Theoretical Principles of the Buffer Mechanism, Monetary Quasi-Equilibrium and its Spillover Effects

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I. Introduction[1]

In our profession monetary theory and, in particular, the analysis of the transmission of monetary impulses to the real economy attracts a great deal of interest. However, up till now in this field relatively little attention has been paid to a systematic application of the insights of modern disequilibrium analysis. Therefore, in this paper an attempt is made to develop a theoretical framework to bridge this gap.

As is known, modern disequilibrium analysis occupies itself with situations in which the price mechanism no longer effectuates a complete clearing between supply and demand in markets. It should be emphasized that in this respect no failure of the price mechanism will be the case.[2] This would demote disequilibrium analysis to an emergency-brake which only comes into operation in case of misconduct of economic agents in a Walrasian type of economy. However, several authors have demonstrated convincingly that disequilibrium situations are certainly not an exception in macroeconomics.[3] Besides, in their philosophy operations in a market in disequilibrium are not a collection of startle responses but rather a part of normal functioning in a world of uncertainties. As *Clower* (1965), among others, already pointed out we may, in fact, consider modern disequilibrium as the microeconomic foundation of Keynesian macroeconomics.

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[1] This paper is an elaboration of Knoester (1980). It appeared under the same title as discussion paper 7908/G/M, Erasmus University Rotterdam, 1979.

[2] In this respect the paraphrase of "inefficient" would be much better. Cf. e. g. *Eckstein* and *Fromm* (1968, p. 1159/1160) who state: "Continuous clearing is an efficient market mechanism only in certain situations where cost of changing prices is negligible, transactions are sufficiently numerous for buyers and sellers to remain in communication, and losses from failing to effect a transaction are high. In many other cases, continuous clearing is inefficient . . .".

[3] See for an explanation of modern disequilibrium analysis e. g. *Barro* and *Grossman* (1971), *Clower* (1965), *Benassy* (1975, 1978), *Siebrand* (1979).

However, the empirical elaboration of this theme is mainly concentrated on disequilibrium situations in the real sphere. In this field we may mention several examples like "undesired" inventory changes in the market for goods, "home pressure of demand" in relation to foreign trade, the so-called "discouraged worker effect" on the labour supply and the impact of excess capacity on employment. All these applications have one quality in common. They base themselves on the impact of a "real" pressure indicator – such as the unemployment and excess capacity rate – on the behaviour of economic agents.[4]

In our view too little attention is paid to a systematic application of the disequilibrium analysis in monetary theory. Indeed, monetary theory offers at certain points important links. In this respect we may especially refer to the theory of credit rationing.[5] However, basically one uses in monetary analysis a classical prescription or, in other words, a Walrasian system of balance identities and equilibrium prices. Therefore, the "portfolio balance approach" of *Tobin, Gurley* and *Shaw* and the "wealth adjustment theory" of *Brunner* and *Meltzer* hardly pay attention to the phenomenon of monetary disequilibrium situations.[6] In fact this omission can be of fundamental importance for our judgement of macroeconomic policy. In this respect it should be borne in mind that a monetary disequilibrium may lead to so-called spillover effects to the real sphere.

Therefore in this paper we endeavour to develop a synthesis of present-day monetary theory and modern disequilibrium analysis. In view of this we point out in section II that in the case of an autonomous disturbance of the equilibrium between money supply and demand, tendencies will arise to-wards a new equilibrium through both price adjustments and non-price induced quantity adjustments. These non-price quantity adjustments we call the buffer mechanism. This buffer mechanism is based on the reaction of the banking and the private sector to a monetary pressure indicator. This item will be explained in section III. The topic of section IV is our contention that the monetary sector is characterized by a mix of the buffer mechanism and the Walrasian price mechanism. We call this the monetary sector in quasi-

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[4] As known, the unemployment rate and excess capacity are ex post figures. However, strictly, speaking ex ante figures are of importance for economic behaviour whereas we have only ex post figures at our disposal. Nevertheless one may try to construct ex ante data with the aid of statistical techniques. For an attempt in this direction we refer to *Siebrand* (1979).

[5] See for the theory of credit rationing e.g. *Jaffee* (1971), *Jaffee* and *Modigliani* (1969). In addition, the papers of *Grossman* (1971), *Tucker* (1968) offer certain starting points.

[6] See *Gurley* and *Shaw* (1960), *Tobin* (1961), *Brunner* and *Meltzer* (1963).

equilibrium. Last but not least we point out that monetary quasi-equilibrium implies spillover effects to the real sector.

II. The Buffer Mechanism

In fact the buffer mechanism is based on some simple starting points. The central element is our contention that in the case of monetary pressure or suction both the banking sector and the private sector are willing to absorb this pressure partly or entirely by way of non-price quantity adjustments. An essential feature is therefore that these adjustments are not the result of the working of the price mechanism (i.e. interest rate changes) but the result of non-price induced stock formation in financial assets. Relatively rigid prices are the inevitable antipole of this type of behaviour.

Of course, this does not imply that the price mechanism plays no role at all. On the contrary, in our opinion this equilibrating mechanism ought to be a fundamental principle in monetary analysis. However, besides this classical mechanism there might be a second, complementary mechanism that commences to function if supply and demand diverge. In practice, a mix of both mechanisms will occur. As said above, we call the corresponding monetary model the monetary sector in quasi-equilibrium. We shall return to this theme later. Here, we will first go further into the merits of the buffer mechanism.

Why, one could ask, will monetary agents use non-price quantity adjustments besides the price mechanism? On what behavioural hypotheses is the buffer mechanism based? How should we define the monetary pressure at which this mechanism is going to take effect?

In fact, modern disequilibrium analysis offers us various starting points for the underlying behavioural hypotheses of the buffer mechanism. For instance, it points out that economic agents often have considerable difficulty in constructing reasonably reliable forecasts. In other words, we live in a world of uncertainty. In addition, technical bottlenecks can often impede the realisation of intended transactions. Besides, modern disequilibrium analysis points out that the collection of data and the preparation and taking of decisions takes time, energy, and money. All of this may illustrate that a perfect functioning of the price mechanism depends on many uncertainties.[7]

With respect to the foregoing one could make out a good case for having certain reservations to the thesis that the price mechanism succeeds in achieving a continous clearing of all markets. In our opinion it is of prime

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[7] See for literature on this subject the authors mentioned in footnote 3.

importance that in such a climate non-price induced quantity adjustments may contribute to the convergence of supply and demand.[8] As has been said, this type of behaviour has many applications in analyses concerning the real economy. However, in empirical monetary analyses this aspect is frequently disregarded, and monetary theory differs from this on a few points only. In particular, this applies to the treatment of the theory of credit rationing. When in this context there is an "excess demand" for credit, the banking sector does not react with bidding up the interest rate on credits but with rationing the amount of credit. The latter corresponds with a kind of non-price quantity adjustment. It would be going too far to discuss in detail the arguments for this behaviour. Some comments are nevertheless called for, but only on certain points.

In the first place we mention the fact that the microeconomic foundation of credit rationing[9] roughly corresponds with the arguments of modern disequilibrium analysis. Where clients are divided into various risk classes, for instance, the existence of uncertainties, the availibility of information, etc. play a central role.[10] On the other hand it is not completely irrelevant that the theory of credit rationing is confined to a very special part of monetary phenomena. In fact, it occupies itself only with the market for credit, and non-price quantity adjustments in alternative financial assets remain beyond the scope of this theory. Besides, credit rationing is mainly treated from one point of view only, namely that of the behaviour of the banking system. In this way one abstracts the behaviour with respect to the demand for credit. Finally, credit rationing is treated only in the case of monetary tightness. On the mirror image of this, which we may describe as "credit pushing", a stony silence is maintained.

The foregoing leads us back to our central theme, i.e. the buffer mechanism. In our opinion this mechanism creates a general framework in which various monetary disequilibrium situations – including those on the credit market – may deserve a place under the sun. As said above, the buffer mechanism distinguishes itself by non-price quantity adjustments of the banking and the private sector during monetary pressure or suction. For the banking sector, this implies for instance, that – as *Rutten* (1973, p. 246) says – it intends "to deliver an additional contribution to the money supply if there is a demand for it and to act absorbingly if the money supply

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[8] In this paper we abstract from changes in the terms of trade, for the sake of simplicity. Of course, this might be an important determining element in equilibrating supply and demand.

[9] See for instance *Jaffee* (1971), *Jaffee* and *Modigliani* (1969).

[10] See *Jaffee* and *Russell* (1976), *Van Loo* (1979).

growths faster because of other sources".[11] With respect to the private sector we may imagine an analogous behaviour. What this will amount to is that, in the case of a situation of monetary ease, the private sector will hoard extra cash balances – with respect to the ruling interest rates and other determinants – whereas in the case of monetary tightness this sector will activate existing cash balances.

To recapitulate, the buffer mechanism represents the phenomenon that in the case of an autonomous disturbance of the equilibrium between money demand and supply both the banking sector and the private sector are willing to eliminate this monetary pressure with the aid of non-price induced quantity adjustments. This stock formation in financial assets we call buffers. They are determining elements in the demand for and the supply of money. For example, when there is an excess supply of money, part of the evolving pressure will be absorbed by the private sector by means of hoarding in various assets such as demand and time deposits. On the other hand the banking sector absorbs this monetary pressure by additional stock formation in assets such as free reserves and net foreign assets. Up till now, for the sake of simplicity, we have defined the concept of "monetary pressure" as an excess demand for or an excess supply of money. However, in view of the vital role of this pressure indicator in our analysis, in the following section we develop this idea in some more detail.

III. Monetary Excess Capacity

As has been said, "monetary pressure" is the incentive behind the buffer mechanism. Therefore we have good reason to ask ourselves at what pressure economic agents move to effect non-price quantity adjustments. In our opinion this is the case if there is monetary excess capacity. The next step we have to make is to explain this pressure indicator. From the foregoing one can derive that it is built up of two components. On the one part it contains a supply factor as an indicator for monetary capacity, and on the other it contains a demand factor. As far as the latter diverges from monetary capacity it indicates the amount of monetary pressure during a period of time.

For the time being we consider base money as the relevant proxy for monetary capacity. Especially in the classical money multiplier model this seems to be an obvious starting point.[12] However, in present-day monetary

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[11] Cf. also *Korteweg* (1973). In American analysis, too, we can trace certain ad hoc elements of this kind of behaviour. See e.g. the authors mentioned in footnote 21.

[12] As is known, in the classical money multiplier model base money dominates the money supply because of an exogenous multiplier.

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analysis this matter is rather more complicated. Today the money multiplier is no longer an exogenous but an endogenous determining element in the process of money supply. As is known, it depends on the behaviour of the banking and the private sector. In turn, this behaviour is a function of the insights of the portfolio balance approach and the wealth adjustment theory. However, the foregoing does not alter our contention that in the long run base money still functions as the main source of the money supply. In other words, the banking and private sector may perhaps succeed on a temporary basis in diverging the money supply from its "trend value" as indicated by base money; in the long term base money will claim its right as the main source of the money supply.[13] In that term the law rules that ultimately base money is the relevant factor for the liquidity position of the banking sector and therefore for the extent of credits. It should be emphasized that several authors have postulated that in the long run base money and not the money multiplier dominates the money supply.[14]

Of course, we are aware of the fact that base money is no more than a crude indicator for our theoretical conception of "monetary capacity". In fact, one can imagine several ways to go into further details in the empirical elaboration of this theme. In this connection we only have to refer to the numerous discussions about the question of whether in monetary analysis base money or some kind of an adjusted monetary base should be the relevant item. In this paper we also use an adjusted monetary base, i.e. base money corrected for borrowed reserves and net foreign assets of the banking sector.[15] This adjusted monetary base acts as the capacity factor of the monetary pressure concept because it reflects the limit of the money supply in the long run.

The second half of our monetary pressure indicator has to be composed of a demand factor. This factor should placed against monetary capacity. From this confrontation one can derive the existence of monetary pressure. Just like the supply factor already discussed we cannot prescribe just one single formula. For clearly this depends on how far we intend to go into details and to refine our concept of monetary disequilibrium.[16] For the time

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[13] Of course, one should not think of base money as literally keeping in step with the trend value of money. In due course there might be gradual changes in this ratio because of more or less technical changes in payment practices. In that case monetary pressure will not increase.

[14] For the Netherlands we may refer to *Korteweg* (1973). See for analyses concerning the United States for instance *Cagan* (1965), *Friedman* and *Schwartz* (1963, tables A-1 and B-3).

[15] This is on an analogy with *Korteweg* (1973). Cf. also *Korteweg* and *Van Loo* (1977).

being we opt for a rather simple treatment of the required demand factor. We use national expenditure as the relevant proxy because this item indicates what must be the long run performance of base money, provided we do not place irrational demands upon the elasticity of the money multiplier. However that may be, it seems obvious that a certain "normal" ratio between nominal expenditure and money is a necessary condition for an adequate functioning of the monetary and real spere. If this ratio is disturbed adjustment processes will occur in order to restore the normal ratio. As said above, we consider the buffer mechanism as one of these processes.

IV. Monetary Quasi-Equilibrium

In our opinion the buffer mechanism is not the only equilibrating mechanism of the monetary sector. In addition, we consider the functioning of the classical price mechanism to be of fundamental importance for any monetary analysis. Therefore, it is our contention that there will be a mix of both mechanisms in the daily practice of a dynamic economy.

The corresponding theoretical concept we call the monetary sector in quasi-equilibrium. The term "quasi" denotes that an ex post equilibrium between money supply and demand is not only the result of the price mechanism but also of the buffer mechanism (non-price induced quantity adjustments). We assume that the evolving buffers of the latter mechanism are regarded as undesired by the market participants in the long run. In this term, perfect price flexibility rules. Under that regime only the price mechanism will clear the market whereas on hand buffers are cut. However, in the short run – or, in other words during a dynamic process – it may be attractive to accept an at first glance suboptimal position. As modern disequilibrium analysis teaches us, economic agents may realise in this way an optimal position in the long run.

Now we shall demonstrate monetary quasi-equilibrium with a quite simple model. Of course, it is not our intention to discuss every detail of the monetary sector. Here we are primarily concerned with the algebraical reflection of the main lines of our view, viz. aiming at a mix of the functioning of the buffer mechanism and the price mechanism. Further, it should be emphasized that it is not our intention to abstract from present-day monetary theory. As said before, it is our purpose to develop a synthesis

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[16] For instance we may think of an ex ante indicator of monetary disequilibrium on an analogy with *Siebrand's* (1979) analysis of the labour market. Further we may distinguish several indicators of monetary pressure starting from the principle that every financial market has its "own" pressure.

between the portfolio (or wealth adjustment) analysis and modern disequilibrium analysis. Therefore, besides scale variables and risk factors our model contains a relative price, i.e. the interest rate. For obvious reasons the interest rate reflects the price mechanism. The buffer mechanism as derived from modern disequilibrium analysis depends on the reaction of monetary pressure. We define this pressure as the difference of growth rates for (adjusted) base money and nominal expenditure. Last but not least we assume ex post equilibrium between money supply and demand.

(1) $$M^d = a_1 S + a_2 m_p - a_3 \Delta r + a_4 r_f + a_5$$

(2) $$M^s = \beta_1 M_b^s + \beta_2 Br + \beta_3 M_{ex}^s$$

(3) $$M_b^s = \gamma_1 S - \gamma_2 m_p + \gamma_3 \Delta r + \gamma_4 r_f + \gamma_5$$

(4) $$m_p = Br - V$$

(5) $$M^d = M^s$$

Endogenous variables: $M^d, M^s, M_b^s, m_p, \Delta r$.

This simple model is expressed in percentage changes. We distinguish:

Br = redefined monetary base containing the contributions to the money supply of the central bank and the foreign sector[17]
M^d = money demand
M^s = money supply
M_b^s = money supply because of the banking system
M_{ex}^s = remaining contributions to the money supply such as, for instance, changes in the currency ratio or the behaviour of the government sector
m_p = indicator of non-price monetary pressure
r = interest rate
r_f = risk factors
S = scale variables; behind this symbol one may think various items, such as private wealth, GNP, the sum of demand and time deposits etc.
V = nominal expenditure.

Before making some remarks about the functioning of this model, we briefly comment on the individual equations. Equation 1 contains, besides accepted theoretical notions such as scale variables, (relative) prices and risk factors,[18] a new element namely an indicator of non-price monetary pressure. The latter represents the buffer behaviour on the demand side of the monetary sector. Behind equation 2 we can imagine a money multiplier model for an open economy. For a model like this we may refer to various authors.[19] However that may be, this equation aims to be in agreement with

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[17] See for a further explanation *Korteweg* (1973), *Korteweg* and *Van Loo* (1977), *Knoester* (1979).

[18] In certain respects we may think of some kind of a more sophisticated represention of the known Keynesian motives, in this case the transaction, the precautionary and the speculative motive.

[19] See e.g. *Korteweg* (1973), *Willms* (1971), *Knoester* (1974, 1979), *Van Loo* (1974).

present-day theory of money supply. Equation 3 represents the contribution to the money supply of the banking sector. In line with the money supply model already mentioned, we may think of behavioural equations for free reserves and net foreign assets of the banking sector. Just like the money demand equation, it contains known theoretical elements such as relative prices, risk factors and scale variables.[20] Besides that, it contains our new element, namely the indicator of non-price monetary pressure. Here it represents the buffer mechanism on the supply side of the monetary sector.[21] Equation 4 depends on our treatment of the buffer mechanism in section III. It is based on the difference of growth rates between adjusted base money and nominal expenditure indicating the non-price pressure between monetary capacity and demand. Last but not least, equation 5 remains. This equation defines an ex post equilibrium between money supply and demand. Because of this definition, both the price mechanism and the buffer mechanism contribute to a complete (ex post) clearing of money supply and demand.[22]

Now, we shall make some comments on the functioning of the monetary sector in quasi-equilibrium. A quite simple way is to consider an autonomous increase of base money. Then, the arisen disequilibrium between money supply and demand has a two-fold effect. On the one hand the evolving excess supply causes a falling interest rate. On that account tendencies arise towards a new equilibrium via the price mechanism since the demand for money increases whereas the money supply of the banking system decreases. On the other hand an autonomous impulse in base money implies an increasing monetary excess capacity since the growth rates of base money and expenditure diverge. Because of this kind of monetary pressure the buffer mechanism becomes operative. On that account a part of the evolving monetary excess capacity is absorbed by banks since they build up buffers

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[20] In the case of a ratio specification for the bank item just mentioned this implies e.g. the sum of demand and time deposits as the relevant scale variable.

[21] It is interesting to note that in empirical analyses we can trace ad hoc elements of this type of behaviour. For instance, we may refer to *De Leeuw* and *Gramlich* (1968, p. 30) who state: "Actual levels of free reserves depend not only on target amounts but also on changes in the balance-sheet items against which free reserves are a bufferstock; that is, on movements in deposits or – for the banking system as a whole – unborrowed reserves and on movements in commercial loans". In fact, they quantify this thesis with the inclusion of changes in unborrowed reserves (i.e. some kind of a monetary base) in the equation for free reserves. Cf. also *Hendershott* and *De Leeuw* (1970, p. 600) who call this "impact" variables consisting of bank portfolio items outside the short-run control of banks. *Meigs* (1962), too distinguishes such an impact variable.

[22] As has been said before, one may in fact consider the case of incomplete clearing. However, for the sake of simplicity we work with the concept of complete clearing because of the price and the buffer mechanism.

of free reserves and net foreign assets. Because of this bank behaviour the money supply decreases in the second instance, thereby reducing the initial gap between money supply and demand. At the same time a similar effect appears on the demand side of the monetary sector. Money demanders, too, absorb a part of the evolving monetary excess capacity by way of hoarding in liquid assets. These buffers on the demand side of the monetary sector imply an increase of the money demand which reduces the initial gap with the money supply as well.

To recapitulate, in our model both the price mechanism and the buffer mechanism take care of equilibrating processes when money supply and demand are in disequilibrium. The ex post equilibrium which then arises we call monetary quasi-equilibrium since it is also the result of non-price quantity adjustments. It should be noted that in our opinion the discrete equilibrating mechanisms function simultaneously. The chosen sequence in the foregoing exposition is therefore arbitrary. Finally, it should be emphasized that our exposition of monetary quasi-equilibrium has been formulated with the possibility of a subsequent empirical elaboration in mind.[23] Of course, there might be many conceivable refinements.[24] However, in this paper we merely intend to show a general framework what might be worked out in several ways.

V. Spillover Effects to the Real Sector

In theory, the linking of the monetary and the real sector can occur along several transmission channels.[25] Up till now much attention has been paid to the linking on the basis of relative prices. In a way this is understandable because, strictly speaking, it depends on a further elaboration of the known IS-LM model with elements of present-day monetary theory. Besides that, the linking on the basis of direct wealth effects belongs to the accepted theoretical notions. However, in many cases wealth effects are represented indirectly by way of relative prices.

As already pointed out in the previous sections, it is our opinion that present-day monetary theory incorrectly abstracts from elements of modern disequilibrium analysis. In fact, this also implies abstraction from linking

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[23] For an empirical elaboration concerning the Netherlands we can refer to *Knoester* (1979), *Knoester* and *Van Sinderen* (1982).

[24] In the foregoing we already mentioned the possibility of an incomplete clearing by the price mechanism and the buffer mechanism. Further one might consider sophisticated statistical techniques in order to approximate an ex ante indicator of non-price monetary pressure. Cf. also footnote 14 and 18.

[25] See for a survey e.g. *Spencer* (1974).

the monetary and the real sector on the basis of a disequilibrium concept. Nevertheless, in this respect there are auspicious starting points. We only have to refer to the so-called "dynamic intermarket pressures" or "spillover effects" which might occur when markets are in disequilibrium. It should be emphasized that this way of linking markets has many applications in analyses concerning the real sector.[26] Therefore, in this section we will try to elaborate this theoretical concept to the linking of the monetary and the real sector.

Economic literature certainly offers some starting points for this way of linking.[27] In particular, we can refer to *Patinkin* (1956) who states that quantity constraints in one market will lead to a spillover in other markets.[28] Since according to Patinkin (1956, p. 178, 266) "the very function of money is to be spent on both commodities and bonds dynamic intermarket pressures (spillover effects) become the very essence of any analysis which is concerned with the money market". In our opinion spillover effects of non-price monetary pressure might be a vital element in the transmission of monetary impulses to the real economy. Our theoretical concept of monetary quasi-equilibrium offers obvious starting points for this kind of linking since it includes elements of a market in disequilibrium. It is our contention that monetary buffers will spill over to the real sector with a certain timelag. For example, when there is monetary excess capacity its primary result is the build-up of buffers on the demand and supply side of the monetary sector. However, economic agents will certainly take into consideration these buffers when they are framing and implementing their expenditure plans. Therefore, in the case of monetary excess capacity there will be an upward pressure on expenditure whereas the opposite effect[29] will occur in the case of undercapacity.

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[26] For instance, the home pressure of demand effect with regard to foreign trade depends on the spillover of national excess capacity to foreign countries. Also on the labour market we can trace a similar effect since the demand for labour depends in many cases on the excess capacity ratio.

[27] See *Patinkin* (1956), *Tucker* (1971), *Negishi* (1965).

[28] In this respect *Patinkin* (1956, p. 157) notes: "for just as this framework – a general equilibrium framework – emphasizes that a change in the price of one good affects the amount demanded of all other goods so does it suggest that the pressure of excess demand in one market affects the price movements of all other markets. Thus, for example, an individual who does not succeed in buying all he wants of a given good will not only bid up its price but will also divert part of the money he was originally planning to spend on that good to bidding up the prices of other goods as well . . . Here the pent-up excess demand in the controlled markets spills over into the uncontrolled ones and pushes their prices upwards".

[29] For an empirical analysis concerning the linking of the monetary and the real sector on the basis of monetary spillover effects we can refer to *Knoester* (1979), *Knoester* and *Van Sinderen* (1982).

Now, we shall demonstrate the above with a further elaboration of the model as developed in section IV. For this purpose we add behavioural equations for private consumption and private investments containing our indicator of monetary pressure and the interest rate. These equations are supplemented with some definitions in order to determine items such as total expenditure, income and the balance of payments. Further, we consider base money as a partly endogenous variable since the balance of payments is an important source of base money. Summarizing, we complete the model of section IV with the following equations:

(6) $\quad C \quad = \lambda_1 Y + \lambda_2 (m_p)_{t-1} - \lambda_3 (\Delta r)_{t-1} + \lambda_4$

(7) $\quad I \quad = \phi_1 L + \phi_2 (m_p)_{t-1} - \phi_3 (\Delta r)_{t-1} + \phi_4$

(8) $\quad V \quad = \pi_1 C + \pi_2 I + \pi_3 X$

(9) $\quad Y \quad = \varepsilon_1 V - \varepsilon_2 O$

(10) $\quad O \quad = \mu_1 V - \mu_2$

(11) $\quad \bar{F}/\bar{B}r_{t-1} = (\bar{F}/\bar{B}r_{t-1})_{t-1} + \eta_1 X - \eta_2 O$

(12) $\quad Br \quad = \Delta SK/Br_{t-1} + F/Br_{t-1} + Ex$

With one exception, these equations are also expressed in percentage changes. Only equation 11 refers to a level, namely the level of the balance of payments as a percentage of adjusted base money.

C = nominal private expenditure
Ex = remaining sources of base money such as e.g. capital imports
F = current account of the balance of payments
L = determinants of investment behaviour as can be derived from neo-classical growth theory (e.g. the "expected" growth rate of capacity)
I = nominal private investments
O = import of goods
SK = open market portfolio of the central bank
V = nominal expenditure
X = export of goods
Y = national income

It goes without saying that many elements should be added to this model before we can claim it is an approximation of the real course of affairs. We only have to think of obvious extensions such as equations for wages and prices, the labour market, the government sector and the supply of goods. Therefore, it should be stressed that it is only our intention to demonstrate the functioning of the buffer mechanism and its spillover effects to the real sector. In this respect we discuss the consequences of an autonomous increase in base money.

As pointed out in the previous section, both the price mechanism and the buffer mechanism absorb the arisen pressure between money supply and

demand. The evolving monetary quasi-equilibrium has direct consequences for the real sector because of two transmission channels. In the first place there will be an upward pressure on consumption and investments because of the lower interest rate. In addition, we distinguish an upward pressure on behalf of a second transmission channel, namely the spillover of monetary excess capacity to private expenditure. For the sake of simplicity we assume with regard to both channels a certain timelag although in theory a simultanously reaction might happen as well.[30]

It should be stressed that the higher level of expenditure does not mean the end of our story. On the contrary, it implies tendencies towards a slackening of the pent-up monetary excess capacity. In the first place we can mention the factor that more expenditure will lead to a balance of payments deficit whereby base money leaks abroad. Together with the direct effect of expenditure on monetary excess capacity it lowers the initial monetary pressure and, consequently, the buffers on the demand and the supply side of the monetary sector.

Apart from this, there will be adjustment processes on behalf of the more traditional links between the monetary and the real sector. In this respect we may refer to the direct impact on the money supply of base money leaking abroad. Further, money demand will arise on behalf of an increasing need for transaction balances. This implies that after some time monetary buffers are replaced in some way by money induced by "traditional" factors such as scale variables or the balance of payments position.

What all this amounts to is that the linking of the monetary and the real sector is of fundamental importance for our view on the working of the buffer mechanism. Our model suggests a temporary character of monetary buffers since the spillover to the real sphere implies absorbent feedback effects which diminish the initial buffers. It also suggest that a once-and-for-all impulse in base money hardly results in a lastingly higher level of expenditure since the additional base money leaks abroad via balance of payments deficits. Empirical research for the Netherlands indicates a decrease of international reserves which is almost the same as the initial increase in base money.[31] In a world of floating exchange rates this might be of prime importance for the exchange rate and therefore for the inflation rate. Of course, this conclusion might be less striking if an economy bears a more closed character. However, in that case we may expect a higher inflation rate because of demand-pull inflation.

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[30] However, empirical evidence suggests a timelag of about one year, cf. *Knoester* (1979), *Knoester* and *Van Sinderen* (1980).

[31] Cf. *Knoester* (1979, p. 114).

The foregoing discussion is based on a once-and-for-all impulse in base money. Clearly, permanent impulses such as for instance a higher growth rate of base money, will lead to a somewhat different opinion. In that case monetary buffers and spillover effects to the real sector bear a permanent character with inherent consequences for the level of expenditure, the balance of payments and the inflation rate.

Therefore, it seems to be of prime importance that policymakers should choose a suitable growth rate of base money. This choice ought to be founded on a comparative evaluation of the positive effects on the level of expenditure and the negative effects on the balance of payments and the inflation rate. In our opinion in this respect the rules as developed by *Meade* and *Mundell* are quite appropriate.[32]

Summarizing, we can state that spillover effects of monetary pressure might be of fundamental importance as a supplement to the existing transmission channels such as relative prices and direct wealth effects. In fact, these spillover effects depend on the application in monetary analysis of very general behavioural hypotheses which can be derived from modern disequilibrium analysis. Further, it should be noted that in actual empirical research this way of linking seems to have many disciples. In this respect we may refer to the common practice of including some kind of a liquidity ratio in behavioural equations for the various expenditure categories. Finally, it should be emphasized that this way of linking might be of prime importance for our judgement on macroeconomic policy. Especially the comparative evaluation of the level of expenditure, the external position and the inflation rate seems to be relevant.

VI. Conclusion

In this paper we have tried to develop a general framework for a more systematic application of modern disequilibrium analysis to monetary theory. Therefore, in section II we argue that non-price quantity adjustments in financial assets might be an important equilibrating mechanism if money supply and demand diverge. These non-price quantity adjustments we call the buffer mechanism which is activated by the behaviour of both the banking and the private sector. Its fundamental object is to absorb unexpected disturbances in the money supply and demand process. In section III we spell out the approximation of our concept of monetary excess capacity, which is the incentive behind the buffer mechanism. For the time being, we

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[32] See *Meade* (1951, 1978), *Mundell* (1968).

define monetary excess capacity as the difference between the growth rates of base money and nominal expenditures. In section IV monetary quasi-equilibrium is our topic. In our opinion both the classical price mechanism and our buffer mechanism function together as an equilibrating force when money supply and demand diverge. On behalf of the working of the buffer mechanism we define this theoretical concept as the monetary sector in quasi-equilibrium. This monetary quasi-equilibrium might have important spill-over effects on the real sector of the economy. Therefore, in section V spill-over effects of monetary excess capacity is our main topic. In addition, we discuss some policy implications from a bird's-eye view.

Finally, it should be stressed that the principal aim of this paper is to offer some starting points for a more systematic integration of modern dis-equilibrium analysis in present-day monetary theory. Of course, the last word in this matter has not yet been said. Apart from the need of a further empirical elaboration of this theme there are several questions which need to be answered. For instance, we should keep in mind that the phenomenon of monetary equilibrium and disequilibrium is not a completely new topic. Already during the Great Depression authors like *von Hayek* (1933), *Wicksell* (1936) and *Koopmans* (1933) paid attention to monetary disequilibrium situations.[33] In their opinion monetary equilibrium should be defined as the zero of inflation or deflation which implies the "neutrality" of money. In certain respects one may trace certain similarities with our concept of monetary quasi-equilibrium and its spillover effects to the real sector. However that may be, this example only stresses the need for further research on this subject. Hopefully this paper will supply some inspiration for subsequent efforts.

References

Barro, R. J. and H. I. *Grossman:* "A General Disequilibrium Model of Income and Employment". A.E.R. 61 (March 1971): 82 - 93. – *Benassy*, J. P.: "Neo-Keynesian Disequilibrium Theory in a Monetary Economy". Rev. Econ. Studies 42 (October 1975): 503 - 23. – *Benassy*, J. P.: "Cost and Demand Inflation Revisited: A Neo-Keynesian Approach". Libraire Droz, Geneva (1978): 113 - 33. – *Brunner*, K. and A. H. *Meltzer:* "The Place of Financial Intermediairies in the Transmission of Monetary Policy". A.E.R. 53 (May 1963): 372 - 82. – *Cagan*, Ph.: Determinants and Effects of Changes in the Stock of Money 1875 - 1960. New York, 1965. – *Clower*, R.: "The Keynesian Counterrevolution: A Theoretical Appraisal". In: The Theory of Interest Rates, edited by F. H. Hahn and F. P. R. Brechling, London, 1965. – *Eckstein*, O. and G. *Fromm:* "The Price Equation". A.E.R. 58 (December 1968): 1159 - 83. –

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[33] See for a discussion of this topic e. g. *De Jong* (1973).

Friedman, M. and A. J. *Schwartz:* A Monetary History of the United States, 1867 - 1960. Princeton University Press, 1963. – *Grossman,* H. I.: "Money, Interest and Prices in Disequilibrium". J.P.E. 79 (September/Oktober 1971): 943 - 61. – *Gurley,* J. G. and E. S. *Shaw:* Money in a Theory of Finance. Brookings Institution, Washington, D.C., 1960. – *Hayek,* F. A. von: Monetary Theory and the Trade Cycle. London/Toronto, 1933. – *Hendershott,* P. H. and F. *De Leeuw:* "Free Reserves, Interest Rates and Deposits, a Synthesis". J. of Fin. (June 1970): 599 - 613. – *De Jong,* F. J.: Developments of Monetary Theory in the Netherlands. Rotterdam University Press, 1973. – *Jaffee,* Dw. M.: Credit Rationing and the Commercial Loan Market. New York, 1971. – *Jaffee,* Dw. M. and F. *Modigliani:* "A Theory and Test of Credit Rationing". A.E.R. 59 (December 1969): 850 - 72. – *Jaffee,* Dw. M. and T. *Russell:* "Imperfect Information, Uncertainty, and Credit Rationing". Q.J.E. (November 1976): 651 - 66. – *Knoester,* A.: "Een stelsel monetaire vergelijkingen ten behoeve van een empirisch macro-model voor Nederland". Maandschrift Economie 38 (juli 1974): 473 - 530. – *Knoester,* A.: "On Monetary and Fiscal Policy in an Open Economy". De Economist 127 (No. 1, 1979): 105 - 42. – *Knoester,* A.: Over geld en economische politiek, Leiden/Antwerpen, 1980. – *Knoester,* A. and J. *van Sinderen:* Economic Policy and Employment, Discussionpaper 8201, Dutch Ministry of Economic Affairs, The Hague. To be published in A. Maddison and B. S. Wilpstra (eds.), Unemployment: a Dutch perspective, The Hague, 1982. – *Koopmans,* J. G.: "Zum Problem des 'neutralen' Geldes". In: Beiträge zur Geldtheorie, edited by F. A. von Hayek. Vienna, 1933. – *Korteweg,* P.: "Over de beheersbaarheid van de geldhoeveelheid in Nederland". De Economist 121 (1973): 273 - 99. – *Korteweg,* P. and P. D. *Van Loo:* The Market for Money and the Market for Credit. Leiden, 1977. – *Leeuw,* F. de and E. M. *Gramlich:* "The Federal Reserve MIT Econometric Model". Fed. Res. Bulletin (January 1968): 472 - 91. – *Loo,* P. D. van: "On the Microeconomic Foundations of Bank Behaviour in Macroeconomic Models". Institute for Economic Research, Discussion Paper Series (7901/M). Erasmus University Rotterdam, 1979. – *Meade,* J. E.: The Theory of International Economic Policy, Volume 1, The Balance of Payments. London, 1951. – *Meade,* J. E.: "The Meaning of 'Internal Balance'". Econ. J. 88 (September 1978): 423 - 35. – *Meigs,* A. J.: Free Reserves and the Money Supply, Chicago, 1962. – *Mundell,* R. A.: International Economics. New York/London, 1968. – *Negishi,* T.: "Market Clearing Processes in a Monetary Economy". In: The Theory of Interest Rates, edited by F. H. Hahn and F. P. R. Brechling. London, 1965. – *Patinkin,* D.: Money Interest and Prices; an Integration of Monetary and Value Theory. Evanston, Illinois, 1956. – *Rutten,* F. W.: "Over de macro-economische politiek tijdens de zestiger jaren". In: Economie dezer dagen, edited by W. Begeer, L. H. Klaassen and J. R. Zuidema. Rotterdam University Press, 1973. – *Siebrand,* J. C.: Towards Operational Disequilibrium Macro-Economics. The Hague/Boston/London, 1979. – *Spencer,* R. W.: "Channels of Monetary Influence, a Survey". Fed. Res. Bank of St. Louis Rev. (November 1974). – *Tobin,* J.: Essays in Economics, Volume 1: Macroeconomics. Amsterdam/London, 1971. – *Tucker,* D. P.: "Credit Rationing, Interest Rate Lags, and Monetary Policy Speed". Q.J.E. 82 (1968): 54 - 84. – *Wicksell,* K.: Interest and Prices, a Study of the Causes Regulating the Value of Money. London, 1936. – *Willms,* M.: "Controlling Money in an Open Economy: The German Case". Fed. Res. Bank of St. Louis Rev. (April 1971): 10 - 27.

Zusammenfassung

Theoretische Grundsätze des Puffermechanismus, monetären Quasigleichgewichts und seiner Übertragungswirkungen

In diesem Aufsatz argumentieren wir, daß die derzeitige Geldtheorie – wie etwa der Portfolio-Ansatz und die Theorie der Vermögensanpassung – die Einsichten der modernen Ungleichgewichtstheorie zu Unrecht vernachlässigt. Dieses Versäumnis kann jedoch für unsere Beurteilung makroökonomischer Politik von grundlegender Bedeutung sein. Wir versuchen daher, einen theoretischen Ansatz zu entwickeln, um diese Lücke zu schließen. Dazu diskutieren wir den Puffermechanismus. Seine charakteristische Grundeigenschaft besteht darin, daß ein Geldüberhang reine Mengenanpassungen bei Finanzaktiva hervorruft, ohne die Preise zu ändern. Durch diesen Ausgleichsmechanismus entstehen Tendenzen zu einem neuen ex-post Gleichgewicht. Zusammen mit dem klassischen Preismechanismus führt das zu einem Zustand, den wir als „monetäres Quasigleichgewicht" bezeichnen. Dieses monetäre Quasigleichgewicht impliziert eine darauffolgende Transmission monetärer Impulse in den realen Sektor, nämlich die Übertragung des Geldüberhangs.

Summary

Theoretical Principles of the Buffer Mechanism
Monetary Quasi-Equilibrium and its Spillover Effects

In this paper we argue that present-day monetary theory – such as the portfolio balance approach and the wealth adjustment theory – incorrectly neglects the insights of modern disequilibrium analysis. However, this ommision may be of fundamental importance for our judgement on macroeconomic policy. Therefore, we try to develop a theoretical framework to bridge this gap. In this respect we discuss the buffer mechanism. Its main characteristic is that a situation of monetary excess capacity evolves non-price quantity adjustments in financial assets. By way of this equilibrating mechanism tendencies will arise towards a new ex post equilibrium. Together with the classical price mechanism it results in a type of a situation which we call "monetary quasi-equilibrium". This monetary quasi-equilibrium implies a subsequent transmission channel of monetary impulses to the real sector, namely the spillover of monetary excess capacity.

Résumé

Principes théoriques du mécanisme compensateur, de l'équilibre quasi-monétaire et de ses effets de prélèvement

Nous démontrons dans cet article que la théorie monétaire actuelle – telle que l'approche de la balance de portefeuille et la théorie de l'ajustement de richesse – commet l'erreur de négliger les discernements de l'analyse moderne du déséquilibre. Or, cette omission peut avoir une importance fondamentale pour notre appréciation de la politique

macroéconomique. C'est pourquoi, nous essayons de développer une structure de base théorique pour combler cette lacune. A cette fin, nous discutons le mécanisme compensateur. Sa caractéristique principale est qu'une situation de capacité monétaire excessive entraîne des ajustements quantitatifs des biens financiers qui ne sont pas relatifs aux prix. Par ce mécanisme d'équilibre, se développeront des tendances qui conduisent à un nouvel équilibre ex-post. Ceci entraîne, avec le mécanisme classique des prix, un type de situation que nous appellons «équilibre quasi-monétaire». Cet équilibre quasi-monétaire implique un canal de transmission subséquent d'impulsions monétaires vers le secteur réel, notamment le prélèvement de capacité monetaire excessive.