Factors Affecting Monetary Growth: ARIMA Forecasts of Monetary Base and Multiplier

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This paper uses the technique of autoregressive integrated moving averages to forecast the money multiplier and noncontrolled factors that affect the monetary base in the United States. These forecasts in turn are used to forecast the $M1$ money stock. Previous analysis along these lines has assumed that the monetary base was autonomous.

The present analyis reveals that the Federal Reserve could have hit its $M1$ growth targets with less than one percent error on the assumption that the Federal Reserve forecasts both the monetary multiplier and noncontrolled sources of variation in the monetary base.

In the present study, the $M1$ multiplier is forecast monthly and the noncontrolled sources of the monetary base weekly from which monthly average forecasts are derived. Details about elements of the monetary base are actually available on a daily basis and daily average monetary aggregate figures are published weekly. If the Federal Reserve were to change its open market securities target systematically each week in response to the previous week's forecast errors, the $M1$ forecast error could presumably be further reduced. There is, however, a lot of noise in the movements in these series. Consequently, though daily Federal open market transactions would be possible in reaction to deviations in the monetary base from target, day to day or week to week fine tuning would generally be unnecessary because such movements are often self correcting without any action by the Federal Reserve. Nevertheless, daily feedback rules for the conduct of Federal Reserve open market operations could perhaps even further reduce the error in forecasting the monetary base.

The conclusion is that observed failures to control monetary growth as targeted in the United States reflect unwillingness not inability to do so. Though control of only the $M1$ aggregate is examined in the present paper, this conclusion would be all the more applicable to broader aggregates, the added components of which are generally more stable and predictable than components of Ml.

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I. Introduction

Our approach in studying monetary control is based on the money multiplier framework. At time t, we have

$$M(t) = m(t)\,B(t)\,. \tag{1}$$

M is any concept of a monetary aggregate such as $M1$; m is the associated money multiplier; and B is any concept of the monetary base. To achieve a monetary target, say $M_T(t+1)$, a central bank could mechanically forecast $m(t+1)$ and then choose a monetary base target expected to yield the desired monetary aggregate. Errors in controlling monetary growth, by this approach, would be accountable to errors in forecasting the money multiplier and the monetary base.[1] In the present study the autoregressive integrated moving average or ARIMA technique was adopted to estimate errors in forecasting the money multiplier and noncontrolled factors that affect the monetary base. These estimates were used to simulate Federal Reserve open market operations to control $M1$ growth in the United States.[2]

The empirical models and data are described in section II of the paper. Section III presents the ARIMA model estimates of the money multiplier and noncontrolled factors that affect the monetary base. The estimates are then used in Section IV to generate forecasts of monetary growth under a particular open market operations procedure. Section V is the conclusion.

II. Empirical Models and Data

Most studies of monetary control have assumed that the monetary base could be perfectly controlled by the Federal Reserve.[3] This assumption is unrealistic because noncontrolled factors that influence the monetary base are in fact not controlled without error.[4] The monetary base is a liability of the monetary authority consisting principally of currency held by the public and monetary reserves held by financial institutions. It is created by the monetary authority accumulating assets less any non-monetary base

[1] Federal Reserve operating procedures in recent years are discussed in *Johannes* and *Rasche* (1981), Federal Reserve Staff Study (1981), *Solomon* (1984), *Wallich* (1984), and *Axilrod* (1985).

[2] See *Box* and *Jenkins* (1976) and *Vandaele* (1983) for discussion of the ARIMA model. The computer program was written by *Doan* and *Litterman* (1986).

[3] See, for example, *Johannes* and *Rasche* (1981) and *Hafer, Hein,* and *Kool* (1983).

[4] *Levin* and *Meek* (1981).

liabilities and net worth on its books. Without an offsetting sale of securities by the Federal Reserve, an increase in member bank borrowing from the Federal Reserve or Federal Reserve Float for example would increase the monetary base. These are assets of the Federal Reserve, an increase in which, other things equal, would increase the monetary base. On the other hand, an increase in Treasury or foreign deposits with the Federal Reserve, which are non-monetary base liabilities would reduce the monetary base. In the present study, rather than assume that variation in such factors could be forecast with complete accuracy, we have modelled the total of the noncontrolled factors that affect the monetary base as a random variable. Since forecasting individual components of the monetary base separately does not significantly improve forecasting performance, only the net amount of noncontrolled factors that affect the monetary base was modelled in the present study.[5]

By taking the money multiplier and the monetary base as random variables, we rewrite (1) as

$$M_T(t) + e(t) = [m_F(t) + u(t)]\ [B_F(t) + v(t)]\,. \tag{2}$$

Insofar as monetary control is concerned, the error in reaching a target monetary aggregate $e(t)$ depends on errors in forecasting both the multiplier $u(t)$ and the monetary base $v(t)$. M_T is the target aggregate, m_F and B_F are respectively the forecasts of the multiplier and the monetary base. We assume that u and v are independent and identically distributed with zero means and constant variances, often referred to as white noise. The correlation coefficient of u and v is not necessarily zero.

The monetary base is decomposed into controlled and noncontrolled factors.[6] The former, Federal Reserve holdings of U.S. government securities, can be controlled in the sense that their effect on the monetary base would not change without an action by the Federal Reserve. The noncontrolled factors are those whose magnitude can change without an action by the Federal Reserve. The major tool for monetary control in the United States is unquestionably Federal Reserve open market operations. Accordingly we consider that Federal Reserve holdings of U.S. government and federal agency securities S are controlled and that all other factors that affect the monetary base N are not. Thus, the monetary base is defined as

$$B_F(t) + v(t) = S(t) + N_F(t) + v(t) \tag{3}$$

[5] See *Lai* (1984).
[6] See *Kehr* (1974).

where B_F is the forecast of the monetary base and N_F, the forecast of noncontrolled sources of the monetary base. v is the forecast error which is assumed to be independent of Federal Reserve holdings of securities.[7]

Substituting (3) into (2), we have

$$M_T(t) + e(t) = [m_F(t) + u(t)]\ [S(t) + N_F(t) + v(t)]\,. \tag{4}$$

To achieve the monetary target on the average, Federal Reserve holdings of securities would be set at

$$S_T = M_T(t)\,/\,m_F(t) - N_F(t)\,. \tag{5}$$

Thus, error in monetary control is attributable to the interactions of random errors in forecasting not only the money multiplier u but also the noncontrolled sources of variation in the monetary base v.

In our empirical analysis, the money multiplier is calculated for the $M1$ monetary aggregate although comparable results can be obtained for any definition of money. The sample period used to estimate the relationships was from 1959 through the pre-forecast month in 1985. All data are weekly and monthly seasonally unadjusted daily averages from publications of the Board of Governors of the Federal Reserve System.

III. ARIMA Model Estimates

1. Money Multiplier Estimates

Table 1 lists ARIMA models of the monthly money multiplier (m), where $\underline{a}$ is the shock. The value in the parenthesis under each parameter is its standard error.[8, 9] Using a chi-square test statistic (Q), the hypothesis of white noise error cannot be rejected at the 10 percent level for equations (6) and (7).[10] The estimated model based on the 1959 - 84 period had a smaller

[7] *Lai* (1984) studies the effects of open market operation on noncontrolled factors in the monetary base by using the multiple time series model developed by *Tiao* and *Box* (1981) and concludes that the concurrent effects are insignificant.

[8] Discussion of the specification of ARIMA model for the money multiplier appears in *Bomhoff* (1977), *Johannes* and *Rasche* (1979), *Hafer* and *Hein* (1984), and *Lai* (1984).

[9] We also examined data from 1975 to 1984, because (1) the Federal Reserve estimated its first formal monetary targets in 1975 in responding to the House Concurrent Resolution 133, see *Poole* (1976), and (2) the monthly data of the noncontrolled factors in the monetary base have apparently different variation pattern after 1975.

Table 1

ARIMA Models of the Monthly Money Multiplier

Sample period = 1959 : 01 – 1984 : 12

(6) $(1 - b)(1 - b^{12})\, m(t) = (1 - 0.136\, b^4 - 0.628\, b^{12} - 0.159\, b^{13})\, a(t)$
$\qquad\qquad\qquad\qquad\qquad\qquad (0.044) \quad (0.045) \quad (0.044)$

$Q(48) = 39.8$ s.e. = 0.0150 s.e./mean = 0.0049

Sample period = 1975 : 01 – 1984 : 12

(7) $(1 - b)(1 - b^{12})\, m(t) = (1 - 0.795\, b^{12})\, a(t)$
$\qquad\qquad\qquad\qquad\qquad\qquad (0.064)$

$Q(29) = 34.8$ s.e. = 0.0173 s.e./mean = 0.0061

Q: Chi-square statistic
s.e.: Standard error of estimation
b: Backward shift operator, that is $b^n X(t) = X(t - n)$

estimation error than for 1975 - 84 as shown by the s.e./mean statistics for equations (6) and (7). The estimated money multiplier in the 1975 - 84 period was significantly related to the lagged shock twelve months earlier $\underline{a}(t - 12)$, but, in the 1959 - 84 estimates, in addition to $\underline{a}(t - 12)$, it was also affected by $\underline{a}(t - 4)$ and $\underline{a}(t - 13)$.

2. *Noncontrolled Factors Estimates*

As shown in equation (5) it is necessary to forecast the noncontrolled factors that affect the monetary base in order to choose appropriate target open market operations for the purpose of controlling monetary growth.

Table 2 presents ARIMA models of the noncontrolled factors in the monetary base using daily data averaged over not only months but also weeks. The chi-square test statistic indicates that the hypothesis of white noise error cannot be rejected at the 25 percent level for equations (8) and (9) based on monthly data, and at the 5 percent level for equation (10) based on weekly data.[11] For monthly data, the model of 1959 - 84 period has smaller

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[10] Using transfer function modeling, we also experimented with the federal funds rate (i) in the model, but it was not a significant explanatory factor.

$$(1 - b)(1 - b^{12})\, m(t) = \underset{(0.0014)}{0.0003}\,(1 - b)\, i(t) + (1 - \underset{(0.066)}{0.80}\, b^{12})\, a(t)\,.$$

$Q(29) = 34.7$ s.e. = 0.0174 s.e./mean = 0.0061

Sample period = 75 : 01 – 84 : 12.

[11] We experimented with the federal funds rate in the model, but, its coefficient was insignificant:

Table 2

ARIMA Models of the Noncontrolled Factors in the Monetary Base

Monthly Data:

Sample period = 1959 : 01 – 1984 : 12

(8) $$(1-b)\,N(t) = (1 - \underset{(0.054)}{0.144}\,b - \underset{(0.054)}{0.152}\,b^2 - \underset{(0.059)}{0.173}\,b^6 + \underset{(0.062)}{0.252}\,b^{24})\,a(t)\,.$$

$Q(47) = 50.6$ s.e. = 1.2229 s.e./mean = 0.0869

Sample period = 1975 : 01 – 1984 : 12

(9) $$(1-b)\,N(t) = \underset{(0.065)}{0.211} + (1 - \underset{(0.089)}{0.172}\,b - \underset{(0.088)}{0.0206}\,b^2 - \underset{(0.094)}{0.262}\,b^6)\,a(t)$$

$Q(27) = 17.2$ s.e. = 1.8722 s.e./mean = 0.1064

Weekly Data:

Sample period = 1975 : 01 – 1984 : 52

(10) $$(1 + \underset{(0.038)}{0.124}\,b + \underset{(0.041)}{0.0200}\,b^2 + \underset{(0.039)}{0.140}\,b^{16} + \underset{(0.039)}{0.148}\,b^{24} - \underset{(0.045)}{0.418}\,b^{52})\,(1-b)\,N(t) = a(t)$$

$Q(58) = 74.7$ s.e. = 1.7472 s.e./mean = 0.0995 .

error than that of 1975 - 84 period as reflected in the s.e./mean for equations (8) and (9). These models yielded similar findings though there are some differences in the influence of particular shocks. For 1959 - 84 compared with 1975 - 84 estimates, the noncontrolled factors were affected by the lagged shock $\underline{a}\,(t-14)$ in addition to $\underline{a}\,(t-1)$, $\underline{a}\,(t-2)$, and $\underline{a}\,(t-6)$. For weekly data, the standard error of estimate is 1.75 which translates into a standard error of 0.87 on a 4-week (monthly) basis and is thus substantially smaller than the standard error of 1.87 in the monthly model for the 1975 - 84 sample period.[12]

The standard errors estimated here should only be considered as indicative of the general magnitude of errors in forecasting noncontrolled factors that the Federal Reserve could reasonably be expected to experience if it seriously attempted to achieve a particular level of the monetary base. Its

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$$(1-b)\,N(t) = \underset{(0.064)}{0.205} + \underset{(0.144)}{0.229}\,(1-b)\,i(t) + (1 - \underset{(0.090)}{0.191}\,b - \underset{(0.089)}{0.207}\,b^2 - \underset{(0.095)}{0.244}\,b^6)\,a(t)\,.$$

$Q(27) = 20.1$ s.e. = 1.8604 s.e./mean = 0.11064

Sample period = 75 : 01 – 84 : 12,

Using daily data for March through September 1961, *Dewald* and *Gibson* (1967) also found an insignificant federal funds rate effect in their noncontrolled factors models.

[12] Weekly data for $M1$ and the monetary base are not reported on the same day of the week, (Monday for $M1$ and Wednesday for the monetary base). We did not specifiy the weekly model of the money multiplier.

staff has intimate knowledge of monetary base determination and up to the minute information about movements in many noncontrolled factors. Thus we would expect that it could forecast more accurately than we with our simple time series approach and weekly or monthly data.

IV. Simulation of Monetary Control in 1985

We now examine the controllability of $M1$ using our 1985 forecasts for the money multiplier and noncontrolled factors based on 1975 - 84 estimates. The procedures are the following:

1. The mid-range annual growth target of $M1$, 5.5 percent announced by the Federal Reserve in 1985, was the monetary growth target. M_T, the desired level of $M1$ for each month, was calculated to be consistent with its annual target.[13]
2. For each month of 1985, an updated forecast of the money multiplier m_F was calculated based on a sample period encompassing 1975 through the month before the forecast month.[14]
3. The targeted monthly level of monetary base B_T was calculated by dividing the desired monthly level of $M1$ by the corresponding updated forecast of the money multiplier.
4. Simulated Federal Reserve holdings of securities S_T was the targeted monetary base less forecast noncontrolled factors affecting the monetary base.
5. The simulated monetary base B is the targeted monetary base plus the control error, which is the forecast error in an updated forecast of noncontrolled factors in the monetary base. The control errors were estimated from the updated weekly model [equation (10)].[15] In effect it is assumed that Federal open market purchases or sales each month are made at a constant daily rate in order to achieve a desired daily average of Federal Reserve securities holdings for the month.

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[13] The Federal Open Market Committee established range for monetary growth of 4 to 7 percent of $M1$ money stock from the fourth quarter of 1984 to the fourth quarter of 1985 at the meeting on February 12 - 13, 1985, Federal Reserve Bulletin (1985).

[14] To illustrate, we included the observed money multiplier in January 1985, re-estimated the model (equation 7), and then forecast its February value. Comparing the updated forecast with the forecast which does not include the most recent observation, the former had the smaller forecast error.

[15] When using the weekly model, the monthly control error would be the average of weekly control errors.

6. Simulated $M1$ is the actual money multiplier times the simulated monetary base. It represents the $M1$ that would have been observed given the actual multiplier and the actual level of noncontrolled factors but with Federal Reserve holdings of securities each month set hypothetically at a level to achieve the $M1$ target.
7. Comparing the desired $M1$ with the simulated $M1$ reveals how accurate monetary control would have been under the assumptions of the simulation.

Table 3 presents the actual monthly average monetary base, $M1$, and the $M1$ multiplier that were observed in 1985. $M1$ grew well above the mid-range target rate of 5.5 percent, particularly in the last half of the year.[16] In December actual $M1$ was $ 48 billion or 8.1 percent above target. The $M1$ multiplier during this period held in a narrow range between 2.796 in February and 2.903 in December whereas the monetary base ranged from less than $ 200 billion in February to more than $ 220 billion in December. Over the full year ending in December $M1$ increased $ 69.3 billion or 12.1 percent. The increase in the multiplier accounted for less than $ 20 billion of the

Table 3
Monetary Base, Multiplier, and $M1$ Target Errors in 1985
(Billions of Dollars and Ratios)

	Monetary Base	Multiplier	$M1$ Actual	$M1$ Target*	$M1$ Error
December, 1984	202.3	2.820	570.5	–	–
January, 1985	201.2	2.825	568.4	560.9	7.5
February	199.8	2.796	558.7	563.7	– 5.0
March	201.1	2.809	565.0	566.4	– 1.4
April	203.7	2.855	581.7	569.2	12.5
May	204.9	2.814	576.5	572.0	4.5
June	208.3	2.846	592.7	574.7	18.0
July	210.6	2.848	599.7	577.5	22.2
August	211.5	2.846	602.0	580.4	21.6
September	212.2	2.871	609.1	583.2	25.9
October	213.3	2.869	612.1	586.0	26.1
November	216.1	2.877	621.6	588.9	32.7
December	220.4	2.903	639.8	591.8	48.0

* 5.5 Percent Annual Growth Rate.

[16] In recognition of the over target growth of $M1$ in 1985, the Federal Reserve widened its target range from 4 to 7 percent to 3 to 8 percent in July.

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increase in $M1$ whereas more than \$50 billion was attributable to the increase in the monetary base.

The question is how would $M1$ have grown in 1985 if the Federal Reserve had conducted open market operations in order to achieve its targets as based on forecasts of both the $M1$ multiplier and noncontrolled factors that affect the monetary base. On the assumption that then were no within month open market operations to offset deviations in the monetary base from forecasts, the average error for weeks in a month represents the error in hitting a particular value of the monetary base. The effect this error would have on $M1$ in conjunction with the actual money multiplier for each month is reflected in simulated $M1$. It is the actual multiplier for the month times the target monetary base plus the monetary base forecast error. Simulated $M1$ is the hypothetical value of what $M1$ would have been, given that the level of Federal Reserve holdings of open market securities was chosen to achieve the $M1$ target on the basis of forecasts of both the multiplier and noncontrolled sources of the monetary base. Deviations of simulated $M1$ from targeted $M1$ thus reflect errors in forecasting both the multiplier and noncontrolled factors that affect the monetary base and any interations between these errors.

The simulation results for this scenario are shown in Table 4. Some of the errors were substantial, for example, $M1$ missed the target by \$4.3 billion in May when the multiplier was substantially underforecast and by \$3.9 billion in November when the monetary base was substantially underforecast. In both instances Federal Reserve holdings of open market securities were too high to limit $M1$ growth to the target path. Nevertheless, the control procedure automatically sets the target monetary base and hence Federal Reserve holdings of securities to offset earlier deviations of $M1$ from target, thus avoiding cumulation of errors such as was actually observed in the last half of 1985. Consequently following our monetary control procedure target $M1$ for December 1985 would not have been changed because of earlier forecast errors. The error in forecasting $M1$ for December would thus be attributable solely to errors in forecasting the multiplier and noncontrolled factors that affect the monetary base in December. Since the December 1985 forecast of noncontrolled factors was on the high side, there would have been insufficient injection of monetary base by open market operations. The result, as Table 4 shows, would have been an actual $M1$ that was \$1.0 billion or 0.2 percent below the target for the year not \$48 billion or 8.1 percent above as was actually observed.

The Root Mean Square Forecast Error for our monetary control procedure was 1.92 which is only 0.3 percent of the mean target $M1$ in 1985. The devia-

Table 4: **Simulated $M1$ with Monetary Base and Multiplier Forecasts for 1985 (Billions of Dollars and Ratios)**

$$M - M_T = B_T u + m_F v + uv$$

	M_T	m_F	B_T	$u = m - m_F$	$v = B - B_T$	$B_T u$	$M_F v$	uv	$M - M_T^*$
January	560.9	2.821	198.8	.004	−.030	.795	−.085	−.0001	.7
February	563.7	2.782	202.6	.014	−.489	2.837	−1.360	−.007	1.5
March	566.4	2.814	201.3	−.005	−.324	−1.006	−.912	.002	−1.9
April	569.2	2.856	199.3	−.001	.301	−.199	.860	−.0003	.7
May	572.0	2.790	205.0	.024	−.208	4.920	−.580	−.005	4.3
June	574.7	2.843	202.1	.003	.082	.606	.233	.0002	.8
July	577.5	2.843	203.1	.005	−.199	1.016	−.566	−.001	.5
August	580.4	2.839	204.4	.007	−.428	1.431	−1.215	−.003	.2
September	583.2	2.864	203.6	.007	−.492	1.425	−1.409	−.003	.01
October	568.0	2.879	203.5	−.010	.842	−2.035	2.424	−.008	.4
November	588.9	2.869	205.3	.008	.771	1.642	2.212	.006	3.9
December	591.8	2.892	204.6	.011	−1.135	2.251	−3.282	−.012	−1.0

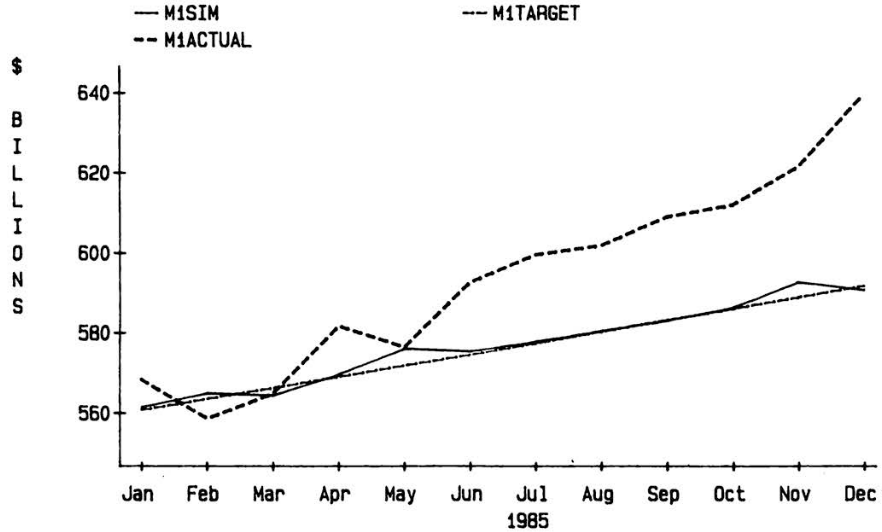
RMSE = \$1.9 billion, RMSE/M_T = .003.

* M is the simulated not the actual value of $M1$.

tion of the observed annual average growth rate of $M1$ from its desired mid-range growth rate would be about 0.2 percent which is much less than the 1.5 percent target range.[17] Thus, if Federal Reserve policy were to have been directed at achieving stable annual growth of $M1$ in 1985 and other assumptions of this simulation were to have been satisfied, $M1$ would not have risen by 12 percent but by close to the target 5.5 percent rate. Comparing actual and simulated $M1$ (in Chart 1), we suspect, along with most other observers, that the Federal Reserve simply did not try to meet its $M1$ monetary target. Nevertheless, our analysis indicates that it could come very close if it would try.

Chart 1

ACTUAL AND SIMULATED M1 TARGET ERRORS -- 1985



SOURCE: CALCULATIONS BY DEWALD AND LAI

[17] Assuming errors in hitting the monetary target, E, are independent with standard errors. Then Var $(\sum_{i=1}^{12} E_i / 12) = s^2 / 12$ and the annual average standard error would be $s / \sqrt{12}.$ The 95 percent confidence interval is twice the standard error. See *Johannes* and *Rasche* (1981).

V. Conclusion

By modeling the money multiplier and the monetary base as random variables, variation in $M1$ is attributable to the combination and interaction effects of random errors in the money multiplier and the monetary base. We assume that the random errors in our forecasts of the money multiplier and the monetary base are white noise and that the models would remain stable in a monetary control regime. The results from our simulation of monetary control for 1985, which considers errors in forecasting both the money multiplier and the monetary base, show that the Federal Reserve could achieve far more stable $M1$ growth, very likely within 1 percent deviation of the annual average. This result is far different from the wide deviations of actual monetary growth from announced targets not only in 1985 but in virtually every year since monetary targeting was formally introduced in 1975.

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Zusammenfassung

Faktoren, die das Geldmengenwachstum beeinflussen: ARIMA-Vorhersagen zur monetären Basis und deren Multiplikatoren

In dieser Untersuchung wird die Methode der autoregressiven, integrierten gleitenden Mittelwerte auf Vorhersagen der Geldmengenmultiplikatoren und unkontrollierten, die monetäre Basis der Vereinigten Staaten betreffenden Faktoren angewandt. Diese Vorhersagen wiederum werden für Prognosen der Geldmenge $M1$ verwendet. In früheren so erstellten Analysen wurde davon ausgegangen, daß die monetäre Basis autonom sei.

Diese Untersuchung zeigt, daß unter der Voraussetzung, daß die Federal Reserve sowohl die monetären Multiplikatoren als auch unkontrollierte Abweichungen von der monetären Basis vorhersagt, das Geldmengenwachstumsziel $M1$ der Federal Reserve mit einer Fehlerquote von unter eins hätte erreicht werden können.

Daraus folgt, daß das beobachtete Unvermögen, das Geldmengenwachstum im Sinne der in den USA geltenden Zielvorgaben zu kontrollieren, Ausdruck von Nichtwollen, jedoch nicht von Unvermögen ist. Auch wenn in dieser Untersuchung lediglich das Aggregat $M1$ untersucht wird, so ist diese Schlußfolgerung auf breitere Aggregate, deren addierte Komponenten im allgemeinen stabiler und zuverlässiger sind als die Komponenten von $M1$, um so zutreffender.

Summary

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This paper uses the technique of autoregressive integrated moving averages to forecast the money multiplier and noncontrolled factors that affect the monetary base in the United States. These forecasts in turn are used to forecast the $M1$ money stock. Previous analysis along these lines has assumed that the monetary base was autonomous.

The present analysis reveals that the Federal Reserve could have hit its $M1$ growth targets with less than one percent error on the assumption that the Federal Reserve forecasts both the monetary multiplier and noncontrolled sources of variation in the monetary base.

In the present study, the $M1$ multiplier is forecast monthly and the noncontrolled sources of the monetary base weekly from which monthly average forecasts are derived.

The conclusion is that observed failures to control monetary growth as targeted in the United States reflect unwillingness not inability to do so. Though control of only

the $M1$ aggregate is examined in the present paper, this conclusion would be all the more applicable to broader aggregates, the added components of which are generally more stable and predictable than components of $M1$.

Résumé

Facteurs influencant la croissance monétaire: les prévisions d'ARIMA de la base et du multiplicateur monétaire

Cet article utilise la technique des moyennes mobiles intégrées autorégressives pour prévoir le multiplicateur monétaire et les facteurs incontrôlés qui influencent la base monétaire aux Etats-Unis. Ces prévisions, à leur tour, sont utilisées pour prévoir la quantité de monnaie $M1$. Les analyses antérieures similaires ont assumé que la base monétaire était autonome.

La présente analyse révèle que la Federal Reserve aurait pu atteindre avec moins d'un pourcent d'erreur, ses objectifs de croissance monétaire $M1$, si la Federal Reserve avait prévu aussi bien le multiplicateur monétaire ques les sources incontrôlées de la variation de la base monétaire.

Dans cette étude, le multiplicateur de $M1$ est prévu mensuellement et les sources incontrôlées de la base monétaire, hebdomadairement. On en dérive les prévisions moyennes mensuelles.

La conclusion est la suivante: aux Etats-Unis, la Federal Reserve n'a pas réussi à contrôler la croissance monétaire, non pas parce qu'elle ne le voulait pas, mais parce qu'elle n'en était pas capable. Bien que l'auteur de cet article n'examine ici que le contrôle des aggrégats de $M1$, la même conclusion serait applicable à des aggrégats plus larges dont les composants supplémentaires sont en général plus stables et prévisibles que les composants de $M1$.

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