provide orientation and a framework of analysis. Behind every economic phenomenon and each macroeconomic magnitude lies individual human action. It is this double reference, the micro-macro relation, that constitutes the macroeconomic problem *sui generis*: the coordination of individual action within a specific economic environment, particularly those conditions that are common to all economic agents, as they are given by the main means of economic communication, such as money and the interest rate as its signaling complement. Although money gains existence only through individual human action, it also has a meta structure and in this respect, money is similar to language or the legal system. In a functional perspective, money serves as an essential tool for coordinating individual human actions and of communicating economic issues within society.

Monetary policy affects the longitudinal structure of capital. Money expansion comes along with new credit and represents additional expendable cash balances. This mechanism lies at the heart of Wicksell's loanable fund model. An increase of the money supply will augment the supply of loanable funds beyond authentic savings, and, *ceteris paribus*, the monetary interest rate will fall below its natural level in the market for loanable funds. With more money supplied to the market beyond authentic saving, the loan-takers are deceived about the sustainable size of funding and embark upon credit-financed expenditures that are not matched by the availability of resources that would be needed in order to maintain an extended capital structure. Monetary expansion augments aggregate demand and thereby nominal national income. In real terms, however, the supply side conditions of the economy represent a production possibilities frontier that will limit debt-driven demand. Monetary expansion that comes with higher expenditures, but without a corresponding expansion of the supply side results in price inflation.

This is also acknowledged by current standard macroeconomics. In the aggregate supply and demand model (AS/AD), as it has become a textbook macroeconomics tool, the intersection of the two curves determines the price level and output. The capacity of the economy to produce goods and services has a limit, which is the availability of the factors of production. A monetary expansion will increase aggregate expenditures, but it cannot augment at the same pace the availability of resources. The AS/AD analysis demonstrates the futility of trying to produce higher economic growth by expanding the money supply and shows how negative supply side shocks cannot be countered by demand side policies. A negative supply side shock would move the supply curve to the left, resulting in an economic contraction and an increase of the price level that together define stagflation. Given the constraint that is represented by aggregate supply, demand expansion would not result in higher real growth but in a higher price index.

This textbook AS/AD model, however, suffers from over-aggregation and is devoid of a microfoundation[3]. In particular, its concept of capital suffers from the deeply unrealistic concept common to most non-Austrian approaches in which capital is modeled as homogenous. The aggregate supply and demand model is basically a Keynesian model that shows that Keynesianism does not work.

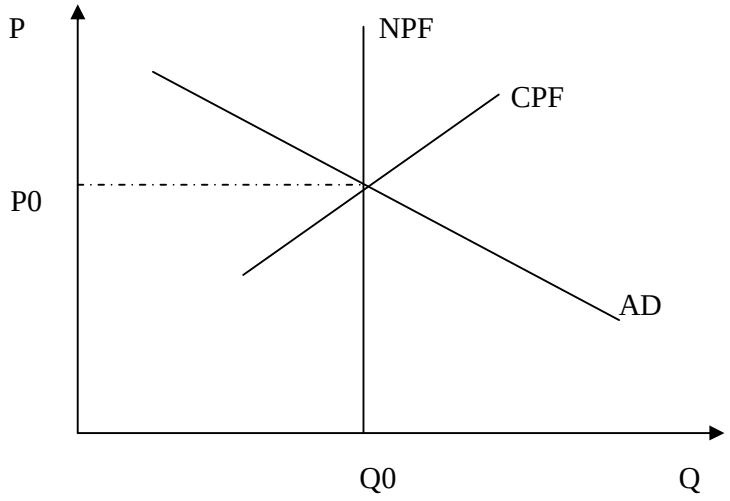
In order to demonstrate the limits of money-induced economic expansion, a different kind of model is needed. In the graphical demonstrations below, a model is presented that differentiates between a natural production frontier and a cyclical production frontier (figure

[3] With a few exceptions such as in the textbook by Baumol and Blinder (1997, pp. 628), who use cost and profit as the analytic foundation of the aggregate supply curve.

3). In order to establish a macroeconomic natural and cyclical production frontier, one does not need to derive these from the concept of the economy as a whole, or from a representative company. As an *empirical generalization*, specific abstraction leads to an *ideal type* – or more precisely, the concepts represent an idealized state of affairs. This way, the natural production function represents an economy where companies produce at an output levels so that there is no pressure to increase prices or to cut back on investment and labor in a collective form. In this perspective, "optimality" considerations have no place. Rather, the concept of natural and cyclical production possibilities frontier as presented here, should be seen as a normative concept in the logic of human action. From the perspective of human action the water for taking a bath will be judged to be too hot or too cold or more or less right. Likewise, in the form of an empirical generalization, businessmen have a norm whether their current business activity is beyond or below the natural level. Thus, the cyclical component – as depicted in the cyclical production possibilities frontier (CPF) – would refer to a situation, where the economy moves towards overheating or is suffering from idle capacity.

Figure 3

Natural and cyclical production possibilities frontiers and aggregate demand



Although at first glance the graph (figure 3) resembles the AS/AD model, the analytical content is of a different nature. The economic unit in this model is not "the economy", but the firm, and the production possibilities frontiers are not derived from a production function. The natural production possibilities frontier represents that level of output, which is congruent with the availability of resources as it is given the current state of the factors of production. For companies it is only temporarily manageable to produce at maximum potential or to know *ex ante*, which would be the optimal output. Instead, actual

production will oscillate around this natural level, which serves as the managerial guidepost or norm to differentiate between overheating and slack. As it is with the stages of production, the praxeological meaning of the natural and cyclical production is an ideal type that is gained through specific abstraction. As to the microeconomic foundation, one can refer to a supply model where the cyclical production possibilities frontier is derived from the marginal cost curve. In a microeconomic supply model of this kind, the vertical curve represents the natural state of business affairs while the cyclical production possibilities frontiers curve shows the variation possibilities that result from a given state of the factors of production that are embedded into the company's overall investment. In this sense the production possibilities frontiers represent states of affairs where the firms work at certain output levels that are judged as natural or cyclical by the entrepreneur and are represented as the two curves NPF and CPF.

The graph (figure 3 above) allows the definition of types of economic growth (negative and positive) and of economic fluctuations. The first kind would be an expansion of productive capacity that would shift the natural production possibilities frontier (NPF) to the right, while a loss of productive capacity, would show up as a movement of the NPF curve to the left. These kinds of positive and negative economic growth represent changes in real terms and reflect the productive capacity of the available factors of production. An economic expansion only in nominal terms would occur with rising demand that is not matched by real capacity. In this case, the aggregate demand curve (AD) would move upwards, while a contraction in nominal terms would be represented by a downward shift of the AD curve. Along the curve that represents the cyclical production possibilities frontier (CPF) movement along the cyclical production possibilities frontier curve from left to right up to the natural production possibilities frontier would be an economic expansion in form of an economic recovery, while a further movement along the cyclical production possibilities frontier beyond the natural frontier would constitute an economic boom.

In contrast to the AS/AD model, the macroeconomic *interpretative* framework of the model presented here can be provided by the equation of exchange

(VI) $M \times V = P \times Q$

(VII) $(MV/P) = Q$

The supply side in the model represents the "goods" sides as it shows up on the right hand side of the equation of exchange, while the demand side represents the "money side" as it is given on the left side of the equation of exchange. Following Hayek, a distinction is made between *Güterseite* (goods side) und *Geldseite* (money side) in-so-far as "changes in the price level coming from the 'goods side' are not merely not detrimental but are even necessary if disturbances of equilibrium are to be avoided" (Hayek 1984:100).

The "goods side" represents production as it happens at the level of firms. The money side represents demand in the form of aggregate expenditure. Money constitutes a common link between *all* of the parts of the economy. At the macroeconomic level demand equals total expenditures as it is represented by the equation of exchange. In this respect aggregate demand is linked to the money supply and money supply is linked to the velocity of money circulation. In the diagram, the natural production possibilities frontier shifts as the result of changes in the availability of the factors of production and their productivity, while the aggregate demand curve reflects changes on the left side of equation of exchange, i.e. money and its velocity of circulation. New ideas and the application of roundabout production would shift the NPF to the right. Given a fixed money supply, real wages (w/P) would rise as the result of a falling price level through the increase of purchasing power (1/P). The cyclical element would play no major role other than in terms of what was once called business fluctuations.

Without active central banking oriented toward specific monetary goals and fiat monies as their tool, and without a fractional reserve banking system, the constraints on the money supply would hold back the boom and thus bring the economy on a path to gradual adaptation. There would be no space for making economic actors think that scarcity had disappeared. The limited availability of credit would make the entrepreneur rely on generated profits, and it would force the consumers to live within their means. Loanable funds would come from the savings out of income, and thus the additional resources for investment would only be set free when savers gave up on higher consumption for some time. Without central bank intervention, the natural rate of interest is not artificially changed by central bank intervention, and the economic expansion is led by productivity gains and funded by authentic savings.

In a credit-driven boom, however, the increase of loanable funds is provided by the monetary expansion and as such it is not congruent with savings out of income. With the interest rate artificially lowered, the competitive situation forces business to expand production. The economy moves along the cyclical production possibilities frontier. Without

credit expansion, demand follows supply; under the condition of monetary expansion, supply is forced to catch up with higher nominal demand that comes from the credit injection. The natural path of the expansion will be transformed into an economic boom.

Sequence of Credit-Driven Booms

In the diagrams shown above (figures 1 to 2), roundaboutness results in higher productivity and allows an increased level of consumable output. Roundabout production is time consuming and requires that for some time consumption or potential consumption is given up in favor of a restructuring of the production process and the shifting of investment away from immediate consumption towards the higher stages of production.

With the inception of active economic policy and modern central banking, this natural process of economic progress has undergone a profound change. In contrast to the situation of passive central banking, modern central banks aim at maintaining a certain inflation rate (falsely called "price stability"), and together with their respective governments, they try to push economic growth (as it get falsely measured by deflating nominal national income). The inflationary bias has characterized modern central banks since they were institutionalized as fiat money managers. Typically, modern central banks define "price level stability" as a positive range of the consumer price index or call their policy aim right away "inflation targeting".

The inflationary bias of modern central banks lays the groundwork for the occurrence of boom and bust cycles. In the absence of substantial technological progress, modern central banks produce inflation, while in periods of intensive technological progress they may achieve lower inflation rates, but thereby they produce credit-driven booms that do not show up immediately in the consumer price index. Modern central banks transform productivity-led economic expansion into credit-driven economic booms that are unsustainable. Assured that there is no excessive inflationary risk, modern monetary policy managers feel relieved to apply more expansive measures and thereby they will produce a monetary interest rate that lies below its natural level. This policy moves the economy to higher debt levels. Productivity gains make it possible that credit expansion comes without price inflation as measured by the consumer price index. In tune with the fractional reserve banking system, booms get extended along with the bust.

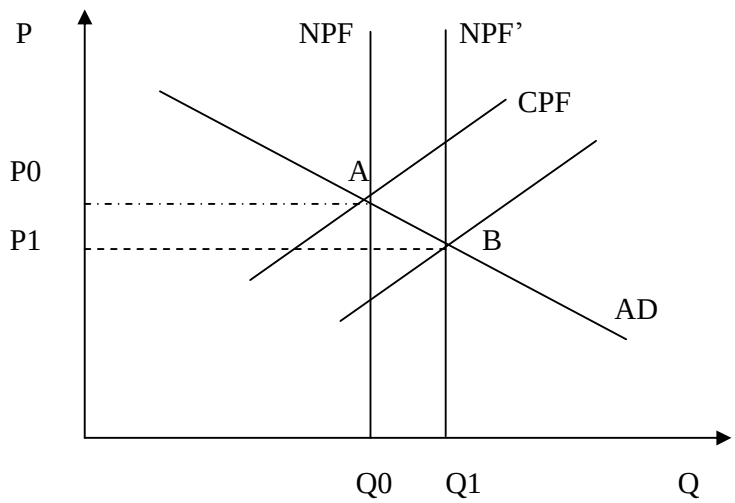
In the graph below (figure 4), roundabout production brings about an economic expansion that shifts the natural production possibilities frontier to the right (Q0 to Q1). The equilibrium point moves from A to B. The new equilibrium point B comes along with a lower

price level (P1). This natural deflation implies a higher purchasing power, and the productivity increase brings down the cyclical production possibilities frontier (from CPF to CPF').

At point B the economy works at a higher output at a lower price level. The economic expansion has occurred in natural way through the application of roundaboutness based on foregone consumption without exogenous changes on money. Neither M nor V need change (left hand side of the equation of exchange), as the changes occur on the right side in compensatory fashion where the higher Q is matched by a lower P.

Figure 4

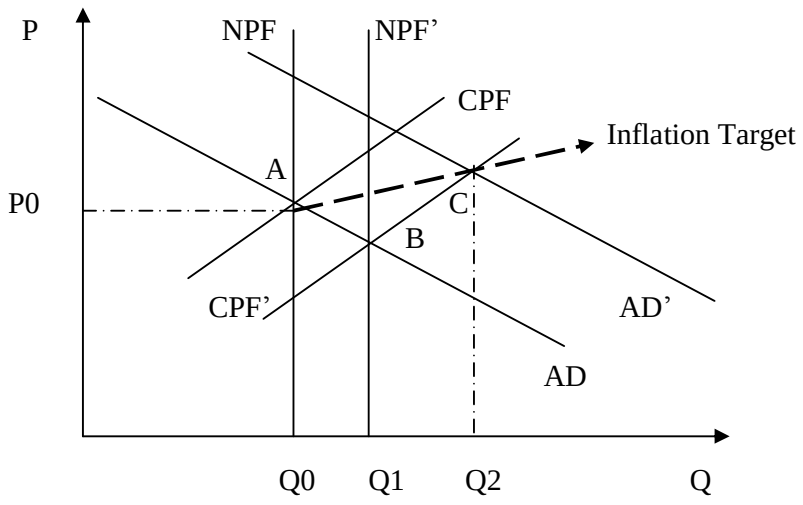
Shift of the Natural Production Possibilities Frontier



If, however, expansionary monetary policy gets applied in pursuit of the policy goal of inflation targeting, the demand curve (AD to AD') shifts rightward (see figure 5 below), the economy is pushed along its cyclical possibilities production frontier into an unsustainable boom. Instead of producing the higher output at a lower price level, inflation targeting produces an additional economic expansion as boom (move from B to C with Q1 rising to Q2) that comes with a higher price level that is deemed to conform to the *past* point of reference as to "price stability".

Figure 5

Monetary policy-induced expansion of aggregate demand



By increasing the money supply, the inflation target will be achieved, and the economy will experience an additional boost, an expansion that now comes from the demand side. Central bankers then claim to be fully vindicated as high economic growth in a non-inflationary environment has occurred. However, this kind of economic expansion is quite different from a movement that would have happened without central bank intervention. By not letting deflation happen as the natural consequence of productivity gains or other improvements of the factors of production, central banks transform an economic expansion that began on the supply side into a demand-led and credit-driven boom.

Under current central banking policies, such monetary expansions in the face of an on-going "threatening" deflationary trend may be repeated several times. Each time when the central bank authorities fear deflationary potential, they will be inclined to augment the money supply, thereby pushing the economy to higher debt levels. The transformation of the original expansion based on productivity gains into a boom implies that with each intervention the debt levels are brought to higher levels. Businessmen cannot simply opt out and renounce new credit that is offered at these low interest rates. Competition forces the individual business to invest in new capital procedures as soon as it becomes financially obtainable to do it. In the practical business situation there is neither place nor use for "rational expectations". The interest rate works like any other price. In the same way that businesses will increase or reduce production when prices are raised or lowered by

interventions in the goods markets, they must react likewise to the interest rate be it above or below the natural market equilibrium.

When central banks continue to expand the money supply even when the productivity increases begin to peter out or when adverse supply-side shocks occur, the excess liquidity will show up in the form of overt price inflation. When productivity increases slow down, the overall monetary expenditures are confronted with the vertical supply function. Further expansions of the money supply will only bring about higher rates of price inflation. At this stage, monetary policy transmits directly into the price level. While savings together with new ideas as to how production could be improved shifts the natural production possibilities frontier to the right, allowing for a higher purchasing power of money and thus for a higher standard of living, modern active monetary policy together with the aspirations of government to achieve higher economic growth, exert pressure towards taking advantage of this natural way of economic progress and assume that there is a chance to bring about higher growth without a substantial increase of the inflation rate as measured by the consumer price index rate or even believe that a higher standard of living can be achieved simply by spending more in nominal terms .

For modern monetary regimes, with central banks that are closely linked to highly indebted governments, deflation presents a threat. The motive to take advantage of the chance to produce higher growth without consumer-price inflation, will dominate central bank policy leading to the application of expansive monetary measures and thereby increasing aggregate expenditures. In the graph above (figure 4), the aggregate demand curve will shift to the right (AD to AD'), output will expand beyond its natural level (from Q1 to Q2), and the price level moves up beyond its earlier level and exceeds the reference point of price level stability (P0) aiming to attain an acceptable inflation target such as a two or more per cent annual increase. Such a monetary policy produces a situation, where *both* consumption *and* investment goods are in higher demand and puts strains on the supply resulting in a higher price level. Because monetary expansion is brought about by lower interest rates, businesses will initiate more roundabout production, and, under modern conditions, consumers as well will ask for more loans. In contrast to a situation where the more roundabout process is being enabled through a resource shift from consumption to higher order goods as it is given by the trade-off between investment closer and further away from final consumption (as shown in figure 2), a monetary expansion increases overall expenditures, including that for final consumption, while at the same time the falling interest rate calls for an extension of the production process and for more consumption.

Scarcity of resources puts a limit on this process and brings about a clash of plans between those economic actors that plan to increase consumption and those that plan to increase roundaboutness. Confronted with unrealizable demand, prices for the factors of production will increase. The equilibrium position that has moved from A to B (figure 5), is pulled to C by higher expenditures. This point, however, is not stable because economic plans are not attainable with available resources. Wages and prices will tend to rise, shifting the cyclical production possibilities frontier upward to its original position (leftward move of the CPF' curve). In this situation higher prices are accompanied by a falling output and stagflation happens.

By fighting a notionally dangerous deflation, monetary policy has produced first an unsustainable boom that leads to price-inflation later on. Should monetary policy now, confronted with visible outbreak of price inflation, switch policies, and initiate a restrictive monetary policy in order to fight inflation, the higher interest rate would reduce aggregate demand, and the equilibrium would move back to point A, producing a recessionary contraction of the economy. If, however, the central bank should continue with expansive monetary policy, the economy would be pushed upward along the natural production possibilities frontier, and the process of higher demand would also push up the cyclical production possibilities frontier. In this case, the result would be a higher inflation combined with stagnation first, and a recession later. Central bank authorities are confronted with the dilemma of choosing between hyperinflation and stagflation.

However, the story does not end here because the exogenously imposed planning error that is put upon the business community entails a massive discoordination in the economy that in turn provokes a shrinking production capacity. In the longer run it is therefore most likely that the curve of the natural production possibilities frontier would shift to the left reflecting failed business ventures and a loss of confidence. By producing the artificial boom, the central bank policy has brought about massive malinvestments and disrupted the subtle coordination process of the market process due to false signals as to the degrees of feasible roundaboutness and the availability of savings.

The expansion phase has brought about unsustainable production structures that have to be abandoned. Central bank action has transformed the earlier deflationary tendencies into inflationary pressure and then applied measures to curb this tendency in order to bring about disinflation. By this process confidence in the business community necessarily will decline. What has happened due to policy intervention has been a structural weakening of the economy's productive capacity. Together with the frustrated state of entrepreneurial spirit, discouraged consumers and the debt load that the expansionary phase had provoked sets the

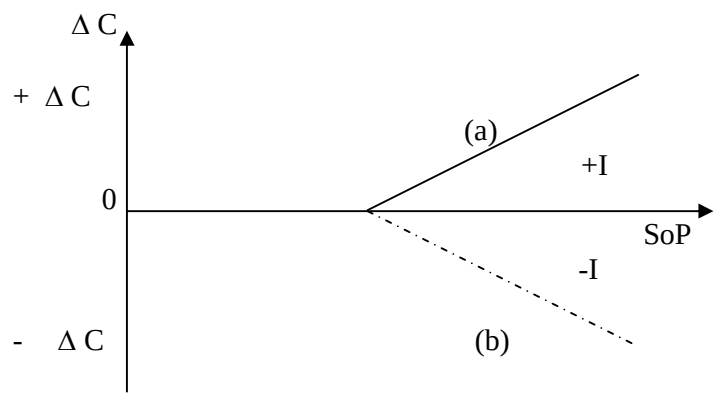
stage for the economic depression. By trying to produce price level stability, monetary policy has brought about destabilization, and by trying to promote economic growth, monetary policy has led to the destruction of the productive capacity.

Sustainable and Unsustainable Production Structures

In the "consumption-investment trade-off model" (figure 1), a monetary expansion would show up as a lengthening of roundaboutness, reflecting the lower interest rates. However, when no actual change of time preferences of the consumers takes place, and consequently consumption is not reduced, while firms, following the signal that comes from the interest rate, increase roundaboutness, they embark upon investing in projects that before the decrease of the interest rate were financially not feasible. The production structure that is being brought about will prove unsustainable, because funds are drawn into higher stages of production even though consumers have no intention to reallocate expenditures and free up resources for investment. The emerging unsustainable production structure can be represented by a graph that is based on the "consumption-investment trade-off model" as shown in figure 1 above. When expansive monetary policy lowers the interest rate with no matching change of time preference, the investment project will turn out to be unsustainable and "*relative* overinvestment" will occur as the result of the lower interest that deceives the entrepreneur about the availability of resources and the state of time preferences (see figure 6):

Figure 6

Relative Overinvestment and Forced Savings

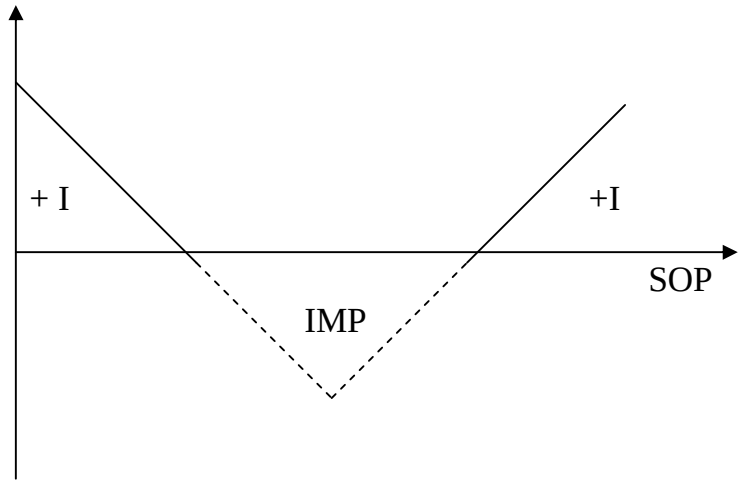


Assuming that consumer preferences have not changed and a parametrically stable supply of authentic savings is present which implies that consumers do not refrain from taking full use of the available consumption potential, the absence of sufficient savings implies an unsustainable production structure. For some time, the lack of savings could be overcome by imports, but this strategy is also unsustainable in the long run, as there is a limit to debt accumulation. As demand (or the "money side" in Hayek's terminology) exceeds production (the "goods side"), only a "cyclical expansion" can occur, an expansion that characterizes the unsustainable boom. Because resources are not freed and thus are not made available due to unchanged consumer preferences, the investors, who are guided by the interest rate, will bid up wages, and the additional demand impulse will lead to higher prices. The entrepreneurial plans collide with the unchanged consumer time preferences. The rising branch (a) in figure 6 shows increased investment in the higher stages of production. The structure cannot be maintained and an expansion can only take place along the cyclical production function (as shown before in figure 5). When the collapse occurs, "forced saving" happens in the form of capital consumption as it is shown in figure 6 by the dotted line (b).

Probably even more common than the unilateral expansion of unsustainable roundaboutness through monetary policy is the combination of fiscal and monetary policy to stimulate growth. Here private and government consumption go hand in hand while the economic boom also affects extensive roundabout production. As development policy this is known as the "growth-cum-debt" strategy; in the framework that is presented here it can simply be called "imports-maintained productions structure" (see figure 7 below) and as such it is not confined to developing countries but can be applied to a host of cases of the so-called developed economies.

Figure 7

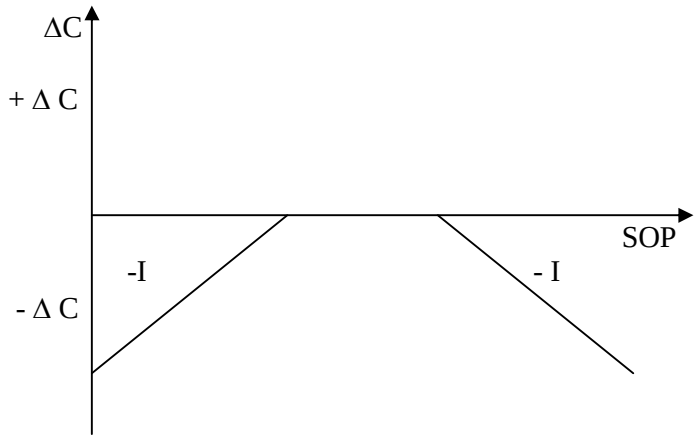
Imports-maintained Production Structure



Such unsustainable production structure requires imports in order to be maintained for some length of time. For a while, the economy will thrive based on production near final consumption such as transport, warehousing and retail, and by the boom that extends to the high degrees of roundaboutness such as research and development. However, the boom is based on insufficient savings. It can go on only as long as foreign savings can be obtained that substitute for domestic savings. This restraint also shows up in the macroeconomic accounting framework where a current account balance (NX) reflects national savings (S) in relation to investment (I).[4]

The growth-cum-debt strategy will break down inexorably, as it has broken down, for example, in the developing countries' debt crises of the 1980s. As its consequence, a massive contraction must occur, because after the collapse of such a production structure, the ensuing forced saving will not only have to take place in the more roundabout parts of the production structure, but also in the collapse of the investment that have taken place close to final consumption, i.e. the edifices of consumption and the infrastructure that had served for their maintenance.

Figure 8
Economic Contraction after the Collapse of an Import-maintained Production Structure



[4] The standard macroeconomic accounting of an open economy shows NX = S – I based on the aggregates of public savings, private investment and private savings. However, the pure accounting model is not suitable to reveal the underlying factors that have brought about the unsustainable production structure and later on have led to its collapse. While on the one hand within this limited perspective it can be shown that insufficient savings go together with current account deficit, standard open macroeconomics is incapable of showing the cause-effect structure. In this respect, capital-based macroeconomics, as it is presented here, is the more comprehensive and more general theory because the competing model can easily be integrated in its framework.

Forced savings is the inexorable consequence of unsustainable capital structures. The diagram (figure 7) shows that the conventional measures of stability and growth as they are common in such statistics as those for national income, gross domestic production, aggregate investments and consumption and the consumer price index will be highly misleading. These statistical constructs may serve as "indicators", but they do not represent "measurement". They suffer from a too wide aggregation and from over-abstractions: they represent statistical constructs with a dubious relation to economic reality and as such are illusionary concepts and, when applied as analytic tools, they most likely induce wrong economic and monetary policies and erroneous investment decisions. Even a central bank that is oriented towards maintaining the purchasing power of money may pursue a wrong policy when following the statistics as they were devised in the wake of the Keynesianism and later of the monetarist "counterrevolution". Both of these economic theories, in all their manifold variations, suffer from an insufficient disaggragation, i.e. from their disregard of the importance of roundabout production, the recognition of the stages of production and consequentially of the appropriate consideration of capital.

Monetary Policy in the Boom Bust Cycle

When price inflation begins to accelerate, the velocity of money circulation will also tend to increases and thereby it will amplify the original monetary impulses. Likewise, when the bust sets in, the velocity of money circulation will contract. It was this phenomenon of a collapsing money supply that attracted the attention of the monetarists. The basic error of monetary policy, however, is not the inactivity of central banking in the slump, but the active stance that was taken at the inception and artificial continuation of the boom, when central banks lowered the monetary interest rates and felt justified by an apparently stable price level. Fooled by the absence of the direct link between monetary expansion and the consumer price level under the condition of productivity gains, this relationship revives in the second stage, but in the contraction phase, the link will break down.[5]

The monetarist model assumes that real economic growth is determined by non-monetary factors and that the velocity of money is trend-stable and therefore that the relationship between the monetary aggregate (M) and the price-level (P) becomes proportional. In the monetarist perspective there is a direct link from the variations of the monetary aggregate to the price level. As Garrison (2001, 2005) explained, this model suffers from over-aggregation. Disaggregating the real side of the economy (Yr) opens the black box

[5] As Alan Blinder (1999:6) admitted, modern central bankers operate with an unknown model, an unknown objective social function and therefore doe not possess an optimal policy rule.

of Y by differentiating between final investment goods (Q_I) and consumption goods (Q_C), and among investment goods the different stages of production. The equation of exchange thus becomes:

$$\text{(VIII)} \qquad M \times V = P\,(Q_C + Q_2 + Q_3 + \ldots\ldots + Q_n)$$

Taking the Garrison version of the equation of exchange as a starting point of analysis, it is necessary to drive disaggregation a step further in order to demonstrate the effects of monetary policy. The monetary aggregate M consists of the monetary base (MB) multiplied by the monetary multiplier (m) while on the right side of the equation three types of transactions need to be differentiated when assets along with investment and consumption goods are included. This way the standard equation of exchange will be disaggregated into the monetary base (MB) and the monetary multiplier (m) on the one side, and into consumption goods (Q_C), investment goods Q_I) and assets (A) and their respective price levels on the other side (equation IX).

$$\text{(IX)} \qquad MB \times m \times V = P_C\,(Q_C) + P\,(Q_2 + Q_3 + \ldots.\ Qn) + P_A\,(A)$$

It is mainly the monetary base that is under direct control of the central bank. Although the other variables are not completely autonomous, their link to central bank actions is rather loose. As shown by the equation above (equation IX), the monetary impulse coming from the monetary base can transform the original monetary impulse into various degrees of strength depending on the monetary multiplier and the velocity of circulation, and from there it can affect in different degrees the components on the right side of the equation. In turn, the performance of these components will also have a feedback on the monetary multiplier and the velocity of circulation.

The expansion of the monetary base can affect both the consumer goods and the investment goods, and within the investment goods, it can affect differently the stages of production. However, variations of the monetary base may also affect asset prices and the effect of a certain quantity of variation of the monetary base can be amplified or minimized by the monetary multiplier and by the velocity of circulation. If expansive monetary policy takes place in an environment of productivity increases or other cost reductions that are strong enough to compensate for the monetary impulses, the prices of investment and consumption goods need not rise in a way that would be proportional to the increase of money, and additionally the asset markets could absorb a considerable part of the excess liquidity.

Analyzed by the variables of equation IX, the monetary impulse from the monetary base (*MB*) can be amplified or nullified depending on the size of the monetary multiplier (*m*) and the velocity of circulation (*V*). Even by assuming a smooth transmission, the question arises as to which degree the different variables react to the original monetary impulse. A variation of the monetary base may go into the prices of consumer goods, or it may affect mainly the prices of investment goods, or the excess liquidity may go into the asset markets. When the main impulse goes to the investment goods, it will affect the various stages of production differently. Here, as with the other two transaction classes, it cannot be determined *ex ante* how the impulse transmits from prices to quantities. In addition, there is another feedback at work among the transaction classes (consumer goods, investment goods and assets). The original impulse that comes from the monetary base will affect the different transaction classes, and have different degrees of feedback on the monetary multiplier and the velocity of circulation. Given that there are no reliable quantitative relations among the variables, central banks are unable to calibrate their policies. There is no certainty as to whether the monetary impulse will affect in a specific way a specific variable. Only in the most general form can it be said that an inflation of the monetary side will affect the "goods side".

The Role of the Financial Sector in the Boom-Bust-Cycle

Keynes identified irrational entrepreneurial decision-making as the supposed reason of economic instability, while consumption expenditure was deemed to rise and fall as a stable function of income. The decision to invest is ruled by the entrepreneur, who -- in Keynes' view -- is driven by unreliable "animal spirit". Keynes paints a picture of the personality of the entrepreneur that in a paranoid way shifts between greed and fear like a maniac on the one hand, but resembles also a spiritless machine on the other hand, a brainless automaton that *reacts* without anticipation or purpose to present conditions ('*stimuli'*) in a primitive way. Likewise in Keynesianism, there is no place for a far-sighted entrepreneur who envisions future demand and acts accordingly by applying resources to the production process in the present while anticipating demand for a consumable product in the future banking on the expectation that roundabout production will succeed. By projecting such a view upon the entrepreneur as the person who holds the decision about investment in his hand, Keynes and his followers were led to believe that a market economy is inherently unstable and therefore the fatherly ("rational") hand of government is required to smooth out the economic process.

It is a fact that the entrepreneurial spirit may break down.[6] However, the reason for that is not inherent to the entrepreneur's personality, but it is the result of a series of deceptions that have come from the monetary data (along with the deterioration of the business climate as it is encapsulated in this generic term), which makes the entrepreneur act like a ping-pong ball. When the interest rate, as the monetary indicator of time preference, is manipulated in the hands of the government and by the central bank as its branch, entrepreneurial decisions lose their anchor (Herbener 2002). The political interest rate manipulations deceive the entrepreneurs about the true time preference that is prevalent in the economy. Additionally, the fractional-reserve banking system not only transmits the monetary impulses that come from the central bank, but serves as their amplifier. Such an economy will be characterized by instability, volatility and uncertainties that exceed widely the capacity to manage the uncertainties at the micro-level for the handling of which the entrepreneur and business manager are the specialists. The monetary impulses that come from the central bank and their amplification by the financial sector distort the interest rate as the central signal about time preferences and as the indicator of the availability of resources and thereby bring about distortions of the business decision as to the degrees of roundaboutness in production that can be maintained (Cochran et al 1998).

Under the modern monetary regimes, the loanable funds that are available in the economy do not only come from authentic savings, but also from monetary expansion and contraction. Given a certain monetary impulse from the central bank, the financial sector tends to amplify both the contractive and the expansionary impulses under an optimistic environment, while the financial sector may also abort expansive impulses and produce a credit crunch under a pessimistic business climate. Even if both, the investment and the savings functions should be stable, massive changes in the amount of loanable funds can occur due to the swings of monetary expansion and their transmission through the financial system.

The interest rate guides the amount of investment and the degree as to which extent roundabout production processes will be initiated. However, in modern economies, credit creation takes place not just for business investment, but also is obtainable for consumption and investment in the asset markets. In this regard, it is not only the supply of loanable funds that is highly unstable, but credit demand, too. Along with the *supply* of funds for business investment, volatility is also produced even if the business investment *demand* for real capital

[6] Or, one may ask, why it was largely absent in ancient times and does not show up in a host of developing countries. In ancient times and in many a developing country the answer is robbery and political power, while the break down of the entrepreneurial spirit in modern times and in the so-called "developed countries" is largely brought about by central bank policies.

is parametrically fixed. In the market for loanable funds not just the supply curve shifts, but also the demand curve will move around in the absence of changes in the business investment curve and authentic savings.

It is not difficult to imagine how business decisions get distorted through monetary policy when the supply of loanable funds is highly unstable as the result of monetary policy. When the interest rate signal has been suppressed and gets distorted due to central bank intervention, entrepreneurs receive no information about the changes in time preferences and consequently cannot adapt production stages to the rising demand for consumer goods.

Implications for Monetary Policy

Under the condition of major cost reductions due to intensive technological progress or because cheaper factors of production have become available, a monetary policy oriented toward price stability is prone to initiate an unsustainable boom. Instead of allowing deflation to run its course, monetary authorities pursue expansive monetary policy guided by the aim of maintaining the so-called "price stability". Thereby, however, the economy is being pushed on a path to debt accumulation. The more intensive the technological advances and the cost reductions are, and the longer the period continues during which monetary policy holds down the interest rate, the more the economy will be induced to increase its debt levels. The size of the debt level relative to the productive base at the peak of the boom will make monetary policy ineffective once the contraction phase takes hold.

In periods of lesser productivity gains, the inflationary bias of modern central banks produces stagflation, as expansive monetary policy feeds directly into higher consumer prices. It is mainly under the conditions of high productivity gains or when other factors bring down production costs on a large scale that central banks have an easy shot to achieve "price-level stability" and hold the inflation rate within the established target for some time. The critical stage and the turning point takes place, when the phase of concentrated technological progress ends or when an adverse supply-shock occurs. Then, the foundation on which the pyramid of debt was erected breaks away. Debt-free growth could have been achieved if the central bank had let the deflationary episode work itself out. Instead, the monetary authorities, in their fixation to avoid all deflation, have created a credit-driven boom. At the first stage of the monetary expansion, the artificially depressed interest rate produces an economic boom; at the peak of the boom, the debt-load has made the economy ever more vulnerable to adverse shocks. Shocks that would hardly affect a robust economy now represent a threat. Central

bank management becomes increasingly precarious and the tendency increases to fight as long as possible against any potential downturn with further increases of the money supply.

With monetary expansion, more savings *appear* to be available than there are in terms of the availability of resources, and the demand for investment goods, particularly at the early stages of the production process, will increase along with the demand for consumer goods. At the end of the boom phase, productivity gains peter out or adverse supply side shocks occur that no longer can be easily absorbed. With the absence of compensating productivity gains, monetary pumping now feeds directly into goods prices. If central banks should continue with monetary expansion, more price inflation results. With prices rising, the monetary multiplier and the velocity of circulation tend to increase and drive the price even faster. If instead central banks try to counter the higher price level, a contraction of the monetary multiplier and the velocity of circulation will amplify the restrictive stance of monetary policy.

Strong economic booms are characterized by high productivity gains due to new technology and often by a concurrent increase in the supply of cheap labor. By not allowing deflation to run its course under these conditions, central banks boost the boom even when they meet a low inflation target. They provide ample liquidity in a situation where a falling price level is required. The expansion of the money supply beyond authentic savings comes along with increasing debt levels. In such a situation, manufactured by central banks, when an excessive debt level relative to the productive base has been reached, deflation indeed becomes a problem.[7] In a low-debt economy, the positive effects of deflation in terms of increased purchasing power outweigh its negative side and are beneficial. In a high-debt economy, deflation becomes vicious. Therefore, modern central banks will be inclined to make the debt surge go on as far and as long as they can.

Conclusion

The models presented in this paper provide an approach that serves to bridge the gap between micro- and macroeconomics and between the short and the long run through the explicit consideration of time and capital. Opening up the black box of conventional macroeconomics by introducing the stages of production concept, the model lends itself to analyzing a wide

[7]Irving Fisher who was an exuberant cheerleader of the stock market boom in the 1920s, changed his intellectual course in early 1930s when he published his "deflation theory of great depressions". Fisher's analysis (1933) saw the accumulated debt of the previous boom as the main cause for the persistence of the depression: "Thus over-investment and over-speculation are often important; but they would have far less serious results were they not conducted with borrowed money … The same is true as to over-confidence. I fancy that over-confidence seldom does any great harm except when, as, and if, it beguiles its victims into debt." (p. 341)

spectrum of economic policy issues. The lack of authentic savings as the source of investment shows up as the consequence of money creation by the central bank and a financial system that is based on fractional reserves. Institutional arrangements of this kind and a policy orientation towards a set of macroeconomic goals are inherently prone to bringing about production structures that are unsustainable and which later have to be abandoned at high cost. It has been shown that monetary and fiscal policies may be inherently faulty even when such indicators as the price index and the data for economic growth suggest that the economy is on path of stable expansion.

Under the current institutional arrangements of active central banking oriented towards macroeconomic policy goals and a monetary regime based on fractional reserve banking, there is no cure for the perpetual occurrence of business cycles. It is the unavoidable outcome of these institutional arrangements that unsustainable production structures will be brought about that bring with them distortions and tensions within the economy, particularly between the resources made available through savings and the investment that takes place.

The policy implications of the model presented here are quite different from the post-mortem cure theories. In the perspective of this model, the recipe against the boom bust cycle to happen is to refrain from instigating the boom. However, there is little reason to expect that central banks would accept deflation at a stage in the sequence of the business cycle when it is possible to fabricate a boom with only moderate inflation rates. Therefore, the more general conclusion of this model for monetary policy says that instead of pursuing the futile endeavor to improve central bank management, one should search for solutions that will transform the monetary system into a decentralized one not subject to active central banking.

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