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From the normatively given aims of the macroeconomic equilibrium, which describe the target state of an economy system, necessary conditions are derived at an optimal growth path with maximum consumption and maximum profits on the interest structure of a market economy, by using the golden rule of capital accumulation of Allais and the own-rate of interest theory of Keynes. From the conditions for an optimal interest structure a new monetary policy is developed, which promises stability without compound interest effect, growth without compulsion, stability of prices and full employment payable from interest savings.

Keywords: liquidity premium, liquidity trap, liquidity charges, interest structure, own-rate of interest, negative interest, neutral liquidity, optimal liquidity, neutral money, optimal growth path, Allais theorem, golden rule of capital accumulation, quantity equation, circulation safeguarding, price stability, monetary policy, monetary order policy.

Introduction

Given the current economic developments, it seems reasonable to search for new integrated approaches in the economy theory, from which successful instruments of economic policy can be derived. It is the purpose of this article to present some sections requiring further research which must be overcome to solve the pressing problems in a joint scientific effort. As a contribution to this scientific discussion, a result is presented for the interest structural theory for national economies on an optimal growth path and interpreted by liquidity theoretical and regulation-technical aspects. To prevent financial crises in the future effectively, the central bank uses an innovative monetary policy that takes control of the monetary creation, the money supply, the circulation of money, the price level and the interest rate structure, in order to create optimal conditions for efficient market processes. In the saturation phase negative interest rates become necessary.[1]

The macroeconomic equilibrium

The target state of the economic system is described by the objectives of the macroeconomic equilibrium:[2] *full employment*[3], *price level stability*[4], *exchange rate stability*[5] and *economy growth*[6] on an optimal growth path. In the long-term saturation equilibrium of the fulfillment of demand the optimal growth path leads to a *zero growth*.[7]

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[1] Negative interest rates are increasingly discussed; e.g. Goodfriend (2000), Buiter & Panigirtzoglou (2003), Levy, Levy & Edry (2003), Fukao (2005), Mankiw (2009), Pavlic (2009), van Suntum (2009).

2 Herder-Dorneich (1975), Pätzold (1993), Thieme (1994), Wagner (1997), Cassel & Thieme (1999).

3 See Siebke & Thieme (1999) for further literature.

4 See Cassel (1999) for further literature.

5 About further external economic aims, concerning the balance of payments, there is no general agreement in the literature; see Willms (1999).

6 See Gabisch (1999) for further literature.

7 The question of the zero growth is controversial in the literature. The zero growth is neither wished nor rejected because the growth should arise from the need and the demand. However, the zero growth should be a permissible and stable equilibrium condition of a theory of the economic development. The economic system should not be dependent on growth, but may go into saturation without problems arising out of it. If such problems occur, it is the task of a constructive economy theory to develop problem solutions, which make a transition possible into the saturation. In the context of the following derivation the zero growth is used to allow some characteristics of an economic maturity process to become clear in its end-point.

The golden rule of capital accumulation

The golden rule of capital accumulation[8] states that the maximum consumption is reached if real interest rate r and growth rate g of the production approach the same value (Allais theorem):[9]

Golden rule: $r = g$

The optimal growth path of a national economy with reference to consumption is therefore characterized by an equality of growth rate and real interest rate level.[10] As an immediate inference from this theorem the real interest rate vanishes in the context of an optimal consumption for a stationary national economy:[11]

Zero growth: $g = 0 \Rightarrow r = 0$

Conditions for an optimal interest structure

From the Allais theorem interesting conditions for the optimal interest structure of a mature national economy can be derived:[12]

1. Credit interest structure: The long-term capital market interest rate for riskless financial investments will drop at a maximum consumption in the saturation equilibrium towards zero. If furthermore a normal interest structure can be assumed,[13] the interest structure curve will drop into the range of negative interest rates at the short-term end. Holding liquidity or relatively liquid money components in the portfolio is consequently involved with costs which can be described as liquidity costs (fig. 1).

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[8] Allais (1947, 1962), Phelps (1961), von Weizsäcker (1962), Solow (1961, 1971), Stiglitz & Uzawa (1969), Gabisch (1999), Huth (2001).

[9] For the aggregated quantities of consumption C, saving S, investment I and national income Y (production) the following budget equation applies under the assumption of a goods market equilibrium $I = S$:

$Y = C + S \wedge I = S \Rightarrow C = Y - I$

We look for the capital stock K, that maximizes the consumption:

$$\frac{\partial C}{\partial K} = \frac{\partial Y}{\partial K} - \frac{\partial I}{\partial K} = r - g \overset{!}{=} 0$$

At a profit maximized production the marginal productivity $\partial Y/\partial K$ of the capital equals the real interest rate r. The partial derivation $\partial I/\partial K$ is calculatetd from $I = g \cdot K$ as the growth rate g of the capital stock K. Hence $r = g$ is a necessary condition for an optimal production process with maximal consumption.

[10] Allais (1947) succeeded in the first theoretically strict formulation of the golden rule as a normative theorem of the optimal, i.e. consumption maximum allocation of a stationary national economy. However, the optimal allocation of the golden rule can be understood also as a result of the *competition* that is as a component of the *positive* (and not only *normative*) allocation theory; cf. Huth (2001).

[11] The interest is here a shortage premium, i.e. the expression of a shortage, which is reflected in an unsaturated demand and thus reveals growth potentials. Growth is a manifestation of striving for shortage reduction; cf. Thieme (1999). In the saturation equilibrium the shortage premium disappears together with the shortage in a dynamic equilibrium of fulfillment of demand.

[12] The interest structure curve represents the payment of interests on different finance assets depending on their residual time to maturity. A normal interest structure is characterized by a positive slope of the interest structure curve. The interest structure can be described simplistically by a short-term money market interest rate and a long-term capital market interest rate; cf. Lutz (1967).

[13] This assumption is usually derived from the liquidity premium theory of interest: The residual time to maturity is essentially proportional to the illiquidity of the investment in question. In the following argument a temporal constant liquidity premium is assumed.

2. Debit interest structure: In the state of saturation of a market economy with maximum consumption the long-term debit interest rate on debt, drops to the bank margin (incl. risk premium). If on the other hand the invariance of the price level requires a money market interest rate which is larger than the average bank margin of the commercial banks, then the state of saturation with maximum consumption must be characterized by maintaining an inverse interest structure with respect to the debit interest (fig. 2).[14]

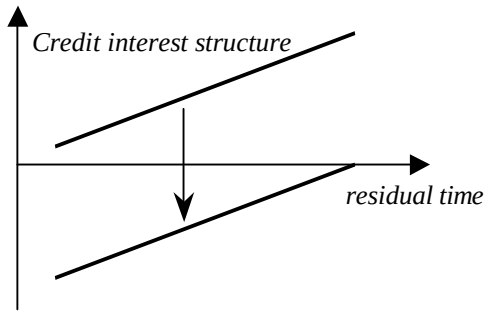

Fig. 1: Credit interest structure at optimal growth

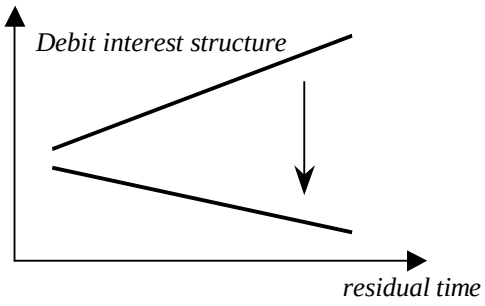

Fig. 2: Debit interest structure at optimal growth

As presupposed not only the saturation phase but the whole growth path shall fulfill the optimality criterion of the golden rule: An economic growth on an optimal growth path with respect to consumption is necessarily associated with a decline of the credit interest structure and with a debit interest structure swiveling from normal to flat or inverse. In the course of the optimal growth process the system changes from a state of cheap liquidity and expensive loans to a state of expensive liquidity and cheap loans. Now the question arises, how an optimal growth process will be reflected in the characteristics of the banking transaction.

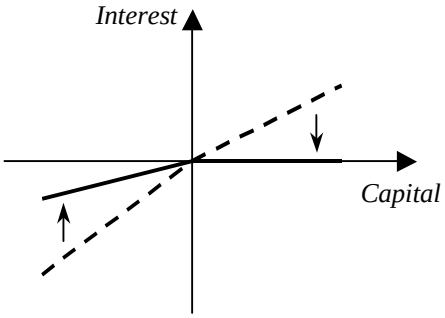

Fig. 3: Credit business at optimal growth

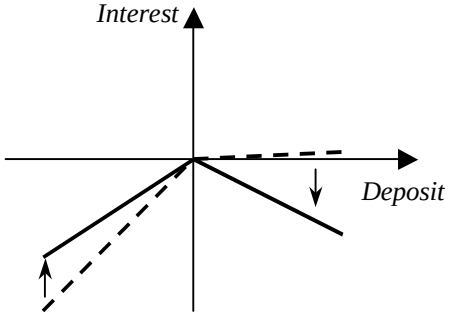

Fig. 4: Giro business at optimal growth

Innovative banking functions

To supply the national economy with liquidity and credit belongs to the essential services of the commercial banking system. Simplifying the banking transactions can be subdivided into *credit transaction* and *giro transfer*.[15] Fig. 3 and fig. 4 show schematically the development

[14] For the moment it is presupposed that the central bank follows the concept of the indirect money supplies and price level regulation by the political specification of bank rates as a matter of priority. A control directly orientated at the money supply development with open market business would result in an appropriately flatter interest structure.

[15] In fact there is a whole continuum of interest rates, risk classes and residual times within the bank functions from which merely the short-term and the long-term end is represented here for a type of asset without risk. Seen from the view of the asset holder the bank giro transfer corresponds with the *medium of exchange function* and the credit transaction corresponds with the *value storage function* of money.

of the characteristics for an optimal growth process in a risk free case (cf. fig. 1, fig. 2).[16] In summary, the interest structure of a saturated market economy with a maximum consumption has the following characteristics:

1. The *capital gain* declines to a risk premium.
2. The *capital costs* decline to the bank margin plus risk insurance.[17]
3. Holding liquidity is associated with *liquidity costs*.[18]

Defusing the liquidity trap

According to the liquidity theory of the interest, the *liquidity premium* is the interest portion which is paid for a temporary disclamation of the liquidity benefit.[19] The liquidity premium is therefore a measure for the liquidity benefit and can be determined in first-order approximation from the difference between long-term and short-term credit interest rates, i.e. essentially from the *difference* between interest levels between money market and capital market.

In the saturation equilibrium the interest rate level falls to zero at maximum consumption at the long end of the interest structure (fig. 1, fig. 3). Liquidity costs arise in the amount of the liquidity premium at the short end (fig. 1, fig. 4). A liquidity whose liquidity benefit is neutralized by liquidity costs is called a *neutral liquidity*.[20] A neutralized liquidity is equivalent to a normal interest structure curve which has the liquidity premium as slope.

By maintaining an adequately normal interest structure a *liquidity trap* cannot appear any more.[21] The incentive for the disclamation of the liquidity and for a long-dated financial investment stays the same during the whole optimal growth process: The profit from interest in the growth phase will be replaced by an avoidance of liquidity costs in the saturation phase. The costs of liquidity in the growth phase are pure opportunity costs which correspond to the lost profit from interest, they become increasingly real costs in the form of negative interest in the saturation phase.[22] In the following the effects of liquidity costs on the structure of a typical portfolio are examined.

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[16] The slopes of the characteristics are given by the corresponding interest rates. The difference between debit and credit interest is the bank margin.

[17] With that the corporate sector is discharged to a large extent by its capital costs; an only still weak discounting of expected yields makes long-term investments possible and thereby a necessary extension of the time horizon for a sustainable economic management.

[18] The protection against the risks of illiquidity by holding liquidity is connected to costs just as the protection against other risks.

[19] The interest is not a reward for a non-consumption but fundamentally the reward for a disclamation of liquidity. Because, according to Keynes (1936), if the saver hoards his savings, e.g. as cash, then he undoubtedly carries out a non-consumption, without receiving a reward for it, however. A reason for an interest arises only when the saver gives up his liquidity. See Keynes (1936), cf. Göggler (1972), Jarchow (1973), Issing (1998), Kath (1999).

[20] Suhr (1983, 1989, 1990), Suhr & Godschalk (1986), Löhr & Jenetzky (1996), Olah (2001).

[21] The liquidity trap describes an extremely high interest rate elasticity of the demand for money, if the interest rate level falls under the liquidity premium of the money; cf. Keynes (1936), Dieckheuer (1993), Issing (1998). More precisely, the *difference* between interest levels at the money and capital market is decisive. The strongly increasing demand for money leads to interruptions in the money circulation and a *money tailback*.

[22] An outbreak from the liquidity trap as a breakthrough through the zero interest barrier into the range of negative interest rates is discussed in the newer literature increasingly; e.g. Goodfriend (2000), Buiter & Panigirtzoglou (2003), Levy, Levy & Edry (2003), Fukao (2005), Mankiw (2009), Pavlic (2009), van Suntum (2009).

Own-rate interest theory and return balancing theorem

According to Keynes an *own-rate of interest* can be assigned to every asset including not only directly monetary values like interest rates and inflation rates but also non-directly monetary benefits like the *liquidity advantage* ("joker advantage"). The own-rate of interest, *ez*, consists of the yield *e* (e.g. interest), the carrying costs *d* (e.g. by inflation or deterioration) and the liquidity premium *l*:[23]

Own-rate of interest: $ez = e + l - d$

A portfolio theory based on this own-rate of interest equation yields an equalization of the own-rates of interest in the equilibrium just in analogy to the equalization of the marginal utilities in the classical household theory. According to the *theorem of return balancing*[24] assets are regrouped till such time as all own interest rates of all assets become equal in the equilibrium. The own-rate of interest structure is flat in the equilibrium (fig. 5).

For a neutral liquidity whose liquidity premium is neutralized by artificial carrying costs in the form of liquidity charges the own-rate of interest reduces to the yield: $ez = e$. With liquidity charges which are graded according to the degree of liquidity the yield of long-term assets can be regulated to equal the growth rate in order to satisfy the Allais theorem and hence the necessary condition for an optimal growth.[25]

To determine the optimal carrying costs as a function of the liquidity ratio, we calculate first of all the own-rate of interest for a completely illiquid long-term asset ($l = 0$), which shall not produce any carrying costs ($d = 0$) and whose yield satisfies the golden rule of the optimal growth: $ez = e = g$. In the equilibrium this own-rate of interest also applies to the most liquid asset, the cash, which doesn't return any yield but has the maximum liquidity premium l_{max}. The necessary charges on cash arise from the own-rate of interest equation: $d_{max} = l_{max} - g$. The optimal liquidity charges $d(l)$ as a function of the liquidity premium l are calculated as follows:

Liquidity charges: $d(l) = l\,(1 - g \,/\, l_{max})$

The figures 5 and 6 show the movements of the own-rate of interest structure and the necessary liquidity charges at an optimal growth process.

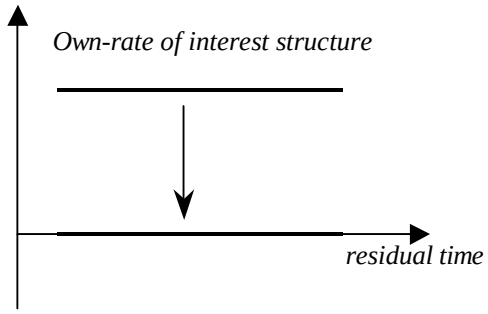

Fig. 5: Own-rate of interest at optimal growth

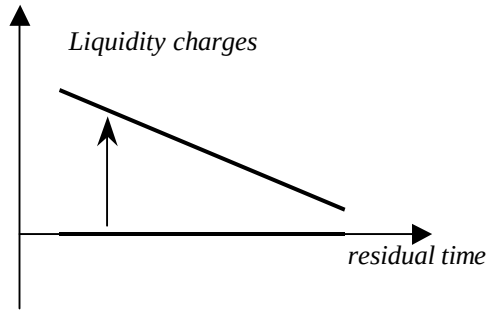

Fig. 6: Liquidity charges at optimal growth

[23] Keynes (1936), Löhr & Jenetzky (1996), Löhr (2000).

[24] Cf. Schumann, Meyer & Ströbele (1999).

[25] The necessity of such a regulation at the interest structure arises particularly in the saturation phase if the growth rate falls under the liquidity premium of the money and a liquidity trap threatens at a flat interest structure.

Neutral money

A normal interest structure with an interest difference in the amount of the liquidity premium of the cash produces a *neutral liquidity*. A neutral liquidity with an optimal interest structure which adapts to the growth rate shall be called *optimal liquidity*. An optimal liquidity with a constant purchasing power can be described as *neutral money*. Neutral money has a stable value and no (negative) influence on the real economy process, i.e. on growth, economic cycles, employment and distribution.[26] The neutrality of the money therefore has three conceptual levels:[27]

1. *Neutral liquidity*: *liquidity utility = liquidity costs*
2. *Optimal liquidity*: *real interest rate = growth rate*
3. *Neutral money*: *price level = const.*

Price stability

For a price level regulation we look at the transmission equation of the economic engine:[28]

Quantity equation: $M \cdot U = P \cdot Y \implies m + u = \pi + g$

If the money supply M and the velocity of money U are controllable, then the price level P is adjustable at a slowly variable national product Y. The artificial liquidity costs attached to the money act as a circulation drive or *circulation securing* of the money. Liquidity charges are also circulation securing charges. If the velocity of money is constant, the money supply can be adjusted to the national product so that the price level remains constant. Consequently a stable currency requires control of both the money supply and the velocity of the money. The constant velocity of the money is an important condition for the smooth running of the economic engine.

Full employment

Full employment is possible and payable if we economize interest burdens. A third of the annual *bank interest payments* of more than 300 bn € would already be sufficient in order to be able to pay 5 million annual salaries. Interests can be saved by lower interest rates[29] and by a lower credit sum. An optimal liquidity promises both: low interest rates and a more efficient money utilization because of the circulation drive.

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[26] Cf. e.g. Koopmans (1933), Hayek (1933), Issing (1998). An inherent exponential dynamism, fluctuating rates of inflation, Keynesian unemployment and the redistribution of wealth driven by interest are reasons that the conventional money isn't neutral for certain.

[27] The concepts of the neutral and optimal liquidity refer to the *medium of exchange* function of money in the short-term and the *value storage* function of the money in the long-term of the interest structure. Furthermore the idea of the neutral money contains requirements on the third function of the money as a *measure of value* which is to be kept constant by means of a suitable regulation.

[28] With the change rates $m = dM/M$, $u = dU/U$, $\pi = dP/P$, $g = dY/Y$ one gets the dynamized form of the quantity equation by logarithmic derivation; cf. e.g. Fisher (1911), Jarchow (1973), Issing (1998).

[29] *Classical unemployment* has its cause in the job market and originates from *inflexible wage levels*, i.e. by wages that are too high and downwards inflexible. *Keynesian unemployment* is caused in the capital market by *inflexible interest rate levels*, i.e. by interest rates that are too high and downwards rigid. Consequently full employment can always be reached by *reductions of wages or interest rates*. Therefore positive effects of an optimal liquidity on the employment situation have to be expected primarily at a Keynesian unemployment if the liquidity trap can be assumed to be the main reason for unemployment. – Empirically not only the *interest rate* level itself seems to be decisive but primarily the *quota of interest burden* which very strongly correlates with the unemployment rate; cf. Creutz (1997).

Control engineering aspects

The same laws that apply to the electricity apply to the *monetary flow* too. So it seems reasonable to install adaptive filters into the monetary circulation.

The implementation of a neutral liquidity by maintaining a normal interest structure works like a *low-pass filter* in the monetary flow. The low-pass filter dampens the unwanted economic fluctuations which can for instance arise from excessive *speculation*. A dancing interest structure implies regroupings in the portfolios which reinforce the systems tendency to oscillate.[30]

The implementation of an optimal liquidity with a lowering of the normal interest structure in the saturation phase works as a *high-pass filter* in the monetary flow. The high-pass filter is a direct current barrier, which prevents that the exponential growth of credit and debt due to the compound interest formula continues also in the saturation phase, which would lead all of us deeper and deeper in the double mill of *growth compulsion* and *debt trap*.[31]

With both a high-pass filter and a low-pass filter, altogether a *band-pass filter* is installed into the monetary flow for *stabilization* and *fluctuation suppression*. Special aims of the regulation are the neutralization of the compound interest effect in the saturation phase and the damping of economic cycles and monetary wobbling masses, furthermore the avoidance of growth compulsion, debt trap, liquidity trap and speculation bubbles.[32]

Process pattern change instead of process optimization

The equality of growth rate and capital market interest rate is a necessary condition for a maximum consumption in a national economy (golden rule). Conversely no maximum consumption or no more optimal growth is possible if the golden rule is violated by a discrepancy of growth rate and capital market interest rate.[33] If an optimal growth path is to be achieved, monetary policy has to take care that interest structures are adjusted at the money and capital markets which match the current growth rate of the national economy.

The liquidity costs in the optimal interest structure of an economy that is changing into saturation can most simply be realized by the commercial banks passing their costs of short-term interest or refinancing interest as liquidity costs along to the current liquidity holders. The key interest rates of the central bank can be understood as charges for using money.[34]

On *book money* liquidity the liquidity charges are imposed as a negative interest. The liquidity costs of *cash* have to be assessed in such a way that cash is somewhat more expensive than

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[30] The main reason for the oszillation tendency on the financial markets is a positive feedback: increasing (dropping) prices cause a increasing (diminishing) demand which causes increasing (dropping) prices again. So with their speculations the speculators themselves cause the fluctuations they live on.

[31] The economy needs a well-performing, efficient, stable and fair-minded clearing system, not an unstable snowball system. It must be guaranteed that the system isn't dependent on new debtors and with that on growth like an ordinary chain letter (pyramid game). Especially the interest which shall be paid for newly created money should actually exists in the monetary circulation.

[32] To accomplish the regulation objectives, artificial neural nets are developed, tested and used.

[33] In the accordance with the golden rule the capital market interest rate should adapt to the growth rate, not reversely. Otherwise under certain conditions an interest rate too high could prevent the national economy to go into the saturation. Such a system behavior would be unwanted; cf. Huth (2001, 2002).

[34] To assign the costs of the monetary utility to the money holders is in line with common principles of regulatory policy: the one who has the benefits should also bear the costs. Liquidity utility and liquidity costs stay together in the monetary flow; cf. Suhr & Godschalk (1986), Suhr (1989, 1990).

deposit money according to the liquidity difference.[35] In order to neutralize the liquidity created by the commercial banking system a tax on the cash reserves of the commercial banks is suitable. The arising costs are passed on to the customers.[36] Decisive for the height of the liquidity costs is the consumption of central bank money.[37] All these actions serve to increase the effectiveness of monetary use.

Although the investor is pressed gently to longer-term investments, the access to cash is ensured at any time because the long-term deposits serve as a security for a bridging credit. Money becomes a "hot coal" which you better pass on, which you, however, can get easily and at little cost if you need it. And even though the neutral money seems to be at the first glance more expensive than the conventional one, it is actually the more economical money.[38] Because a more efficient use of money reduces the money supply required for a given transaction volume with a (constant) higher circulation speed and therefore leads to savings at the bank interest payments and with that to a reduction of the interest burden.[39]

Implications for monetary policy

The central bank takes over control of the money creation, the money supply, the circulation of money, the price level and the interest structure as far as it is necessary. The central bank shall be enabled to control not only the cash, but also the money creation by the commercial banking system without withdrawing this task from the commercial banks. However, a procyclical money creation of the commercial banks must be prevented.[40]

The money market interest rate required for the desired regulation of the interest structure is in general not identical to the required money market interest rate for the regulation of inflation.[41] From that reason further instruments of central bank policy must come into use for the realization of a neutral money beside the interest rate policy.[42] The different instruments of monetary policy serve different goals of the complete economic equilibrium (fig. 7):[43]

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[35] At the version of cash for example a small fee becomes due. The banknotes are provided with an expiration date and exchanged after expiry only with a reduction in fresh bills.

[36] Assuming that the bar reserve is 10% of the view deposits. If a tax of 50% p.a. on the bar reserves is lifted up, this would mean a load of the view deposits with 5% p.a. E.g. the interest payment on the view deposits would move down from 1% to -4 % ; cf. Löhr (2000).

[37] With the regrouping from long-term assets to near to money assets the individual liquidity of the investor is increased at the expense of the overall liquidity of the economy. The arising costs have to be borne now as liquidity costs by the initiator; cf. Löhr (2000 & 2005).

[38] Cf. Suhr (1983, 1989, 1990), Suhr & Godschalk (1986).

[39] More than 90% of all households benefit from neutral money, because today more than 90% of all households pay more at covered interest burdens then they have income from interest; cf. Creutz (1997). Today, the euro circulates only half as fast as the deutschmark at 1970. A doubling of the circulation speed is realistic and would save right away approximately half of the interest burdens for new loans.

[40] Money might be created by purchasing stocks of assets, financed by loans. Because only the money volume is increased, but not the amount of goods and services, a financial bubble might be created that way.

[41] With a complex system it would appear as a regulation-technical coincidence, if one could regulate two variables, the inflation rate and the interest rate level to its set points, by using the base rate as the one and only control factor. Such a regulation is only possible under very special conditions met by the controllability of the system in question; cf. e.g. Isidori (1989).

[42] Cf. e.g. Pätzold (1993), Dieckheuer (1993), Issing (1998).

[43] Of course there are complex interactions between all of the instruments and all of the objectives of the monetary policy. The assiciation between objectives and instruments shall only indicate the "main effect directions", the possible "main axes" for a *decoupling controller* that is to be designed; cf. e.g. Isidori (1989).

- The *minimum reserve policy* is used to control the money supply. Due to the minimum reserve ratio of *MR* the money creation of the commercial banks is limited. If necessary the maximum controllability of the money supply can be achieved: *MR* = 100% ("full money").[44] A tax is levied on the minimum reserves (or all cash reserves) of the commercial banks.[45] Rule of thumb: $(l_{max} - g) / MR$.
- The *interest rate policy* is used for the objectives of growth and employment. The key interest rate i_{ZB} helps to regulate the interest rate level r to the growth rate g: $r = g$. The operational objective of the refinancing policy is to maintain a normal and growth-optimized interest structure. Rule of thumb: $i_{ZB} = l_{max} - g$.
- The *open market policy* is used for the objective of price stability. By controlling the money supply, dependent on the growth rate g of the social product, inflation rate π is controlled, at best at a constant circulation speed: $m = g \wedge u = 0 \Rightarrow \pi = 0 \Rightarrow P = const.$
- The *monetary order policy* ensures the circulation of money. The key interest rates of the central bank are passed on to the current money holders as a fee on using money.[46] In the equilibrium the costs of money holding lead to a constant circulation velocity U of the money: $d_{max} = i_{ZB} \Rightarrow U = const. \Rightarrow u = 0$.

Paradigm change by neutral money

The process pattern change in monetary order policy opens new perspectives:

1. Interests are fees for using money which have to be borne by the money user.
2. Who has the liquidity utility, also bears the costs of liquidity.
3. Capital costs are transferred from the borrower to the money holder.
4. Covered interest burdens become visible and thus effective for decision.[47]
5. The interest costs minimize itself as a circulation drive.
6. The money supply keeps itself scarce, however access to money keeps cheap.[48]
7. The apparently more expensive liquidity is actually the more favorable one.
8. Saving of interest costs instead of saving of wage costs.
9. Discharge of capital costs instead of dismissal of man power.
10. Capital costs are transformed into liquidity costs.
11. Capital income is transformed into earned income.
12. Full employment is payable by interest savings.
13. The neo-classical ideal world is transformed into reality.

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[44] Cf. Fisher (1935), Huber (1998).

[45] Cf. Löhr (2000).

[46] With this action, a sign in the causal relation between key interest rates and capital market interest rates is reversed: In former times, an increase in the key rate of interest led in general to a regrouping towards more liquid assets and to a rise of the capital market interest rate level. In the future an increase in the key rate of interest operating as an increasing liquidity charge rather causes a regrouping towards illiquid assets and with that a lowering of the interest rate level.

[47] The capital costs are nowadays hidden in all prices and taxes. On average, the interest portion in the prices are more than 30%; cf. Creutz (1997).

[48] Money, that keeps itself scarce by regulation is fiat money, however, it needs no return to the gold reserve. There is no “inevitable inflation rate”.

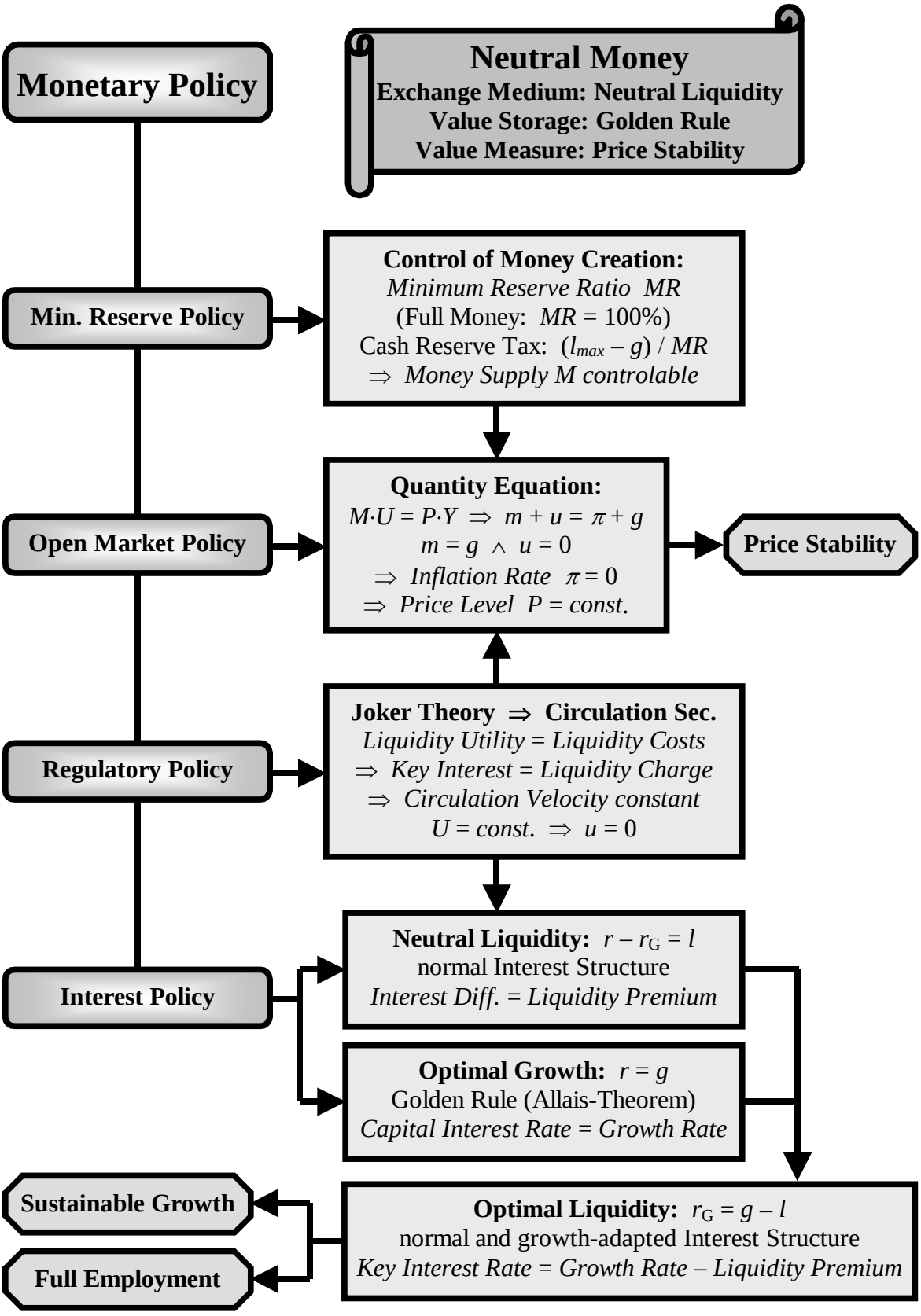

Fig. 7: Instruments and objectives of Monetary Policy

Discussion and forecast

From the golden rule of capital accumulation and the theory of the equalization of the own interest rates a growth-optimum interest structure was derived. The temporal development of the interest structure curves was shown on an optimal growth path into saturation. In the long-term saturation equilibrium appears a normal, but lowered interest rate structure in the credit interest and an inverse or flat interest structure in the debit interest, depending on the method of central bank policy.

From these results arises a need for further research. First it is to be examined, how an optimal interest structure would affect the accessibility, controllability and stability of the complete economic equilibrium.[49] The objectives of optimal growth, price level stability and full employment were already addressed but not the objectives of exchange market stability.[50] From the foreign economic aspects of an optimal interest structure arise further interesting questions.

If every region of the earth shall develop on an optimal growth path with its own individual growth rate, then corresponding interest gradients must reflect the current differences of the growth rates. An optimal global economic development needs regional interest differences until all regions have reached the zero growth. It raises the question how far a single currency or a single region can maintain an international interest difference with contemplation of the *interest parity theorem* which is confirmed empirically very well.[51] Under which conditions for an open economy with an optimal liquidity do exist stable foreign economic equilibrium states and to what extend are such equilibrium conditions advisable or disadvantageous for the reform region?

Furthermore the question can be raised, which role plays a theory of optimal liquidity in a "macroeconomic synthesis" between neo-classical theory and Keynesianism.[52] The theoretical and empirical research discovers diverse investigation topics which are suitable to stimulate the scientific competition and to find solutions for problems. A good theory is the most practical thing there is (Kant announced).

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[49] To achieve this condition would mean to overcome the mysticism of the magical polygons at the same time.

[50] E.g. a neutral liquidity is relatively unsuitable for currency speculations.

[51] Dieckheuer (1991), Jarchow & Rühmann (1994), Rose & Sauernheimer (1995), Willms (1999).

[52] See Dieckheuer (1993), Dornbusch & Fischer (1995). The newer literature shows a "consolidation of the macroeconomic theory"; cf. Siebke & Thieme (1999). Because of the assumption of an interest inelastic demand for money neo-classical models cannot describe interest induced speculation phenomena adequately. For this reason a keynesian interest theory is frequently included into the modelling.

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