CREDIBILITY AND MONETARY POLICY

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ABSTRACT

The purpose of this paper is to describe and evaluate the most
important existing ideas concerning credibility of monetary policy, with
special emphasis given to matters pertaining to the U.S. economy and the
practices and procedures of the Fed. The main discussion begins with
Fellner's hypothesis that the costs of a disinflationary episode will be
smaller when the public believes that the disinflation will in fact be
carried out. This hypothesis has been challenged recently by several
writers; an evaluation of their evidence is attempted and some new results
presented. Next, the discussion turns to positive analyses of the
monetary policy-making process. Models developed by Barro and Gordon
and others are examined, the object being to develop an understanding of
why certain features of monetary policy tend to prevail. The main
implications of this analysis are then used to consider various strategies
for obtaining a type of policy behavior that might produce better
macroeconomic results--less inflation with no more unemployment--than the
U.S. has experienced in the recent past. Particular proposals touched upon
include the adoption of a commodity-money standard, a balanced-budget
amendment, a legislated monetary rule, a nominal GNP target, and the
absorption of the Fed into the Treasury.

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I. Introduction

According to my dictionaries, "credibility" is the property of being credible, with the later meaning roughly the same as believable. So with this definition a policy lacks credibility if it is one that could not reasonably be believed. It would appear that William Fellner (1976)(1979), who introduced the idea into the macroeconomic arena, chose this particular word because he believed that the U. S. aggregate demand policy of the middle/late 1970's was unsustainable and in that sense unbelievable. With the passage of time, the term has come to be used in a slightly different way, in particular, as meaning "believed" rather than "believable." In what follows, the term will be used in this latter fashion: credibility obtains to the extent that beliefs concerning policy conform to the way in which policy is actually being conducted and to official announcements about its conduct.

It should be emphasized that this meaning is conceptually quite distinct from that pertaining to a situation in which it is expected that future rates of inflation will be small. As it happens, interest in the notion was from the start stimulated by Fellner's argument that a credible (believed) disinflation would be less costly, in terms of foregone output, than one that the public expected to be aborted. Because of this interest in disinflation, much of the discussion has been conducted under the presumption that prevailing policy is of a type that will lead to a low inflation rate in the future, which circumstance implies an agreement between "correct beliefs" and "low inflationary expectations." But these concepts are obviously quite

different, and to define the term in the latter way would be to abuse
language as well as to create unnecessary possibilities of confusion.

A second distinction concerns phrases such as "credibility of
monetary policy." Here it is important to distinguish between policy
as an ongoing process--a way of making decisions and taking actions--
and the resulting period-by-period actions (instrument settings)
themselves. Thus the credibility of a policy is to be distinguished
from the credibility of the announcements pertaining to a particular
period. While the latter is certainly a concept of some interest,
economists' efforts are--for reasons explained by Lucas (1980)--
usually more fruitful when focused on the analysis of policies as
opposed to specific policy actions.

The objective of the present paper is to describe and consider
the most important existing ideas concerning credibility of monetary
policy. Special emphasis is given to matters pertaining to the U. S.
economy and the practices and procedures of the Fed. Open-economy
aspects of the topic are, as in most of the literature, ignored. The
main discussion begins in Section II with a review of Fellner's
hypothesis that the costs of a disinflationary episode will be smaller
when the public believes that the disinflation will in fact be carried
out. This hypothesis has been challenged recently by B. Friedman
(1983), Gordon (1983), Perry (1983) and others; an evaluation of their
arguments is attempted and some new results presented. In Section
III, by contrast, the discussion centers on positive analyses of the
monetary policy-making process. Models developed by Barro and Gordon
(1983a)(1983b), Canzoneri (1983), and Cukierman and Meltzer (1984) are
examined, the object being to develop an understanding of why certain

features of monetary policy tend to prevail. The basic ideas of the
analysis are then applied in Section IV, which is concerned with
various strategies for obtaining a type of policy behavior that might
produce better macroeconomic results--less inflation with no more
unemployment--than the U. S. has experienced in the recent past.
Particular proposals touched upon include the adoption of a commodity-
money standard, a balanced-budget amendment, a legislated monetary
rule, a nominal GNP target, and the absorption of the Fed into the
Treasury. Some conclusions are suggested in Section V.

II. The Importance of Credibility

The basic idea of the credibility hypothesis--that the foregone-
output costs of a disinflationary episode will be smaller if the
public correctly believes that the attempt will not be abandoned--is
familiar enough to require only a brief sketch. If, for example, the
economy's aggregate supply function (or Phillips relationship) is of
the form[1]

$$(1) \quad y_t - \bar{y}_t = \alpha_1(\Delta P_t - E_{t-1}\Delta P_t) + \lambda(y_{t-1} - \bar{y}_{t-1}) + u_t,$$

with u_t a purely random disturbance, then the inflation rate ΔP_t can
be lowered without any deleterious effect on output relative to
capacity $y_t - \bar{y}_t$ provided that the reduction in ΔP_t is correctly
anticipated by at least one period, while a cumulative output
reduction of $\alpha_1/(1-\lambda)$ will occur per unit decrease in ΔP_t if the
latter is not anticipated. More generally, if instead of (1) the
supply function is of the nominal-contract type utilized by Fischer
(1977),

$$(2) \quad y_t - \bar{y}_t = \alpha_1(\Delta P_t - E_{t-1}\Delta P_t) + \alpha_2(\Delta P_t - E_{t-2}\Delta P_t) + \alpha_2(E_{t-1}\Delta P_{t-1} + E_{t-2}\Delta P_{t-1})$$
$$+ \lambda(y_{t-1} - \bar{y}_{t-1}) + u_t,$$

then each ΔP_t reduction must be anticipated 2 periods in advance to
avoid all output costs, with an extension to J-period lags straight-
forward. These costs will, nevertheless, be smaller the smaller is
the excess of expected over actual inflation rates during the episode.[2]
The rather different contracts of the type employed in Taylor's models
(1980)(1983a) also give rise to such effects. An interesting recent
analysis using a more general framework appears in Fischer (1984).

Two or three years ago, the relevance of this credibility hypoth-
esis[3] for the U.S. economy was, I believe, very widely accepted by
economists doing macroeconomic research. More recently, however, it
has been called into question on the basis of U.S. data referring to
the recent (1982-83) recession and slowing of inflation. In particular,
Friedman (1983) (1984), Gordon (1983)(1984), and Perry (1983) have
each suggested that the credibility hypothesis and its close intellectual
king, the "Lucas Critique," are factually incorrect. More specifically,
they have argued that conventional (i.e., non-rational expectation)
Phillips curve relationships based on pre-1980 data are consistent
with the disinflationary episode and that this would not be true if
the credibility hypothesis had empirical relevance.[4]

The most extreme of the positions taken in these papers is
expressed by Friedman (1983, p. 14), who indicates that the unemploy-
ment-inflation figures "are strikingly in line with the conventional
estimates of the cost of disinflation surveyed by Okun." This refer-
ence, of course, is to Arthur Okun's famous summary of six econometric
Phillips curves, which indicated that "the cost of a 1 point reduction
in the basic inflation rate is 10 percent of a year's GNP, with a
range [across models] of 6 to 18 percent" (Okun, 1978, p. 348). In
making his calculation, Friedman presumes that the episode lowered the
inflation rate by 5 percentage points and estimates that the incremental
unemployment during 1980-82 was about 5 point-years. These figures
would imply a sacrifice ratio [5] of only about 2.5 to 3.0 (depending
on the "Okun's Law" figure used to convert unemployment into output
loss), well below Okun's lower limit of 6. But Friedman also counts
unemployment predicted for the years 1983-88, which totals three times

as much as that for 1980-82, giving him a final value of 10-12 ("toward
the pessimistic end of Okun's range") for the episode's sacrifice
ratio. In a more recent look at the episode, furthermore, Friedman
(1984) was able to use actual data for most of 1983. This brought the
sacrifice ratio up to the 5-6 range without reliance on predictions of
future unemployment.

Basically the same raw data has also been examined by.Fischer
(1984). As a result of a slightly different assumption regarding the
natural unemployment rate (6.5% vs. Friedman's 6.0), and a different
set of predictions about unemployment in 1984-1988, Fischer finds "a
sacrifice ratio around 5 to 6, at the lower end of the range quoted by
Okun," (1984, p. 27). If, moreover, the inflation drop is viewed as
6%, rather than 5%, then the implied sacrifice ratio is below the Okun
range.

Perry's (1983) study of the recent episode is based in part on a
comparison of actual nominal wage changes during 1980.1-1983.2 with
values predicted by an equation estimated on data from the period
1954.1-1980.1. Evidence in favor of the credibility effect would
consist of negative prediction errors, i.e., actual minus predicted
values of the rate of wage change. In his evaluation of the results,
Perry emphasizes that such errors do not show up in 1980 or the first
three quarters of 1981, and that those resulting for 1981.4-1983.2 are
not large compared to their standard errors. It is the case, neverthe-
less, that the prediction errors are negative for each of the last
seven quarters that he examined, 1981.4-1983.2. This finding, which
is duplicated for the DRI model's wage equation in a study by Blanchard
(1984), is qualitatively consistent with the credibility hypothesis.

Perry (1983) also reports that price-change prediction errors are predominately positive, rather than negative, for two of three versions of the Gordon-King (1982) inflation equation. Thus from this equation "there is no evidence supporting the credibility hypothesis in connection with the present policy of disinflation" (Perry, 1983, pp. 598-9). A similar finding is reported by Clarida and Friedman (1983).[6]

What should we make of all of this? Certainly there is not a great deal of evidence in the quarterly data for 1980-83 that would serve to change the mind of someone dubious about the credibility hypothesis or, for that matter, the Phillips-curve applicability of the Lucas critique. But likewise the record is not such that a true believer—even a relatively open-minded one—would be strongly inclined to alter his position. A leading reason is noted by Perry (1983, p. 600): "No measure exists of what private decisionmakers thought about policy aims in this period. Because of this, one could argue that the promised benefits of credible disinflationary policy have not been realized because the credibility of anti-inflation policy has never been established." My own opinion gives a great deal of weight to this argument. Some reasons for doubting the Fed's resolve to eradicate inflation can be inferred by consideration of Herb Stein's (1980) list of six features that a disinflationary policy should possess in order to be credible. These include:

  (i) a combination of various policy measures

 (ii) cooperation between the president and the Fed

(iii) a high degree of bipartisan support

 (iv) quantitative specification of intermediate-term goals and

       measures, so that deviation...from the program will be

immediately visible

(v)   rejection of any commitment about the unemployment rate

(vi)   rejection of substitute measures such as "incomes policy".

Among these features, only (vi) in fact obtained during the episode in question.   Of particular importance, in my opinion, was the absence of feature (iv), about which more will be said below.

Indeed, from an ex post perspective as of June 1984 it is not at all clear that the episode of 1980-82 did in fact involve a change to a new, non-inflationary policy regime.   Neither private nor governmental forecasts are now predicting a continued lowering of the inflation rate from its 1983 level, and some vector autoregression models are predicting sharp increases within a few months.   More fundamental is the evidence concerning policy provided by the behavior of the monetary base.   In particular, the growth rate of the (St. Louis) base has averaged 8.4% per annum since the third quarter of 1979, as compared with 2.8% for the 21-year period 1947.4-1969.4.

Examination of one particular episode is, of course, not the preferred method of testing hypotheses.   Standard econometric techniques utilize data from longer sample periods and so are less susceptible to distortion by one or two random disturbances.   Thus a preferable approach to the issue at hand would be a more general consideration of the empirical significance of the credibility hypothesis/Lucas critique. In this respect it is notable that Gordon (1984, p. 42) has contended that "the U.S. Phillips curve appears to be one of the most stable empirical macroeconomic relationships of the postwar era, one that shows no sign as yet of being subject to Lucas's econometric critique." This conclusion is based in part on the study by Gordon and King

(1982, pp. 224-9), who find only minor evidence of any parameter change between subsamples divided at the end of 1966.

Since whether one finds evidence of relationship changes will depend on the way in which he looks, I will report the results of a brief investigation of my own. One consideration of importance is that evidence of a parameter change will assert itself more clearly when the alternative hypothesis--alternative, that is, to a null hypothesis representing no parameter change--is not excessively general. From the analysis of Sargent (1971), one would expect that the place to look for changes in a Phillips relationship is in the value of the coefficients attached to past inflation rates. Accordingly, I have looked for changes in the values of b_1 , ... , b_N in equations of the form

(3) $\quad \Delta p_t = a_0 + a_1 x_t + a_2 x_{t-1} + b_1 \Delta p_{t-1} + \cdots + b_N \Delta p_{t-N} + \xi_t$,

where x_t denotes the U.S. unemployment rate for males over 20 years of age and with p_t measured as the log of the PCE deflator. I have sought to determine whether the b_j values changed between the non-inflationary 1950's and the inflationary 1970's by expressing each of these coefficients as $b_j = b_{j0} + b_{j1} d_t$, where d_t is a dummy variable equally zero in the earlier period and 1.0 in the later period. I have followed Gordon and King (1982) in using the end of 1966 as the breakpoint for d_t. My overall sample period is 1954.1 - 1982.4; seasonally adjusted quarterly observations are used.

Since the quarterly inflation rate was, over the early part of the sample, fairly well-represented as a first-order autoregression (see Nelson (1972)), let us first consider OLS estimates with N = 1. With the dummy excluded we obtain

(4) $\Delta p_t = .0026 - .0012x_t + .0009x_{t-1} + .875\Delta p_{t-1}$
         (2.5)   (1.6)   (1.2)   (17.8)

$R^2 = 0.739$ SSE $= .00155$ DW $= 2.51$

where SEE is the sum of squared residuals and the figures in parentheses
are absolute values of t ratios. Including the dummy--allowing the
coefficient on Δp_{t-1} to be different from 1966--gives rise to the
following:

(5) $\Delta p_t = .0053 - .0007x_t + .0003x_{t-1} + .230\Delta p_{t-1} + .566d_t\Delta p_{t-1}$
         (5.0)   (1.1)   (0.5)   (1.8)   (5.3)

$R^2 = .791$ SSE $= .00124$ DW $= 2.17$

Obviously the dummy variable is highly significant; indeed, it carries
most of the explanatory power. Other aspects of the results are not,
however, satisfactory--e.g., the unemployment variables have little
explanatory power. Consequently, it appears that a larger value of N
is needed--that more lagged values of Δp_t are required to reflect the
effect of past inflation.

Estimates with N = 4 indicate that the fourth lag is not important
so results will be reported for N = 3. With the inclusion of the
post-1966 dummies, these estimates are

(6) $\Delta p_t = .0046 - .0017x_t + .0010x_{t-1} + .158\Delta p_{t-1} + .241\Delta p_{t-2}$
         (4.2)   (2.5)   (1.6)   (1.2)   (1.8)

    $+ .183\Delta p_{t-3} + .517d_t\Delta p_{t-1} - .399d_t\Delta p_{t-2} + .213d_t\Delta p_{t-3}$
       (1.3)   (3.1)   (2.1)   (1.2)

$R^2 = .819$ SSE $= .001078$ DW $= 1.95$

Without the dummy terms, the SSE value is .001232. Consequently, the
relevant chi-square test statistic has the value $[(.001232/.001078)-1]$

[120-9] = 15.9. As there are three constraints under the null hypothesis, the critical value for a test with significance level 0.01 is 11.3. The null hypothesis of no parameter change is therefore easily rejected.

Furthermore, it will be noted that the sum of the b_j values is .913 for the post-1966 subperiod and only .582 for the earlier subperiod. These numbers would suggest very different pictures concerning the extent of an inflation-unemployment tradeoff across inflationary steady states to someone who (incorrectly, in my opinion) believed that the estimates could be interpreted in this fashion.

While the foregoing investigation is certainly not a definitive study, its results illustrate that the Gordon-King finding is sensitive to the testing strategy employed. To conclude that Phillips relationships are not susceptible to the Lucas critique, and thus that the credibility hypothesis is invalid, seems premature at best. We continue the discussion, then, under the presumption that expectational effects are important in relationships describing output/inflation tradeoffs.[7]

III. Reasons for Credibility Problems

Our next topic concerns reasons why credibility tends to be low.
At this point the intention is to discuss the issue at a general and
slightly abstract level, turning later (in Section IV) to specifics
concerning the United States. The discussion will be somewhat specific
even here, however, in that its emphasis will be on the tendency of
inflation rates--and agents' expectations of them--to exceed values
planned and announced by the monetary authority.

Among studies designed to explain policy behavior of the monetary
authority, the most prominent analysis relating to the subject at hand
is that presented by Barro and Gordon (1983a)(1983b), who built upon
insights originally developed by Kydland and Prescott (1977). In the
simplest version of the Barro-Gordon (1983b) model, the monetary
authority's objective function is increasing in the current inflation
or monetary surprise, but decreasing in the square of the inflation or
money-growth rate itself, with discounted values of similar terms for
all future periods.[8/] If this authority were to adopt a policy rule
that chose among constant inflation rates,[9/] he would recognize that
on average surprise values would be zero so that the optimal choice
would be for a zero inflation rate. For the same sort of reason, an
average inflation rate of zero would be implied by the optimal rule
choice when a broader class of rules is permitted.

Suppose, however, that there exists no mechanism for institutional-
izing a policy rule, so that the authority proceeds in a discretionary
manner, selecting current inflation rates on a period-by-period basis.
In each period, then, he will take the prevailing expected inflation
rate as a given piece of data (an initial condition). The current

surprise value then appears to be under his control, so the optimum choice of the current inflation rate seems to be that which just balances the marginal benefit of surprise inflation against the marginal cost of inflation per se. With an objective function of the type described, this optimal value will be strictly positive, with a magnitude that is greater the lower is the cost assigned to inflation.

Rational individuals understand this process, however, so the public's expectations about actual inflation are correct on average. Thus the surprise magnitude is zero on average, over any large number of periods, even though the monetary authority views it as controllable in each period. Consequently, there is on average no benefit actually materializing to compensate for the cost of a positive inflation rate. The discretionary outcome, it is clear, features more inflation but the same amount of surprise inflation (on average) as under a rule. According to this model, then, a discretionary mode of policy behavior by the monetary authority leads to consequences that are unambiguously poorer than would obtain (for the same economy and same objectives) under rule-like behavior.

Credibility enters the picture when Barro and Gordon enrich the menu of policy considerations to reflect the possibility of reputational strategies. In a reputational equilibrium, the monetary authority delivers a preannounced inflation rate in each period even though this rate is below the value that would obtain under discretionary behavior, the reason being that any departure from the preannounced value would induce private agents to disbelieve announcements concerning the future and expect more inflation than promised. Under the Barro-Gordon assumptions regarding the policymaker's

objectives this rate lies between zero and the discretionary value discussed above. Thus in each period the monetary authority partially bypasses the apparent possibility of exploiting given expectations because of his recognition that such exploitation would lead to a loss of credibility (reputation) that would imply a more unfavorable tradeoff in the future. Taking account of these reputational effects, Barro and Gordon then obtain an equilibrium solution that is a weighted average of those that would obtain under discretion and under the optimum institutionalized rule. A concern for credibility is helpful, but is not a fully adequate substitute for the possibility of an institutionalized rule.

The Barro-Gordon line of analysis accurately reflects, in my opinion, several crucial aspects of the situation that actually obtains in the U.S. economy. In particular, its emphasis on the tension created by the desirability of money growth surprises together with the undesirability of anticipated money growth, seems central to the policy problem. It provides, moreover, an explanation of why our economy experiences significantly positive inflation on average even though policymakers (as well as economists) profess to believe that no benefits are thereby induced.

Taylor (1983b) has expressed reservations about this aspect of the Barro-Gordon analysis. His argument is that, in other contexts involving similar tensions, "society seems to have found ways to institute the optimal (cooperative) policy. For example, patent laws are not repealed each year to prevent holders of patents from creating monopolist inefficiencies [which] would eliminate any incentive for future inventions" (1983b, p. 125). That argument seems unconvincing,

however, for the Barro-Gordon analysis is designed for an economy with fiat money and our system has only recently completed its dissociation from a commodity-money (gold) standard. Thus it should be possible, if Taylor were right, to point to the recent creation of some institutional arrangement comparable to our patent system. Indeed, the need for something of this type would seem to be the main message of the Barro-Gordon analysis. This argument of Taylor's seems to imply, moreover, that our system has been generating the optimal amount of inflation--which he disputes elsewhere (1985).

My own reservations would be just the opposite of Taylor's. Specifically, I would think that the actual situation in the U.S. would be better represented by the purely discretionary equilibrium, in the Barro-Gordon model, than by the reputational equilibrium. Establishment of the latter apparently requires specification by the policymaker of a (non-institutionalized) rule governing preannouncements that is "enforced" by the cost of departing from its instructions. (See Barro-Gordon, 1983b, p. 108.) But there is no existing counterpart of this rule in the U.S. system. Indeed, spokesmen for the Federal Reserve have been adamant in their rejection of any prespecified pattern of policy behavior and in their assertions concerning the desirability (or even "necessity") of policy-making flexibility.[10/] In addition, I am bothered by the assumption about expectations that is utilized by Barro and Gordon (1983b, p. 108).

More recently, Cukierman and Meltzer (1984) have enriched the aforementioned line of analysis by incorporating three complications not present in the basic Barro-Gordon framework: imperfect control of, and unreliable announcements about, money growth rates plus

stochastically changing objectives of the policymaker. The fluc-
tuations in objectives, moreover, are not promptly recognized by the
public. These extra ingredients permit Cukierman and Meltzer to
derive a large number of interesting conclusions concerning monetary
behavior; two examples are that the monetary authority will choose to
have relatively looser control procedures the higher is his rate of
time preference and that looser control leads to higher average rates
of money growth (and inflation). Despite the ingenuity of these
enrichments, however, the basic source of an excessive average inflation
rate continues to be the exercise of period-by-period discretion,
rather than the one-time choice of a rule.[11/]

A point emphasized in the Barro-Gordon discussions is the com-
patibility of fixed rules with policy activism, i.e., responses to the
current state of the economy. The distinction between rules and
discretion is quite different from the distinction between activist
(i.e., contingent) and non-activist (e.g., constant growth rate)
rules. Canzoneri (1983), by contrast, has tied together the two
distinctions by positing an environment in which desirable activist
responses depend upon a state variable about which the monetary
authority has private information (i.e., one not currently observable
by individual agents). This makes it impossible for agents to verify,
in a given period, whether the current rate of money growth differs
from its average value because of an activist, rule-dictated response
to current perceptions, or because the monetary authority is attempting
to exploit initial conditions as in a discretionary equilibrium. But
while that point is correct as stated, it does not imply that from a
series of observations the public (i.e., individual agents) cannot

tell whether the monetary authority is following a rule or behaving discretionarily, for the average money growth rates will differ. Consequently, the difference between the two distinctions remains important, despite Canzoneri's example.

The main messages that I see in all of this are, then, those stressed by Barro and Gordon. They are that (i) discretionary behavior tends to lead to excessive inflation and (ii) the operation of rules does not preclude activist stabilization responses. Reputational considerations may move the outcome in the direction of an optimal rule equilibrium, but will do so to a limited extent. What is needed to prevent excessive inflation, and expectations of the same, is the adoption of an appropriate policy rule.

It may be noted that the undesirably-high inflation rates in discretionary equilibria in the Barro-Gordon framework do not necessarily correspond to imperfect credibility as defined in Section I, that is, as existing when there is a divergence between privately expected and actual or officially announced values. There is, however, an interpretation of the discretionary equilibrium path that matches the second of these definitions precisely. Suppose that in period t the monetary authority takes $E_{t-1}\Delta p_t$ as given, but that he recognizes that _future_ surprises have expected values of zero. Thus in period t he chooses $\Delta p_t > 0$ and _plans for_ $\Delta p_{t+1} = \Delta p_{t+2} = \ldots = 0$. Then when period t+1 comes around, the relevant initial condition is that $E_t \Delta p_{t+1}$ is given, so the authority chooses $\Delta p_{t+1} > 0$ and plans $\Delta p_{t+2} = \Delta p_{t+3} = \ldots = 0$. In each period, according to this story, the monetary authority takes actions that differ from those that he planned (last period) to take. Then if his announcements accurately

represent his plans, the equilibrium will be one in which inflation in each period—or more generally, on average—exceeds its previously planned and announced value. Rational private agents' expectations will (on average) equal actual values, so will be different from planned and announced values—a situation of low credibility.

To this picture it may be objected that the policymaker is posited as behaving in a peculiar manner. In particular, he is not accurate in his predictions about how he himself will behave in the future. Dynamic inconsistency thus prevails in a different sense than that described by Barro and Gordon (1983a, p. 599). This objection is well taken, but on behalf of the story (equilibrium concept) offered, it can be said that it describes a process in which outcomes are consistently less desirable than those planned and announced by policy authorities. In particular, there is in the example at hand more than zero inflation on average even though the monetary authority is always planning and announcing that the inflation rate will be zero in the future. It seems possible that this story has some relevance for actual economies.[12/] It certainly conforms in several respects— target misses, base drift, positive inflation—to the portrayal of the U. S. experience as described by Hetzel (1984c), Lombra-Moran (1980), and other knowledgeable observers.

IV. Macro Policy Credibility in the United States

In this section we turn our attention more specifically to the
United States and, in particular, to its monetary authority, the
Federal Reserve. In a discussion concerning credibility, the first
thing that needs to be said about the Fed is that it appears, from the
viewpoint of an outside observer, that the Fed has no desire for a
situation of high credibility. Of course it would prefer for the
public to expect that future inflation rates will be low. But, as
Section I emphasized, that is not the same as desiring a high degree
of conformity in general between public beliefs about policy and the
Fed's own plans.

There are various ways in which the Fed's actions and procedures
suggest the absence of a desire for public understanding of the
policies being pursued. One obvious example in this regard was the
Fed's opposition in the 1970's to Congressional proposals for the
announcement of monetary targets. Of continuing significance, more-
over, is the practice of announcing target ranges--with quite wide
bands--for a number of different monetary aggregates. In addition,
there is the ambiguity concerning the meaning of these "targets"--are
they something that the Fed attempts to achieve or do the numbers
serve merely as indicators relevant to judgments about current con-
ditions?

To these observations it might be countered that the Fed's
position is appropriate since it is undesirable to have targets
expressed in terms of monetary aggregates. The items of actual
concern are macroeconomic goal variables such as inflation, employ-
ment, output growth, etc. Thus it is undesirable for the Fed to try

to achieve announced monetary targets in the face of exogenous distur-
bances; instead, according to this argument, it should readily abandon
monetary targets when to do so would result in better fulfillment of
macroeconomic goals. Consequently, the argument concludes, the
ambiguity concerning monetary targets is not evidence of any lack of
desire to communicate actual goals. But if that is the position of
the Fed, then it should be happy to announce target paths for the goal
variables, if it wants its plans to be understood by the public. In
fact, of course, the Fed is on record as opposing the establishment of
publically-announced targets expressed in terms of goal variables.[13]

The absence of a desire for credibility is also suggested by the
type of dialogue that often arises in response to criticism or sug-
gestions for procedural changes. For example, officials of the Fed
have frequently responded to criticism regarding money stock variability--
i.e., fluctuations in M1 growth rates--with the assertion that the Fed
is unable to exert control over the aggregate in question over short
spans of time. Almost simultaneously, other officials of the Fed have
argued in opposition to proposals for the adoption of operating
procedures that would serve to improve month-to-month monetary con-
trol.[14] Then in response to the criticism that arises naturally from
this concatenation, it has been argued that "short run" monetary
control is unimportant; as long as the money supply is well managed
over longer intervals there is no need (it is argued) for improved
month-to-month control. But that position is hard to reconcile with
the Fed's tendency to permit "base drift," i.e., its practice of
expressing each period's money stock target in terms of percent
changes from that period's starting value, without adjustments to

compensate for target misses of the previous period.[15/] Clearly, if
misses were white noise, this practice would lead to random-walk
behavior of money stock deviations from any given target path--which
is not what most economists would mean by "long run control."[16/] More
generally, long-run control under almost any definition requires
either accurate month-to-month control or an absence of base drift.
Thus it is difficult not to obtain the impression that the Fed places
little value on long-run monetary control--an attitude that sharply
contradicts the Fed's own statements about the relationship between
inflation and money growth together with its announced determination
not to contribute to inflation.[17/]

It might be possible to construct an argument that inflation (and
thus monetary control) is not actually of much importance,[18/] but that
is not the issue under discussion. The point of the previous paragraph
is that the nature of the Fed's multipart response to its critics is
not of a type that would engender belief that the Fed is frankly
conveying a clear notion of its goals and intentions.[19/]

As a result of the record of the last 15 years, many economists
have concluded that basic institutional reforms will be required to
create a high degree of credibility for promises that inflation will
not be permitted by the Fed in the future. The basic aim of the
proposed changes is, of course, to generate noninflationary behavior
of the monetary system as opposed to optimism unrelated to any changes
in the forces that have resulted in the inflation of the past. A
number of quite distinct proposals, representing different monetary
standards, have been presented. Prominent among there are proposals
for:

(i)   adoption of a gold standard or some other commodity money

       system,

(ii)   passage of a constitutional amendment requiring a balanced

       budget for the Federal government in each year,

(iii) legislative imposition of a monetary rule upon the Fed, and

(iv)   conversion of the Fed into a bureau of the Treasury.

A complete consideration of these proposals is clearly beyond the

scope of this paper. But since each of the first three involves the

adoption of some form of a rule involving precommitment, discussion of

certain aspects is needed. More complete reviews have been provided

by Stein (1980) and Friedman (1984).

The logical attraction of a genuine gold standard[20/] is that it

makes the price level--i.e., the money price of commodities in general--

a relative price. There are then limits on the extent to which the

price level can change over any given span of time, limits that are

determined by changes in tastes and technology rather than the speed

with which paper money and bank deposits can be created. Thus it

seems almost certain that severe inflation could not occur while a

gold standard was in operation. The system does, however, permit

significant cyclical fluctuations in the price level, corresponding to

relative price changes between gold and commodities in general. How

severe there fluctuations would be is a matter open to dispute, but

most students seem to believe that the magnitude could be troublesome.

Various writers have consequently proposed a monetary standard based

on a composite commodity bundle, rather than a bundle consisting of

gold alone. Hall (1982), for example, has suggested that a bundle

composed of ammonium nitrate, copper, aluminum, and plywood (in

specified quantities) would have rather small relative price changes—
relative to commodities in general—in the United States of the
present day.[21/]

A significant difficulty with a composite commodity system is
that a bundle such as Hall's would not possess the historically-based,
mystical attractiveness of gold. All arrangements concerning the
bundle would obviously be the product of explicit attempts consciously
to devise a desirable monetary system. But in the absence of the
mystique widely accorded gold, there would be little reason to prefer
a commodity money system in comparison to one based on fiat money.
Furthermore, if the commodity standard (i.e., the "dollar" price of
the bundle) were adjustable, as Hall proposes, a monetary authority
not bound by a rule would have the same type of incentive for discre-
tionary behavior as exists under our present system.[22/]

It should also be mentioned that much of the apparent support for
a "gold standard" is probably based on distorted views of what such a
system entails. Friedman (1984, p. 45) has conjectured that a genuine
gold standard "has miniscule political support."

Let us turn next to item (ii). While the notion of a constitu-
tional amendment provides an attractive route for possible institu-
tionalization of a non-discretionary policy rule, the emphasis that
has been given to balanced budgets seems slightly misplaced. An
example in a recent paper of mine (McCallum, 1984b, pp. 130-1) illus-
trates that in principle an economy without excessive monetary growth
can avoid inflation even if it maintains a positive deficit that gives
rise to an ever-growing stock of government debt.[23/] Strictly speaking,
this result requires rather extreme "Ricardian" assumptions involving

infinite planning horizons and lump-sum taxes. But one does not have

to believe in the literal empirical accuracy of these to accept the

point made by this example, which is that government purchases

(absorption of resources) and money creation—rather than deficits—

are the macroeconomic policy variables of primary importance. Conse-

quently, an amendment whose intent is to avoid excessive growth of

nominal aggregate demand should be designed to place limits on govern-

ment purchases (rather than taxation) and on money creation.

One other point to be made about any amendment, whose purpose is

the establishment of a policy rule concerning fiscal variables, is

that it would be unfortunate if its design were to eliminate the

built-in automatic stabilizers provided by a tax system that relates

receipts to current income.[24/]

Closely related is the much-discussed possibility of congressional

imposition of a rule that would constrain and precommit the behavior

of the Fed.[25/] The main reasons why such a rule should be beneficial

are implicit in the discussion of Section III; here the relevant issue

is whether there is any reason to expect that Congress would choose to

impose such a rule. In that regard, the analyses of Hetzel (1984a)

(1984b) and Kane (1982) are not encouraging. According to Hetzel,

discretionary period-by-period policy behavior results from an attempt

to appear responsive to the conflicting desires of various politically

significant groups, the intensity of whose desires fluctuates from

month to month and year to year. The effect of this hypothesis is

reinforced by Kane's "scapegoat theory" according to which members of

Congress want the Fed to have a substantial amount of discretion so

that each member can attempt to place blame on the Fed, ex post, for

unpopular developments. Each of these lines of reasoning seems to suggest that the likelihood of Congress imposing an operationally well-defined rule on the Fed is lower than the likelihood of the Fed adopting such a rule of its own volition.

Recently, Friedman (1983) (1984) has mentioned the possibility of legislation that would "end the independence of the Fed by converting it into a bureau of the Treasury Department" (1984, p. 43). He suggests that while this arrangement would be "by no means ideal. . . it would be a great improvement over the existing situation, even with no other changes" (1984, p. 45). The basis for this judgement is that bringing the Fed inside the administration would provide it with a "bottom line" that would serve as a check on bureaucratic inertia that prevents reform (1983, pp. 114-118). The bottom line in question would, however, result from potential voter dissatisfaction rather than the type of financial incentives faced by a private business firm. In view of the type of performance that has been forthcoming from Congress and recent administrations, it is not obvious that better results would obtain. It would appear that the monetary authority would, if placed in the Treasury, be faced somewhat more directly with the same type of conflicting and fluctuating pressures that it is now subject to indirectly. If such pressures are in fact an important reason for discretionary behavior, this arrangement would be unlikely to lead to improved performance. The case of the Bank of Israel is relevant in this regard.

Before concluding this discussion of proposed institutional reforms, a few words should be added concerning one that has received a great deal of attention recently, namely, that the Fed engage in

"nominal GNP targeting."[26/] This proposal has been discussed, both by
friends and foes, as if it were something dramatically different from
"money stock targeting." Consequently, I would like to suggest that
they are in fact highly similar. Some essential features of similarity
are as follows:

(a) both assign the monetary authority an objective
    stated in terms of a single nominal variable

(b) in both cases, this variable is not itself an ultimate goal
    variable or an instrument that can be manipulated directly
    by the Fed

(c) thus in both cases specification of the target does not
    amount to an operational rule

(d) such a rule can be easily constructed, however, by
    specifying adjustments to the growth rate of the monetary
    base or the Fed's portfolio that would automatically take
    place whenever the GNP or money-stock variable is above or
    below its target path

(e) for the avoidance of inflation, that target path needs to be
    defined in level (rather than growth rate) terms or,
    equivalently, base drift must be scrupulously avoided.

Of course the operating characteristics of a system based on nominal
GNP targets will be different from those of one based on M1 or M2
money supply targets. But, given institutional arrangements under
which the money stock is not directly controllable, this difference is
one of a technical nature that does not involve major issues of
principle or ideology. More important issues, in my opinion, involve

the presence vs. absence of operational rules for manipulating a

controllable instrument and the presence vs. absence of base drift.

V. Conclusion

It remains to bring together some of the diverse themes presented above concerning credibility of monetary policy;[27]/ an attempt will be made here. In Section II it is maintained that evidence purporting to contradict the validity of the credibility hypothesis--i.e., the importance of expectations for output-inflation tradeoffs--is unconvincing at best. Given the strong theoretical basis for this hypothesis it then seems reasonable to base analysis involving macroeconomic policy on specifications in which inflation-rate expectations play a central role. In Section III the Barro-Gordon analysis, which builds upon precisely this sort of a specification, is reviewed together with elaborations and related arguments. The main message is that attempts by the monetary authority to optimize on a discretionary period-by-period basis tend to result in more inflation, and no less unemployment, than would prevail under a mode of operation that involves a fixed (but perhaps activist) monetary rule. A successful anti-inflationary policy would then seem to require the adoption of rule-like behavior, the central feature of which is abstention from attempts to exploit each period's historically-given initial conditions.

A discouraging aspect of this conclusion, mentioned in Section IV, is that discretionary behavior appears to reflect a response to political pressures of a type that may impinge more directly upon Congress and the executive branch than upon the Fed. Consequently, it seems unlikely that steps to end period-by-period monetary policymaking will be forthcoming from Congress or any part of the executive branch. Nor does it seem likely that constitutional amendments of an effective type can be relied upon.

There are reasons for believing, then, that the best hope lies--
discouraging experiences notwithstanding--in the possibility of
adoption of something closer to rule-like behavior by the Fed itself.
In that regard, it should be noted that the Barro-Gordon analysis does
not imply that such an outcome is infeasible; it merely _assumes_ that
discretionary or reputational equilibria will be established in the
absence of mechanisms for binding precommitments. But while the Fed
cannot literally precommit its future actions, it can adopt procedures
that would make departures from a preselected rule _costly_ to itself.
If, for example, the Fed were to adopt an operational rule such as
that described by Hall (1984, p. 68) or McCallum (1984a, p. 390),[28/]
then a host of activities and procedures involving rapid and accurate
collection and processing of the requisite data would grow up and
become established. Public statements and lectures explaining the
benefits of the rule--and perhaps even the infeasibility of departing
from it--would be given by Board members, advisors, and System econo-
mists. Departures from the rule would come to require justification,
and proposals for departures would inflict embarrassment on those
individuals who made then. In time, the whole gamut of forces for
bureaucratic inertia emphasized by Friedman (1983) would come to work
on behalf of adherence to the rule.

But would not this sort of behavior deprive the Fed of the
political benefits of period-by-period discretionary policymaking
emphasized by Hetzel (1984b), namely, those obtained by appearing
responsive to the multiple, shifting objectives of various politically-
significant groups? There is of course some danger involved, but
there are also dangers associated with the attempt to be responsive.

In particular, there is the danger that the groups in question will
come to recognize that the Fed cannot deliver the desired outcomes.
Actions involving redistributions can help one group but only by
hurting others, while extra attention during one part of the business
cycle requires below-normal attention during other phases. Thus the
type of behavior under discussion produces only the appearance of
being responsive to all of the various interest groups.[29/] .

Furthermore, there is an important danger involving the
independence of the Fed, i.e., its existence as an entity dictated to
by neither Congress nor the executive branch. In a democratic system
of government, the ultimate justification for this sort of independence
would seem to be based on the presumption that it will promote far-
sighted behavior,[30/] modes of operation that avoid the pursuit of
transitory benefits that entail poorer performance on average over
long time spans. But the choice between discretionary and rule-like
behavior amounts to the choice between a way of doing business that is
always focussed on the immediate present and one that takes a longer
perspective. Discretionary behavior is then, on this view, fundamentally
inconsistent with the raison d'etre of an independent monetary authority.
The decision not to adopt rule-like procedures for monetary policy
constitutes, in other words, neglect of the Fed's institutional
mission. One would expect prolonged neglect of this type to lead to
public calls for institutional reform, a conclusion that derives some
support from the experience of the past few years.

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Footnotes

1. Here $\alpha_1 > 0$ and $0 \leq \lambda < 1$ while y_t and $\bar{y}_t$ refer to logarithms of actual and "capacity" or "natural rate" values of aggregate output for period t and p_t is the log of the aggregate price level. In equation (1), $E_{t-1}\Delta p_t$ merely denotes the subjective expectation of Δp_t held at the end of period t-1. At various points, however, we will interpret $E_{t-1}(.)$ as the conditional mathematical expectation $E(.|\Omega_{t-1})$ where Ω_{t-1} is an information set including realizations of all relevant variables in periods t-1, t-2,.... In other words, we shall in that case be assuming rational expectations. That hypothesis is neither necessary nor sufficient for the credibility hypothesis, although there are strong relationships and many proponents of the credibility hypothesis do in fact come to the latter by way of rational expectations.

2. This statement is phrased so as to avoid taking a position on the issue of whether costs are incurred whenever $y_t \neq \bar{y}_t$. Thus this paper continues in the common tradition of bypassing this fundamental and important issue.

3. Note that the "credibility hypothesis" does not imply only that policy credibility (as defined above) obtains, but also that the economy's Phillips curve is of the expectational variety. This terminology is taken from Fellner.

4. An entirely different argument calling into question the hypothesis was developed by Grossman (1983). This argument concerns equation (1) together with rational expectations [i.e., with $E_{t-1}\Delta p_t = E(\Delta p_t|\Omega_{t-1})$], a specification that has often been interpreted as

applying to an economy with full price flexibility. Under that interpretation, as Grossman notes, the true structural supply function (as developed in Lucas (1973)) related to contemporaneous _perception_ errors rather than anticipational errors; equation (1) is just an aggregated reduced-form expression that is appropriate in some cases. Consequently, if individuals possess useful information on contemporaneous nominal aggregates (money stock or price index values), as would seem to be the case in actuality, then previously-formed expectations of Δp_t are irrelevant for output determination. Credibility then becomes unimportant for price and output developments; all that matters is the path actually taken by the money stock and price level. So, Grossman in effect suggests, credibility arguments are important only for economies in which there is some stickiness in price adjustments. McCallum (1982) uses a related argument to suggest that price stickiness is in fact a feature of the U.S. economy.

5. The sacrifice ratio is the percent of a year's output lost divided by the number of percentage points (on an annual basis) that the inflation rate falls. The term was used by Gordon and King (1982).

6. Other studies of the episode have been conducted by Cagan and Fellner (1983) and Englander and Los (1983).

7. At the Jackson Hole conference, Robert Gordon reported some test statistics indicating that the difference between my results and those of Gordon-King arises primarily because my specification (3) does not

include a number of additional explanatory variables that do appear in
the Gordon-King study (1982, p. 218). One's conclusions concerning
the relative merits of the tests must then rest, to a considerable
extent, on his judgment as to the theoretical appropriateness of the
inclusion of these additional variables.

8. Other versions of the model exist. The square of actual inflation
relative to some constant target rate appears in one, while Barro and
Gordon (1983a) use the square of $y_t - k\bar{y}_t$ (with $k > 1$) as a penalty
term rather than making the objective increasing in $y_t - \bar{y}_t$ (or the
surprise term).

9. There is no need, in the Barro-Gordon setup, to distinguish
between inflation and money-growth rates. Consequently, we shall for
simplicity write as if the authority were directly selecting inflation
values.

10. See, for example, the statements in Volcker (1982)(1984). Also
see the discussions of the Fed's attitude by Hetzel (1984a) and Lombra
and Moran (1980).

11. Cukierman and Meltzer (1983, pp. 34-5) suggest that their
framework does not involve any dynamic inconsistency "because the
'action' taken by the public [forming expectations of money growth]
does not depend on the future settings" of policy variables. As the
same expectation formation is the public's only "action" in the
Barro-Gordon and Kydland-Prescott setups, these must also involve no
dynamic inconsistency in this sense. A different concept of dynamic
inconsistency might define the latter as obtaining when there exists a

discrepancy between instrument settings under rules and under period-by-period decision making (given the same preferences and technological constraints in each case). This sort of discrepancy would prevail in the Cukierman-Meltzer framework, if rules were considered.

12. It is my opinion not obvious that it is wrong to assign a different extent of rationality to private agents, whose modelled actions impinge primarily on their own welfare, and policy authorities, whose modelled actions impinge primarily on others. To treat such actions differently is to admit to having a poor model of the political process--something that I am willing to do--for, with a good one, policymakers could simply be treated as maximizing their own private individual utility subject to the constraints of the political process.

13. See, e.g., Volcker (1983).

14. Especially relevant in this regard was the Fed's long-lasting opposition to contemporaneous reserve requirements. One of the reasons given for the Fed's reluctance to change--viz., the possible technical infeasibility of banks' compliance with contemporaneous requirements--was itself enough to give one doubts about the candor of the position (given that such requirements prevailed before 1968). As a climax to the matter, when the Fed finally introduced in 1984 a scheme that it describes as contemporaneous reserve requirements, it chose one that continues to feature a two-day lag between the end of computation and maintenance periods. As Goodfriend (1984) has explained, this two-day lag could--depending on whether the Fed

stabilizes the Federal funds rate during the two days--make the system
no different for monetary control purposes than others previously
found wanting.

15. From 1975 to 1978, base drift could occur every quarter; since
the passage of Humphrey-Hawkins legislation in 1978 it occurs once
each year, with a second occasion possible (and realized in 1983).

16. Barro (1982, p. 105) refers to this type of regime as "one that
possesses no nominal anchor."

17. See, e.g., Volcker (1984).

18. I would not try to do so.

19. Another indication is provided by the Fed's opposition to the
prompt release of trading-desk directives and minutes of FOMC
meetings.

20. Friedman's (1961) (1984) distinction between "real" and "pseudo"
gold standards is somewhat unclear. It has been summarized by Stein
(1980, p. 63) as follows: a real gold standard is a condition in
which gold and promises to pay gold are circulated and exchanged
freely but in which the government does not peg the price of gold
relative to the national currency. . . . In a pseudo-gold standard,
the government fixes the price of gold by standing ready to buy or
sell. . . ." It would seem that the existence of a national currency
with a pegged gold price would constitute a genuine gold standard
provided that this price is maintained permanently. The gold standard
then amounts to a rule governing the behavior of currency issues, one

that subordinates the currency in a way that makes it consist of "promises to pay gold." Aid in understanding Friedman's point is provided by a useful paper by Cagan (1982), which describes the forces for management of actual gold-standard systems in a discretionary manner. Cagan also describes the influences that tend to bring about the breakdown of such systems.

21. Hall's paper includes the unorthodox contention that a government purchases and sales of the bundle would be unnecessary and undesirable. I will not attempt to consider that suggestion here.

22. These problems are recognized by Hall (1982, p. 112): "The commodity standard is not inherently superior to fiat money as a way to stabilize the cost of living."

23. The example is of some theoretical significance because it occurs in the context of a general equilibrium model in which all agents maximize explicitly specified objective functions and all markets clear.

24. This concern would be unnecessary if the economy were perfectly Ricardian. The viewpoint being taken is that the Ricardian model provides a good starting point for analysis of macroeconomic phenomena, but that its conditions are unlikely to obtain in full.

25. Also possible is a constitutional amendment restricting monetary behavior (Friedman, 1984, pp. 41-2).

26. See, e.g., Gordon (1983), Hall (1984), and Taylor (1985). The scheme described in McCallum (1984a) uses nominal GNP target

departures as input variables to a fixed but semi-activist rule
prescribing growth of the monetary base.

27. Certain portions of the discussion--e.g., Sections I and II--are
equally applicable to a discussion of the credibility of fiscal
policy. The model of Section III would not, however, appear to be
appropriate for such a discussion. Issues involving the interaction
of monetary and fiscal policy have been recently discussed by Blinder
(1982).

28. It is crucial in this regard that the rule be operational, i.e.,
specified in terms of a controllable instrument variable, in order to
minimize possible self-deception. Adoption of an (intermediate)
target variable, be it M1 or nominal GNP, does not constitute adoption
of a rule.

29. Another problem with Hetzel's argument is that it seems to
presume that rules must be of a non-reactive type, i.e., unresponsive
to current conditions. Thus he says: "The requirement of balancing
multiple goals among which priorities change. . . creates the demand
for flexibility, and absence of precommitment" (1984b, p. 18).

30. Volcker (1983) refers to the "independent status of the Federal
Reserve that makes a longer-term view possible."