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Monetary Policy and the Trade Cycle

by Dr Jürgen Siebke and Dr Manfred Willms, Bonn University

There is a group of economists who try to explain the effects of monetary policy on the data of the actual economic process through the structure of interest rates, which changes under the impact of the varying parameters of monetary policy¹.

The Portfolio Theory of Monetary Policy

Following this monetary theory, they maintain that the stock of real capital, securities, credits, savings deposits and demand deposits, as well as Central Bank money, held by the private economic entities are kept in equilibrium by a very specific structure of interest rates. The Central Bank is thus able to influence the decisions of the economic entities to spend by creating disequilibrium in the overall composition of their portfolios by changing the structure of interest rates. For example, this will be the case when the Central Bank, in order to cut down monetary liquidity, offers for sale to the private economic entities open market papers. The private economic entities will be willing to exchange their holdings of banknotes against bonds only if and when these yield to them a higher rate of interest. If the Central Bank wants to carry through this substitution, the rate of interest in the bond market will rise. As all the financial markets are connected by, as it were, a system of communicating tubes, and will substitute each other, all the other rates of interest will also be driven up, including interest for credits. The only exception is the yield on real capital, which is unable to adapt itself to this change without delay, and will become too low comparatively, in contrast to other forms of investment. The effect will be that the economic entities reduce their demand for real capital, and production will consequently contract.

This adaptation is a complicated process, operating through a large number of shifts in the composition of the holdings accumulated by the individual economic entities. Thus, monetary policies are under the influence of yield expecta-

tions, the assessment of the risks run by capital held, and the reaction to recognised risks. However, the basic operator of monetary policies is the change in the structure of the interest rates. According to this theory, it is the task of the Central Bank to establish a structure of the rates of interest which safeguards the desired effects on actual production and business operations.

The Modern Quantity Theory of Money

The modern representatives of the quantitative theory do not deny that monetary policy effects the economy by the described mechanism, but they believe that the quantity of money kept by the private sector of the economy is the decisive factor which operates the regulatory effect of any monetary policy. They only deny that the rates of interest set up a close relationship between the monetary variables and the variables of the real sector of the economy via the costs of credit². Economic models of the criticised kind appeared to confirm the unimportance of monetary policy, because it was found that the economy is reacting with relatively small elasticity to changes in the rates of interest. Their results contradict those of simple models of the quantity theory, which neglect the mechanism of credit costs, but which experience has shown prove that the mere quantity of money in circulation has an overriding significance³. The adherents of the modern quantity theory of money always quote the results of these quantitative assessments when they pronounce on what they expect of monetary policy. They are able to show that variations in the trade cycle go always hand in hand with pro-cyclical changes in the growth rates of the volume of money. This, however, does not prove that the Gross National Product (GNP) and the quantity of money circulating are causes and effects of each other, in one or the opposite direction. But detailed analysis of the shifts in the quantities of money in circulation for many trade cycles in the United States seem

¹ James Tobin, *An Essay on Principles of Debt Management*, in: "Fiscal and Debt Management Policies", published by the Commission on Money and Credit, Englewood Cliffs, N.J., USA, 1963, pp. 143-218; James Tobin, *A General Equilibrium Approach to Monetary Theory*, in: *Journal of Money, Credit and Banking*, Vol. 1, 1969, pp. 15-29.

² cf. Karl Brunner, *Eine Neuformulierung der Quantitätstheorie des Geldes (A Reformulation of the Quantitative Theory of Money)*, in: *Kredit und Kapital*, Vol. 3, 1970, No. 1, p. 1-38.

³ cf. Milton Friedman and David Meiselman, *The Relative Stability of Monetary Velocity and the Investment Multiplier in the United States 1897-1958*, in: *Stabilization Policies*, Commission on Money and Credit, Englewood Cliffs, N.J., USA, 1963, pp. 165-268.

to confirm that the cyclical shifts in the observed data of production and actual business have been influenced and increased by changes in the quantity of money⁴.

What the adherents of modern theory on the quantity of money therefore want, in order to reduce the amplitude of cyclical fluctuations, is a stable growth rate in the quantity of money. It is the Central Bank's task, in their view, to see to it that the annual growth rate of the money in circulation is hitched to the long-term growth rate of the GNP. They have also been able to show, by their empirical studies, that the Federal Reserve System is capable of this. They have been able to demonstrate that the Central Bank money within the US monetary system is de-

termined by the Federal Reserve Banks, that fluctuations of this quantity are only marginally dependent on the behaviour of the commercial banks and of the general public, and that variations in the quantity of money are prevailingly caused by fluctuations in the quantity of Central Bank money. From the latter observation, they infer the direct responsibility of the Federal Reserve System for the cyclical movements of the economy.

The Liquidity Theory of Money

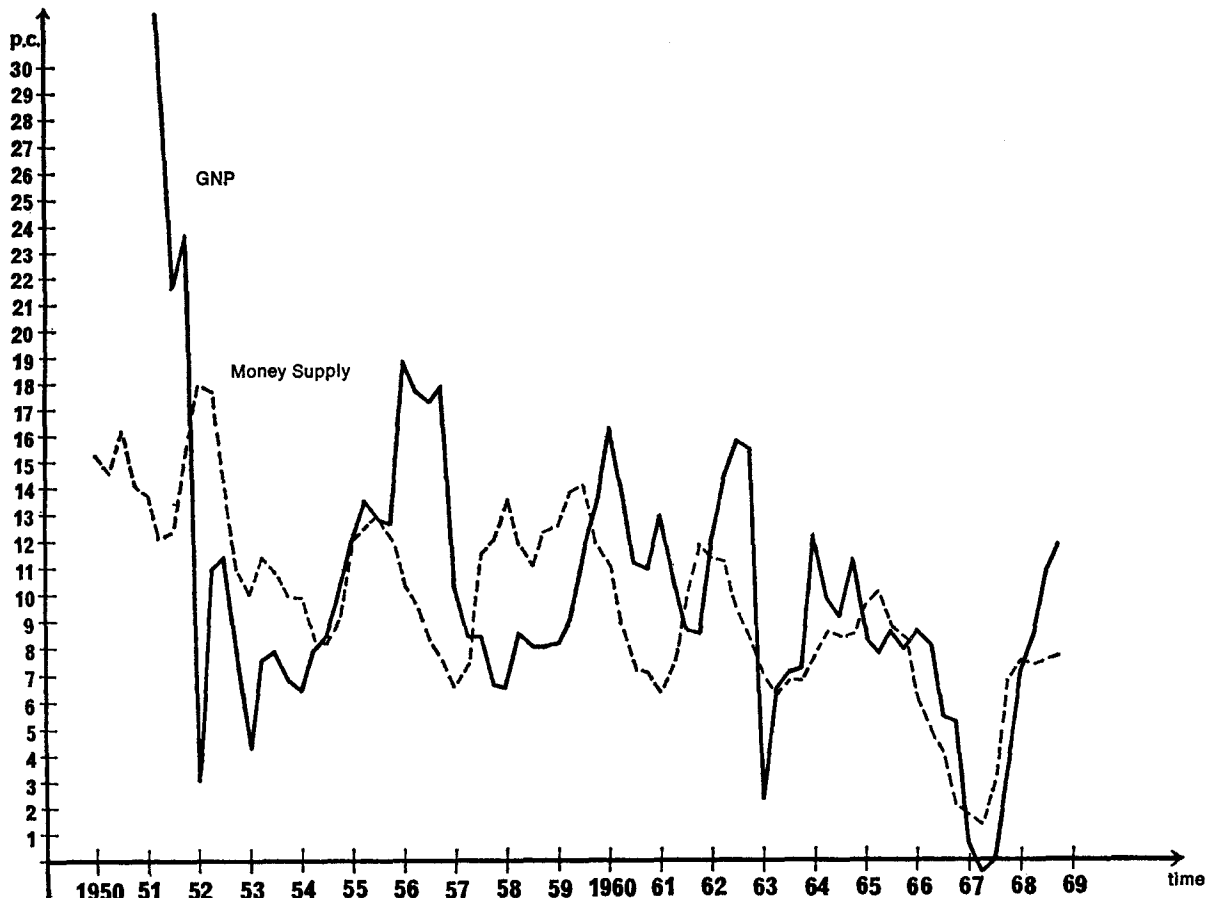
There is still a third kind of theory on the effects of money, coming from Europe, especially from the UK⁵ and from Germany⁶. It bases its conclusions on the assumption that the decisions

⁴ Milton Friedman and Anna J. Schwarz, Money and Business Cycles, in: Review of Economics and Statistics, Supplement Vol. XLV, 1963, pp. 32-64; by the same authors: A Monetary History of the United States 1957-1960, Princeton, 1963; Karl Brunner and Alan H. Meltzer, An Alternative Approach to the Monetary Mechanism, Subcommittee on Domestic Finance, Committee on Banking and Currency, Washington, 1964.

⁵ Report of the Committee on the Working of the Monetary System (Radcliffe Report), London, 1959.

⁶ Günther Schmolders, The Liquidity Theory of Money, in: Kyklos, Vol. XIII (1960), pp. 346-360; Otto Veit, Volkswirtschaftliche Theorie der Liquidität (Economic Theory of Liquidity), Frankfurt-on-Main, 1948; Otto Veit, Reale Theorie des Geldes (Real Theory of Money), Tübingen, 1966.

Chart No. 1
Annual Growth Rates of the GNP and of the Money Supply 1950 I to 1968 IV



on spending made by the economic entities are determined not only by the quantity of money at their disposal, but beyond that by the entire availability of liquid funds, which can be exchanged against money at a moment's notice. Some of the representatives of this theory go so far as to describe not only the actual, or objective, degree of liquidity but its subjective form (the feeling that one is liquid) as the ultimate determinant of effective demand for both consumption and investment goods. Basically, this theory is only an extended variation of the quantity theory of money, for in the final analysis, it is the quantity of money which forms the basis for overall liquidity in a given society, and as long as the typical behaviour of commercial banks and other private economic entities does not follow paths that are fundamentally different from their present habits, overall economic liquidity can only rise, or fall, in line with monetary expansion or contraction.

Of the three different types of theorists, only the quantity theorists have so far been able to produce empirical proofs for their assertions. The two remaining theories have hitherto only produced programmes for further research. The instruments of observation forged by the authors of the modern quantity theory of money are particularly suitable for analysing monetary policy during the cyclical movements of the economy. They have therefore been utilised for the following analysis.

Chart No. 1 displays the growth rates of the nominal GNP and of the quantity of money (quarterly increases against the previous year) in the Federal Republic of Germany, between 1950 and 1968. It shows that both the growth rates of the GNP and of the quantity of money tend to decrease in the long run. Over and above this long-term trend, there are big fluctuations of the two observed variables, which display some kind of symmetry, but the cycles of monetary fluctuations occur usually earlier than those of the GNP.

This parallelism of movement, distinguished only by a phase shift between the two curves of GNP and available money, poses the following questions:

- ☐ is there a connection, as between cause and effect, between the quantity of money and the GNP?
- ☐ which kind of time lag occurs between changes in the quantity of money and changes of the GNP?
- ☐ which economic entities (the Central Bank, the commercial banks, or the general public) cause the variations of the quantity of money?

To find an answer to the first question is impossible without detailed analysis of the movements of various elements making up the money supply during cyclical changes of the economy. Available empirical material has not been sufficiently processed to provide this answer—the only conclusion which may be drawn is that cyclical changes of the GNP will obviously not occur without preceding changes of the quantity of money tending in the same direction⁷. It is this connection in itself which makes it appear to be not an unreasonable requirement that monetary expansion rates ought to be stabilised, in order to flatten out the oscillations of the GNP.

If we accept the fact that changes in the quantity of money exert an influence on economic activity, we must then ask after which delay changes in the quantity of money will affect significantly the real economic variables. Our first task will be to discern the influence brought to bear on the GNP by a given change of the quantity of money. It stands to reason that this effect will certainly operate immediately, run up to a climax, then flatten out, and eventually fade out. This is what is known as a distributed lag. The lag which is of importance for monetary policies is not the whole period of impact but a "slice" of time during which average maximum impact has been operating.

Recognition of the Time Lag

A relatively simple method of finding the length of the lag is to compare the maximum and minimum growth rates of both the quantities of money and of the GNP⁸. During the three most pronounced economic cycles in the Federal Republic of Germany registered after the close of reconstruction, namely the periods 1956/I to 1960/I; 1960/I to 1962/III, and 1966/I to 1968/III, the upper and lower turning points of growth rates for the GNP and money supply, respectively, are separated by time lags varying in length between six and twelve months⁹.

On average, growth rates of money supply had arrived at their periodical highs about seven months before the respective record levels of

⁷ Winfried Vogt's hypothesis (in: "Die Wachstumszyklen der westdeutschen Wirtschaft von 1950 bis 1965 und ihre theoretische Erklärung" (West German Economic Growth Cycles from 1950 and 1965 and their Theoretical Explanation), in: *Recht und Staat*, No. 730, Tübingen, 1968, p. 9) that all economic growth periods in the Federal Republic of Germany were occasioned by above-average growth of export demand does not run counter to his observation. A powerful expansion of exports at a time when imports rise less strongly will lead to a payment surplus on international account and thus increase proportionately the quantity of highpowered money.

⁸ cf. Milton Friedman, *The Lag in Effect of Monetary Policy*, in: *Journal of Political Economy*, Vol. LXIX, 1961, p. 252; by the same author, *The Supply of Money and Changes in Prices and Output*, in: *The Optimum Quantity of Money*, London, 1969, p. 180.

⁹ The only exception is the recession of 1967/II.

GNP growth rates, and average anticipation of GNP minimum growth rates by minimum growth rates of money supply was about six to seven months.

Economic Cycles in the Federal Republic of Germany

(Time Lag between Growth Rate Variations
of GNP and Money Supply Respectively)

	Money Supply	GNP	Time Lag
Maxima (Upper Turning Points)			
First Cycle	1955/III	1956/I	6 months
Second Cycle	1959/III	1960/I	6 months
Third Cycle	1965/II	1966/I	9 months
Minima (Lower Turning Points)			
First Cycle	1957/I	1958/I	12 months
Second Cycle	1961/I	1961/III-IV	6-9 months
Third Cycle	1967/II	1967/II	

In order to identify the influence of separate classes of economic entities on the movements of money supply, it is intended to relate the changes in money supply, by components, statistically to the behaviour of the authorities making policy decisions on the money supply, the commercial banks, the non-bank private economic units. Previous discussions on monetary policy have circled too much round the disparate influences which, in theory, are conceivable as the effects of behaviour by different branches of the economy. But for the practice of monetary policy, it is more important to discern typical modes of behaviour and their quantitative impact.

Economic Entities and Their Influence

The following analysis makes use of the multiplier method. Thus, the supply of money circulating in a given economy (M) may be expressed as the product of the Central Bank monetary base, (B) and a multiplier (m). In mathematical symbols, this is

$$M = m \cdot B$$

The monetary base may be broken down, following the balance sheets of the German Bundesbank, into elements, according to different statutory sources which give rise to the issue of Central Bank money. Under the currency system of West Germany, these are the sources: statutory and non-official foreign exchange reserves (G)¹⁰; deposits at the Central Bank made by public authorities, less their cash borrowings from the Central Bank (E); banks' refinancing lendings (F), and the holdings of government bonds, which are used for open market transactions (W). The methods used by the Central Bank's open market policy in Germany are similar to private bank refinancing: the Federal Bank is selling to, and buying from, other banks short-

term Federal Treasury bonds, fixing a rate of interest at which it is willing to engage in such business.

Under German law, the Federal Bank compels private banks to hold in their Central Bank accounts minimum reserve funds, i.e. to lend Central Bank money to the Bundesbank. By manipulating the variable minimum reserve rate, the Federal Bank draws into these minimum reserve Central Bank issues, or it releases them, at discretion. In this way it imposes a credit squeeze or credit liberalisation, respectively, on the private banks. The quantitative effect of the minimum reserve policy will be listed here as an element (B') contributing to the supply of money^{11 12}.

The elements, E and B', are under the control of the authorities in charge of monetary policy. They either offset, or increase, the effect of foreign trade and payments on inland money supply, which is reflected by G. G is an element in total money supply which may be treated as exogenous to the system. In order to reduce dependence of inland money supply on G, the Central Bank and the Government usually react to fluctuations of G by changing the magnitude of both E and B'. Here are three sources feeding the creation of Central Bank money issues, which are under the influence of official monetary policy, and which may therefore be considered as forming one single composite element of money supply. The other single component element of money supply is F + W, which links the creation of Central Bank money issues to the activities of private credit institutes.

Composition of the Multiplier

If all the remaining items in the balance sheet of the Bundesbank, including the circulation of coins, are compounded into one element containing Miscellaneous Sources (S), the monetary base (B) is determined as follows:

$$B = (G - E + B') + (F + W) + S$$

¹¹ r_t will stand for the average minimum reserve rate and RV_t for the amount of liabilities during the period t, for which minimum reserves must be held under mandatory law. We then start by computing for each month the variation in the size of minimum reserves, as follows:

$$\Delta B_t^r = (r_t^+ - r_{t-1}^+) \cdot RV_{t-1}$$

The monetary base must then be varied, month by month, by all these changes in the size of minimum reserves which have occurred in the past, thus:

$$B_t^r = \sum_{\tau=t_0}^t \Delta B_{\tau}^r$$

Actual calculations were based on initial dates of February, 1949 (= t_0).

¹² cf. also Leonell C. Andersen and Jerry L. Jordan, The Monetary Base - Explanation and Analytical Use, in: Review of the Federal Reserve Bank of St. Louis, Vol. 50, 1968, No. 8, pp. 7-14.

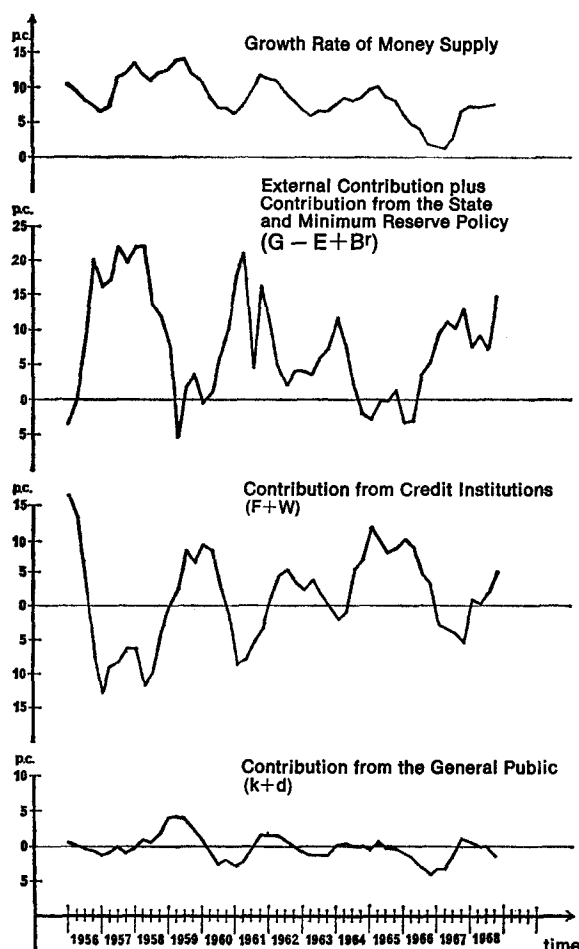
¹⁰ Including claims on the Federal Government and foreign countries originating from an exchange for gold and foreign currency.

Economic subjects outside the banking sector bring their influence to bear on the supply of money through changing their cash holdings and their demand deposits. This is reflected by the changes of the cash-demand deposit-ratio (defined as the ratio of cash held, or C , to money on call with the banks, or D^P , both in the hands of the general public) and of the deposit parameter (d), expressing the ratio of total deposits to private demand deposits. The two parameters, together with the adjusted reserve ratio r , (defined as the ratio of actual reserves held by the banks, less that part of the monetary base known as B^r , to D , the overall volume of all deposits), enter into the composition of the multiplier, as follows:

$$m = \frac{1 + k}{rd + k}$$

Chart No. 2

The Effect of the Single Elements on Money Supply



The reserve ratio, r , which reflects voluntary reserves and cash holdings of the banks, is relatively immobile, in the long term, as opposed to the remaining coefficients. It is therefore possible to disregard it as a separate element contributing to the volume of money.

Chart No. 2 reflects the contribution made by individual elements to the growth rate of money supply over the period 1956-1968^{13, 14}. It is evident that the first single compound element forming the monetary base has always moved in the opposite direction to the second single component: the influence of foreign trade and payments, plus measures taken by the authorities in charge of monetary policy, as against the influence of activities of private banks. The banks have always reacted to a rising supply of Central Bank money, which are to them exogenous, by reducing their refinancing activities, and by buying open market treasury bonds. Vice versa, when Central Bank money issues, as the exogenous element, started to shrink, the banks procured money by increasing refinance and selling open market securities. The combined effect of the variations of these two elements largely produces the fluctuations of money supply growth rates. The general public only adds to the amplitudes of these fluctuations. Quantitatively speaking, the contribution of these two components is relatively minor, compared with the contributions made by the elements of the monetary base.

Conclusions

The foregoing is only a rough sketch highlighting some of the problems connected with manipulating the business cycle through monetary measures. But even this brief survey will persuade readers that much more empirical research needs to be done before more precise predictions may be made with confidence about the degree of impact attributable to monetary policy decisions, and about the time lag after their use. This is especially true of Germany where research into the quantitative effects of monetary policy is still in its infancy.

¹³ The contributions made to the growth rate of the money supply were calculated from an amended formula showing the composition of the multiplier.

¹⁴ A detailed analysis of the money supply in West Germany is contained in: Jürgen Siebke and Manfred Willems, "Das Geldangebot in der Bundesrepublik Deutschland. Eine quantitative Analyse für die Periode 1958 bis 1968" (Money Supply in the Federal Republic of Germany. A quantitative analysis for the period 1958-1968), in: Zeitschrift für die gesamte Staatswissenschaft, Vol. 126, 1970, pp. 55-75.