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**Article**

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# The Money Supply: The Evidence from the Brazilian Economy\*

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It is the purpose of this paper to analyze the money supply in the Brazilian economy. The technical feasibility of controlling the stock of money is examined. A money supply function is estimated and an attempt is made to test the hypothesis that the monetary authorities have discretionary power to control the monetary base. The period of investigation is restricted to the period 1948 through 1967 in view of the ready availability of data<sup>1</sup>. During this period the rate of increase in prices averaged thirty-one per cent per year and the money supply rose at an average annual rate of thirty-six per cent. Some discussion of the institutions in which the available monetary tools are applied is provided as an overview.

## I. Institutional Setting

During most of the period covered by our analysis, the Central banking functions were carried out by the Bank of Brazil, by the Treasury and by SUMOC (Superintendency of Money and Credit). The Treasury had the control over the currency issue. SUMOC was founded in 1945 and was given the power to fix the reserve requirement ratio and determine the rediscount rate within the limits established by law. It also exercised regulatory power over the commercial banks and exchange

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\* I have benefit from studying economics with Prof. Allan H. *Meltzer*. I wish to express my gratitude for this guidance, criticism and encouragement. Prof. M. *Bronfenbrenner* also made innumerable suggestions which will be incorporated in future research. I am also grateful to Dr. Fernando de *Mendonça* for his support.

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<sup>1</sup> The basic research was conducted in 1970. An extensive treatment appears in my unpublished dissertation, "Studies of Money and Interest Rate in Brazil", Carnegie-Mellon Univ., 1971, which was financed by USAID-Brazil, ITA and CAPES.

rates. The Bank of Brazil carried out the rediscount operations, but also controlled a large share of the credit extended to the private sector<sup>2</sup>.

On December 31, 1964, the Central Bank and the National Monetary Council were founded. The Central Bank incorporated SUMOC and was given power to conduct open-market operations and to control the currency issue. The National Monetary Council “was probably intended merely to lay down general lines of policy . . . but the council has been given specific and ad hoc directives to the Banco Central on discount rates and the like” (*Ellis* 1969, pp. 190).

An important aspect of the institutional setting is the unquestioned power of the executive over the central banking functions. The finance minister was the chairman of SUMOC’s governing council and the federal government holds the majority of stock in the Bank of Brazil. The creation of the Central Bank imposed some constraints on the federal government control of the money supply, but the power still remains highly concentrated in the government hands, at least as long as the National Monetary Council continues to dictate the Central Bank policies<sup>3</sup>.

The exhibit depicts the annual percentage variations of the money stock. Using money as an indicator of monetary policy, we observe that the policy was highly expansive before 1965<sup>4</sup>. Slight contractions may be detected in 1952 and 1960 while more pronounced ones are observable in 1951 and 1958. Only in 1966 was the highly expansive trend strongly reversed. And the renewed expansion in 1967 evidenced the difficulties faced by the monetary authorities in maintaining a contractive policy after two decades of expansion.

From 1930 to 1970 the political instability of the country was very high. Only Dutra and Kubitschek completed the legal presidential term of five years. There is a close parallel between the political and the

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<sup>2</sup> See *Baer* (1965, pp. 89 - 90) and *Ellis* (1969, pp. 189 - 190).

<sup>3</sup> The eleven members of the Council are: Minister of Finance, Minister of Industry and Commerce, Minister of Planning and Economic Coordination, President of Bank of Brazil, President of the National Development Bank, four officers of the Central Bank and two officers of the commercial banks appointed by the President (*Ellis* 1969, pp. 190).

<sup>4</sup> Expansive and contractive monetary policies are relative terms, which “compare the size of monetary changes to the changes that have gone before and not to some absolute or ideal rate of monetary expansion”. (*Meltzer*, May 1969, pp. 17).

monetary instability. President Goulart was ousted at the peak of the inflationary process and the succeeding strong regime was able to bring the inflation rate down to the thirty per cent level. The terms of the two finance ministers of the revolutionary government (since March, 1964) are greater than those of all their predecessors since 1953. From June 1953 to February 1964 the average term of the finance minister was 9.9 months. From March 1961 to February 1964, the period of highest acceleration in prices, it was reduced to 6 months.

As for the tools of monetary policy, during the two decades the monetary authorities lacked the most powerful one, open-market operations<sup>5</sup>. The reserve-requirement changes were systematically used for tax purposes, but may have been occasionally employed in sporadic contractive policies<sup>6</sup>. The discount and the prime rates were constrained by a usury law which introduced distortions and a tangle of compromises in the economy<sup>7</sup>. There remained the clumsy variations in the volume of rediscount, which shows an exponential decrease of five per cent per year in terms of the Monetary Authorities assets, and in the volume of credit directly extended to the private sector, which shows no trend in terms of the Monetary Authorities assets, but increased exponentially at an annual rate of thirty-three per cent.

The Bank of Brazil had been the repository of 18 per cent of the private sector deposits and extended 32.5 per cent of the total credit to the private sector. It is the largest commercial bank of the nation<sup>8</sup>, and it financed 99.9 per cent of the government deficit from 1954 to 1967. There are about 300 commercial banks (*Kafka* 1967, pp. 619), ten to twenty per cent of them having branches in most of the states. Among the latter group, some are partially owned by the state governments and some are totally or partially owned by several large foreign banks. There are no state boundaries on their operation and no limitation on foreign ownership<sup>9</sup>. The banks are secure and there have been no

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<sup>5</sup> Beginning in 1968 the monetary authorities conducted experiments with such transactions and in 1970 the government started issuing securities adequate for open-market operations.

<sup>6</sup> See, for instance, *Bulhões* (1969, pp. 190).

<sup>7</sup> See *Silveira* (1973, pp. 794 - 895).

<sup>8</sup> The Bank of Brazil ranked 33 by deposits and 27 by assets in Fortune's list of the largest commercial banks outside the U.S. (Fortune, August 1969).

<sup>9</sup> For a list of the largest Brazilian Banks, see *The New Brazil*, pp. 21 (prepared and published by Business International, 757 Third Ave. New York).

financial panics during the two decades in focus, despite the wide fluctuations in the rate of changes of the money stock.

Under the above circumstances the highly expansive monetary policy which prevailed most of the period constitutes no surprise. With the change in policy in 1964, a change in the institutions was undertaken, modernizing the tools and providing some independence to the monetary authorities. The experience of the two decades under study will not be repeated in the future if these reforms remain in effect.

## II. Monetary Base and Money Stock

Our theme in this section is that the monetary authorities are able to control the stock of money. The answer to this question determines the relevance of adopting the money stock as an indicator or as target of monetary policy. There are two aspects of our theme which have to be disentangled. We separate the analysis of the technical feasibility of controlling the stock of money from the identification of the authority who has the discretionary and political power to control it.

In the United States there is abundant evidence indicating that the Federal Reserve System has the technical ability to control the stock of money. The Federal Reserve also has the legal and, perhaps, political power to control the money stock if it chooses to do so. An example and an analogy may emphasize the distinction that we are making. The discretionary power of the Federal Reserve may be totally abolished by a law setting rigid monetary rules. However, the technical ability to control the money stock has to be maintained if the implementation of the law is intended.

Let us understand the Brazilian monetary authorities as the officers and institutions which carry out the central banking functions. The ultimate power to control the money stock in Brazil has rested on the Presidency of the country. But before presenting further evidence in support of this statement, let us investigate the evidence that the Brazilian economy offers on the technical ability of the monetary authorities to control the money stock.

The stock of money, the total quantity of currency and demand deposit held by the public, is not under the direct control of any central bank. So the possibility of controlling the money stock rests upon the existence of a stable relationship between the money stock and some other variable or set of variables which is under the central bank con-

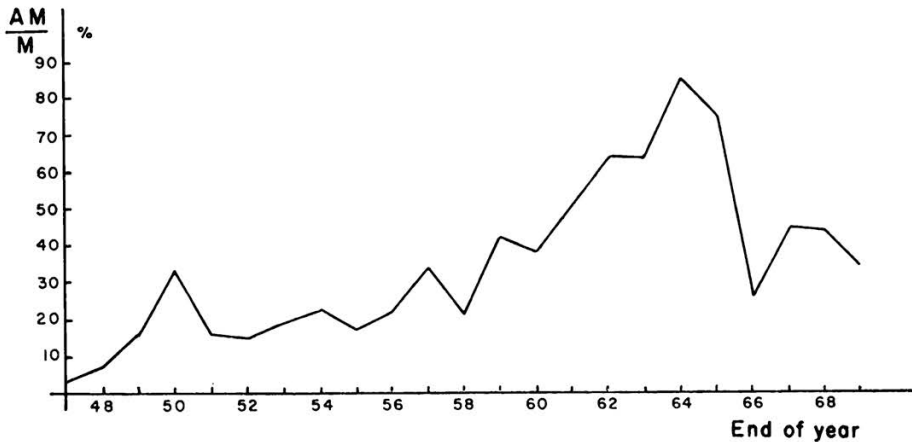
trol. The monetary base, the sum of currency in circulation and bank reserves at the central bank, seems to satisfy this condition. *Meltzer*, among others, maintains that, in the United States (May 1969, pp. 16 to 24) and in France (June 1959, pp. 275 - 95), "evidence from past periods suggests that the monetary base is the most important determinant of the money supply and that there is a high degree of association between the base and the money stock" (May 1969, pp. 18).

The evidence from the Brazilian economy also indicates this high degree of association. Letting  $M$  stand for the end of year money stock and  $B$  for the end of year monetary base<sup>10</sup>,

$$(1) \quad M = - .820 + 2.35 B \quad 1948 - 66 \\ \quad \quad \quad (- .02) \quad (69.)$$

$$df = 17, \quad DW = 2.35, \quad RA = .998, \quad sa = 190$$

*Nominal Stock of Money-Annual Variations*



The fit is very good: variations in the monetary base explain 96 per cent of the variability of the money stock. And the *Durbin-Watson* statistics indicates that no serial correlation exists at the ten per cent level. Given the randomness of the residuals with respect to time, the t-test definitely shows the statistical significance of the expansion ratio. The level of the expansion ratio confirms the multiplied effect on the money stock of

<sup>10</sup> The following convention and symbols are used: "t" statistics are in parentheses, *df*: degrees of freedom, *DW*: Durbin-Watson statistics, *RA*: adjust multiple coefficient of correlation, *sa*: adjusted standard error of estimates.

changes in the monetary base. And it is quite close to the parameters of the United States (*Meltzer*, May 1969, pp. 19) and France (*Meltzer*, June 1959, pp. 281).

The estimation of the relationship after the elimination of the intercept, and also in its first difference form, introduces no noticeable change in the parameters and statistics. The high rates of change in prices during the period may evoke uncertainties on the validity of the relationship or of the estimates in the absence of the pronounced trend in the variables. Removing either the linear or the exponential trend, we found no significant change in the estimates and this strongly suggest that such uncertainties are unfounded.

The data show a close relationship between the base and the money stock. The theoretical framework leading to this relation may be found in *Brunner and Meltzer* (1959, pp. 175 - 81). It is a simple model containing four definitional equations, identities from the monetary authorities accounts, and five linear behavioral equations between currency and demand deposit held by banks and the public. The final linear reduced form passes very well the statistical test. It suggests that variables which are not included in the relation have indeed small or accidental influence. However, we did conduct a test on the possible influence of the currency ratio, of the deposit ratio and of both the currency and the deposit ratios. No statistical significance was detected in any of them.

So far all measurement were made for the period 1948 - 66. We have been excluding 1967, because we do not have the private sector deposits at the monetary authorities in 1967 and up to date figures in the base published by International Financial Statistics includes those deposits. Using this later measure of the base, we re-estimate all the equations<sup>11</sup>. The decrease in the expansion ratio to 1.74, the only noticeable difference in the estimates, was expected, given the increase in the value of the monetary base.

Evidence was provided on the extent to which the monetary base determines the money supply, but the degree of potential control over the base itself has not been discussed yet. *Meltzer* (May 1969, pp. 21) maintains that in the United States "the monetary base can be controlled weekly" and that this control permits the Federal Reserve to "contain the short-term growth rate of money within narrow limits". *Friedman*

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<sup>11</sup> We have estimated twenty-six equations. Lack of space does not permit their reproduction.

(1970, pp. 20) proposes that the power of a “Board of Monetary Control”, with the ability of issuing currency and of conducting open-market operations, “would be every bit as great as the power of the present Federal Reserve System”.

Let us assume that this hypothetical Board loses the power to conduct open-market operations, but gains control over the discount mechanism and the reserve requirement changes. Consider further that each of these operations is executed in a different institution. Certainly this board still has direct control over the monetary base. It is less effective, substantially less precise and more cumbersome in the conduct of the monetary policy. But “fine tuning” apart, the control of the base exists.

The situation in Brazil was close to the latter hypothetical Board. All officers in charge of central banking functions were members of SUMOC governing council. And the council had sufficient potential control of the money stock. But the council also had to finance the budget deficit.

### III. Discretionary Control of the Monetary Base

The net government borrowings from the Bank of Brazil covered in average 99.9 per cent of the deficit! Once it is established that a Central Bank has to meet the budget deficit, a passive response to this constraint would be to change the base by the amount of the deficit. The opposite reaction would be the avoidance of changes in the base and the financing of the deficit by active use of the monetary tools. The monetary authorities decision on how to finance the deficit determines in the first instant the magnitude and timing of the effect of the deficit on the base.

Under an international gold standard system variations in gold reserves bring about proportional variations in the nominal money stock. Under the current system of international finance there is no necessary connection between the money stock and variations in international reserves. Again, the central bank may partially or totally offset the effect of variations of reserves in the monetary base<sup>12</sup>. So, there is a potential

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<sup>12</sup> *Friedman* (August 1959, pp.91) states that these effects “typically are offset by Federal Reserve action”. *Furtado* (1968, pp.225) seems to see no offset or delay of this effect in Brazil before 1950: “The swiftness with which the inflationary process spreads in Brazil largely reflects the way in which the country’s banking system operates. It might be expected that the inflationary effects of the unusual situation prevailing between the increase in monetary income in the export sector and the increase in imports would be cushioned by the monetary authorities, who could prevent the banking



relationship between additions to the base and changes in international reserves.

Obviously the more modern a Central Bank, i. e., the greater the strength, flexibility and precision of its tools, the greater is its ability to cushion these effects on the base if it chooses to do so. The size of the Central Bank may also be a determining factor. Depending on the size and duration of a deficit process, a Central Bank may exhaust its tools if it is forced to finance the government and decides to do so without increasing the money stock. But this was not the situation in Brazil.

Let us formally hypothesize a positive linear relationship between additions to the base, the budget deficit<sup>13</sup>, and the variations in international reserves. The estimates are<sup>14</sup>:

$$(2) \quad B = .519 BD + .385 \Delta IR + 1.32 B - 1 \quad 1949 - 66$$

(5.6)                      (5.2)                      (81.)

$$df = 15, \quad DW = 2.22, \quad RA = .9996, \quad sa = 37.5$$

Autocorrelation is not significant at the 10 per cent level<sup>15</sup>. The explained variability of the base is 99.9 per cent. The estimate shows that one unit increase in the budget increases the base by half unit in the current year. The estimate of the influence of changes in international reserves indicates that the base increases only by .385 units for each unit of increase in reserves. However, there is no reason for a different behavior of the monetary authorities in relation to the two variables.

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system — in a growing state of liquidity — from expanding credit. However, the banks almost always act in a completely passive manner”.

<sup>13</sup> This hypothesis is often suggested and tested in different countries. Inter alia: Meltzer (1959, pp. 285 - 6).

<sup>14</sup> The international reserves series which we have available (Published by *International Financial Statistics*) is probably not entirely consistent. The 1966 figure probably excludes inconvertible currencies; and it is possible, but not probable, that the figures for the period 1960 - 65 also excludes inconvertible currencies. This series is published in dollars; it was converted to cruzeiros using the index for free exchange rate published by *Conjuntura Econômica*; this was expressed in cruzeiros using the quotation of the dollar in 1963, .055, published in *International Financial Statistics*.

<sup>15</sup> Excluding the variations in international reserves, we do not observe a significant decrease in the explanation of the base. But the *Durbin-Watson* statistics indicates that the disturbances are not independent in different periods: The shifts in the residual satisfy a simple autoregressive equation of first order, being the coefficient of proportionality equal to minus .630.

One possible explanation for the difference in the coefficients is the use of compulsory deposits of exchange. The existence of compulsory deposits introduces an institutional, technical, time-lag in the effect of international reserves. The deposits for exchange averaged 5.1 per cent of the monetary authorities' assets and they increased substantially during the two decades. The monetary authorities also gained substantial profits on the exchange transaction, 7.8 per cent of their liabilities; and the exponential growth in profits was 161 per cent per year as compared to 34 per cent in their assets in general.

The low values of the estimates of the effect of the deficit and of changes in reserves on the base may be partly explained by the fact that the monetary authorities used their tools to offset part of the effect, but it may also be related to the positive trend indicated by the coefficient of the lagged base. A contemporaneous effect equal to one indicates that the monetary authorities act in a completely passive manner. But we showed in section (1) that the monetary authorities steadily and significantly increased the required reserve ratio and decreased the commercial banks share in their assets.

Part of the effect was thus offset by the monetary authorities. It is possible that the steadily growth of the base, indicated by the coefficient of the lagged base, also explains partly the low value of the estimates. A possible explanation for this positive trend in the base, which is not accounted for by the budget deficit and the variations in international reserves, is a resistance to adopt a contractive monetary policy with its accompanying short run dampening effect on economic growth. On this hypothesis, part of the increase in international reserves and of the deficit may be financed by the steady growth of the base.

Changes in the base may be caused by changes in the relative weights attached to price stability, output growth, employment level, distribution of wealth and income<sup>16</sup>, government share of the economic activity<sup>17</sup>, foreign economic policy, etc. Some direct evidence of the depend-

<sup>16</sup> See, for instance, *Alcbian and Kessel* (1962, pp. 521 - 37).

<sup>17</sup> *Kafka* (1967, pp. 609 - 10) points to the government share of the economy and the distribution of income as the determinant variables in the decision to follow a gradual stabilization policy adopted by the Brazilian monetary authorities in 1964. The government civil and military employees had their salaries raised just after the ousting of President. *Goulart*, March-April 1964, and the minimum wage had been increased a few months before. According with *Kafka*, a rapid stabilization policy would result in "a relative shrinkage of the private sector," and, "since money wages and salaries

ence of the base on the set of goals chosen by the monetary authorities was obtained. Let us consider the monetary authorities' ideology, this "confusing but indispensable term" in *Gerschenkeran* (March 1969, pp. 1 to 2) words. We are concerned with the *economic* ideology of the monetary authorities, assumed in the first instance equal to the economic ideology of the President. We take ideology as an dichotomy right-left. We assume that rightist monetary authorities are less willingly to conduct increases in the base, i. e., that they allocate more weight to the goal of stable price levels in their decision-making process.

An alternative and certainly preferable way to put it is to consider the price-stability goal as the additional explanatory variable. This variable is implemented by a dichotomization of the monetary authorities in terms of the weight attached to price stability, ideology being used as a proxy. If ideology is a significant determinant of the base, the inclusion of a constant (statistically equal to zero above) and of a dummy variable as arguments in (2) will result in significantly different intercepts. Considering just *Vargas*, 1951 - 4, and *Goulart*, 1962 - 3, in the "left dummy variable",  $d$ , we find the influence of ideology confirmed.

$$(3) \quad B = -24.9 + 38.6d + .519BD + .395 \Delta IR + 1.33B - 1 \quad 1949 - 66$$

(-2.16)
(2.24)
(6.2)
(5.9)
(86.)

$$df = 13, DW = 2.48, RA = .9997, sa = 33.2$$

Including *Kubitschek*, 1959 - 60, and *Quadros*, 1961, in the dummy variable, either separately or together, the influence of ideology is not statistically significant. This fact constitutes no surprise in *Quadros'* case; stabilization of the price level was an important target in his government. But that was not the case during most of *Kubitschek's* presidential period; only during *Lucas Lopes* period in the finance department, 1958, the price level had high priority.

Including *Kubitschek* and *Lucas Lopes*, 1958, in the right and including *Kubitschek's* remaining term in the dummy variable, the influence of ideology is also supported<sup>18</sup>.

could not be reduced, it was necessary to continue the inflation for some time".

<sup>18</sup> For a classification of the Brazilian political leaders and parties in terms of their ideology, see *The New Brazil*, pp. 5 (prepared and published by Business International, 757 Third Ave., New York). The only departure from this classification in our variable is *Quadros*; *Kubitschek* is classified in the center there.

$$(4) \quad B = -32.8 + 33.6 d + .533 BD + .391 \Delta IR + 1.33 B - 1 \quad 1949 - 66$$

(- 2.05)
(1.82)
(6.1)
(5.6)
(84)

$$df = 13, DW = 2.26, RA = .9997, sa = 34.9$$

The estimates in (3) and (4) are very close to the measures in (2). So as far as we can tell from the Brazilian evidence, changes in the base are related but not completely determined by the deficit and the changes in international reserves. The monetary authorities determine the pattern of influence of these variables on the base.

#### IV. Conclusion

A review of the institutional setting governing the money supply indicates that the monetary authorities were submissive to the Presidency of the country during these two decades. Considering the monetary tools, the open-market operations were not carried out during the two decades, and the required reserve ratio increased systematically during the period. A trend is also observed in the variations of the volume of rediscount, which decrease in terms of the monetary authorities' assets and of the credit extended to the private sector by the commercial banks. The credit directly extended to the private sector by the monetary authorities shows no trend in terms of the monetary authorities' assets, but increases in terms of the credit extended to the private sector by commercial banks.

The final reduced form of *Brunner and Meltzer's* (1964, pp. 240 - 83) money supply models is tested. Ninety-six per cent of the variability of the stock is explained by the monetary base. The test is conducted on the raw data, in their first differences and in the trend-free data. The parameters and statistics are impressively close. The expansion ratio is estimated at 2.35, confirming the multiplier effect on the money stock of changes in the monetary base. We may conclude that the base determined the money stock. The technical feasibility of controlling the base is also considered. We conclude that, "fine tuning" apart, the Brazilian monetary authorities had the means to control the base.

Discretionary control of the base is brought forward for consideration. The base is discussed in terms of the budget deficit and the changes in international reserves. The behavior of the monetary authorities determines the relationship among the base, the deficit and the changes in reserves. The degree of discretion of the monetary authorities depends partly on the quality of their tools and on the size of their asset stocks.

Conceivably, the monetary authorities may make use of their tools in order to finance the deficit and to conduct the exchange transactions with no changes in the base. The magnitude of the changes is a function of the monetary authorities' policy goals and the set of weights attached to them.

In Brazil the monetary authorities were not in a position to refuse to finance the deficit<sup>19</sup>. From 1948 to 1967 the deficit and the changes in reserves determined most of the variations in the base. However, the monetary authorities offset part of their effect. Further evidence on the discretionary power of the monetary authorities was obtained by splitting the period in terms of the weight attached to price stability. The proxy used, an "ideological" dummy variable, added significantly to the explanation of the base.

In conclusion, we were able to explain the money stock in terms of the base, but our evidence did not permit us to raise the exogeneity of the base. In other words, we may consider the banking industry as having a negligible effect on the money supply, at least on the level of abstraction of the conventional macro model<sup>20</sup>. The exogeneity of the base remains, and the monetary authorities' ability and discretion to control the base is verifiable even in this extreme Brazilian case. The data show the independence of factors affecting the money demand and supply functions<sup>21</sup>.

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<sup>19</sup> The dependence of the base on the deficit may be entirely behavioral. If a Central Bank decides to maintain the Treasury bill rate constant, the dependence of the base on the deficit is established. This was not the problem in Brazil, however.

<sup>20</sup> It does not mean that the banking industry is viewed as "mechanical expander of deposits" (*Mayer* 1968, pp. 81). Even if it is assumed that banks can influence the multiplier, they could still be ignored on the grounds that the Central Bank may lead them, as profit maximizers, to its desired stock of money. It is enough to recall that open-market operations are and may always be made profitable to banks.

<sup>21</sup> For the estimate of the money demand function from 1948 to 1967, see *Silveira* (Feb. 1973, pp. 113 - 40).

vestigations of Demand and Supply for Money.” *Journal of Finance* (May 1964), pp. 240 - 83. — 4. *Bulhões*, Octávio G.: “Financial Recuperation for Economic Expansion.” In *The Economy of Brazil*, edited by H. E. Ellis. Los Angeles: Univ. of California Press, 1969. — 5. *Christ*, Carl F.: *Econometric Models and Methods*, New York: John Wiley & Sons, 1966. — 6. *Ellis*, Howard S.: “Corrective Inflation in Brazil, 1964 - 1966.” In *The Economy of Brazil*, edited by H. E. Ellis. Los Angeles: Univ. of California Press, 1969. — 7. *Friedman*, Milton: “The Demand for Money: Some Theoretical and Empirical Results.” *Journal of Political Economy* (August 1959), pp. 327 - 51. Reprinted in *Monetary Theory and Policy*, edited by Richard S. Thorn. New York: Random, 1966. — 8. *Friedman*, Milton: “Controls on Interest Rates Paid by Banks.” *Journal of Money, Credit and Banking* (February 1970), pp. 15 - 32. — 9. *Furtado*, Celso: *The Economic Growth of Brazil*. California: Univ. of California Press, 1968. — 10. *Gerschenkron*, Alexandre: “History of Economic Doctrines and Economic History.” *American Economic Review* (May 1969), pp. 1 - 17. — 11. *Kafka*, Alexandre: “The Brazilian Stabilization Program, 1964 - 66.” *Journal of Political Economy* (August 1967), pp. 596 - 631. — 12. *Mayer*, Thomas: *Monetary Policy in the United States*. New York: Random, 1968. — 13. *Meltzer*, Allan H.: “The Behavior of the French Money Supply: 1938 - 1954.” *Journal of Political Economy* (June 1959), pp. 275 - 296. — 14. *Meltzer*, Allan H.: “Controlling Money.” *Review-Federal Reserve Bank of St. Louis* (May 1969), pp. 16 - 24. — 15. *Silveira*, Antonio M.: “Interest Rate and Inflation: The Evidence From pp. 794 - 895. — 16. *Silveira* Antonio M.: “The Demand for Money: The The Brazilian Economy.” *Journal of Money, Credit and Banking* (Aug. 1973), Evidence from the Brazilian Economy.” *Journal of Money, Credit and Banking* (Feb. 1973), pp. 113 - 40.

## Zusammenfassung

### Die Geldversorgung: Erkenntnisse aus dem Fall Brasilien

Die Studie analysiert den Geldversorgungsprozeß der brasilianischen Wirtschaft von 1948 bis 1967. Während dieser Periode belief sich die durchschnittliche Preissteigerungsrate auf jährlich 31 %, während die Geldversorgung mit einer jährlichen Rate von 36 % stieg. Ein Blick auf die institutionellen Regelungen zeigte, daß während dieser 20 Jahre die Geldbehörden vom Präsidenten abhängig waren.

Im einzelnen werden die technischen Möglichkeiten zur Kontrolle der Geldmenge betrachtet. 96 % der Geldmenge wird durch die Geldbasis bestimmt, wobei die Expansionsrate mit 2,35 geschätzt wird. Die Geldbehörden hatten die technische Möglichkeit einer Kontrolle mit Hilfe der Diskont- und der Mindestreservpolitik. Man kommt zu dem Schluß, daß von der „Feinsteuerung“

abgesehen, die Behörden durchaus die Mittel hatten, den Geldumlauf zu kontrollieren.

Des weiteren wird in dem Aufsatz die Frage einer uneingeschränkten Kontrolle der Geldbasis untersucht. Sie wird begründet durch die Fiskalpolitik, durch Änderungen der Währungsreserven und durch den Zielkomplex, der von der Geldbehörde bestimmt wird. Die Geldbehörden steuern teilweise gegen den Effekt der Defizite und der Veränderungen der Währungsreserven an. Preisstabilität und das Vermeiden von Schwankungen im Produktionswachstum scheinen eine signifikante Wirkung auf die Geldbasis zu haben. Die Daten zeigen die Unabhängigkeit der Faktoren, die die Geldangebots- und -nachfragefunktionen beeinflussen. Die Exogenität der Geldbasis und die Fähigkeit der Geldinstanzen zur Kontrolle wird sogar in diesem extremen brasilianischen Fall bestätigt.

## Summary

### The Money Supply: The Evidence from the Brazilian Economy

The study analyses the money supply process in the Brazilian economy from 1948 to 1967. During this period the rate of increase in prices averaged thirty-one per cent per year and the money supply rose at an average annual rate of thirty-six per cent. A review of the institutional setting indicates that the monetary authorities were submissive to the Presidency of the country during these two decades.

The technical feasibility for controlling the stock of money is considered. Ninety-six per cent of the variability of the stock is explained by the monetary base and the expansion ratio is estimated at 2.35. The monetary authorities had the technical ability to control the discount mechanism and the reserve requirement changes. We conclude that, "fine tuning" apart, the authorities had the means to control the money stock.

Discretionary control of the base is brought forward for consideration. The base is explained in terms of the budget, the changes in international reserves and the set of goals chosen by the monetary authorities. The monetary authorities offset part of the effect of the deficits and the changes in reserves. Price stability and variations-in-output-growth avoidance seem to have significant effect in the base.

The data show the independence of factors affecting the money demand and supply functions. The exogeneity of the base remains and the monetary authorities ability and discretion to control it is verifiable even in this extreme Brazilian case.

## Résumé

### L'alimentation monétaire: constatations tirées de l'expérience du Brésil

L'étude analyse le processus d'alimentation monétaire de l'économie brésilienne de 1948 à 1967. Au cours de cette période, le taux annuel moyen de hausse des prix s'est élevé à 31 %, alors que l'alimentation monétaire croissait d'un taux annuel de 36 %. Un coup d'oeil dans les règlements institutionnels montre que, pendant ces 20 années, les autorités monétaires dépendaient du Président.

Les moyens techniques de contrôle du volume monétaire sont examinés en détail. 96 % du volume monétaire est défini par la base monétaire, le taux d'expansion étant évalué à 2,35. Les autorités monétaires avaient la possibilité technique d'un contrôle à l'aide de la politique de réescompte et de la politique des réserves minimales obligatoires. L'on aboutit à la conclusion que, la « direction en finesse » exceptée, les autorités disposaient des moyens nécessaires au contrôle de la circulation monétaire.

L'article étudie ensuite la question d'un contrôle sans restriction de la base monétaire. Celle-ci est déterminée par la politique fiscale, par des modifications des réserves de change et par l'ensemble d'objectifs définis par les autorités monétaires. Les autorités monétaires agissent partiellement contre les effets des déficits et des fluctuations des réserves monétaires. La stabilité des prix et la suppression de variations dans l'expansion de la production semblent avoir un effet significatif sur la base monétaire. Les données statistiques démontrent l'indépendance des facteurs influençant les fonctions de la demande et de l'offre monétaires. La nature exogène de la base monétaire et la capacité des instances monétaires d'exercer un contrôle reçoivent donc confirmation même dans un cas aussi extrême que celui du Brésil.