monthly review

FEDERAL RESERVE BANK OF KANSAS CITY

A Time Series Analysis
Of the Control of Money

By Jack L. Rutner

In recent years the Federal Reserve System has come to place somewhat greater emphasis on monetary aggregates as policy variables and somewhat less emphasis on money market conditions, i.e., interest rates. As a result of this shift in emphasis, there has been a great deal of research done within and without the System on how to control the money stock.'

One approach to money stock control, originally suggested some years ago by Milton Friedman and Anna J. Schwartz,[2] relates the stock of money to the monetary base, which is defined as member bank balances at the Federal Reserve plus all commercial banks' vault cash and currency held by the nonbank public.[3] In this approach, the determination of the money stock is symbolized by the identity $M = mB$. In the identity, the money stock (M) is decomposed into the monetary base (B)—the portion of the money stock controlled by the monetary

authorities — and the multiplier (m)—the uncontrolled portion of the money stock.[4]

An important assumption underlying this multiplier-base approach is that the Federal Reserve can control the monetary base rather closely and thereby control the money stock. There is little reason to doubt this assumption because the monetary base is almost exclusively a liability of the Federal Reserve. Even with close

1/See, for instance, *Controlling Monetary Aggregates II: The Implementation,* Proceedings of a Conference sponsored by the Federal Reserve Bank of Boston, **February 1973;** and *Monetary Aggregates and Monetary Policy,* Federal **Reserve** Bank of New **York,** October 1974.
2/Milton **Friedman** and Anna I. **Schwartz,** *A Monetary History of the United States 1867-1960,* (Princeton: Princeton University **Press** for the National Bureau of Economic Research, **1963),** Appendix B.

3/**This** analytical framework begins by dividing the stock of money into a currency component (C) and a deposit component (D) as, for example:

$$M = C + D.$$

Similarly, it divides the monetary base (B) into a reserve component (R), where reserves are member bank balances at the Federal Reserve plus all commercial banks' vault cash, and a currency component, as in the following equation:

$$B = C + R.$$

By **dividing** M **by** B, the following identity is obtained:

$$\frac{M}{B} = \frac{C + D}{C + R},$$

and by dividing the numerator and denominator of the right side of the last **equation** by D and multiplying both sides of the equation by B, the following multiplier-base identity is obtained:

$$M = \left[\frac{\frac{C}{D} + 1}{\frac{C}{D} + \frac{R}{D}} \right] B.$$

The quantity **in the brackets,** called the money multiplier, expresses that part of the money stock outside the control of the Federal Reserve, while B expresses that part of the money stock said to be controlled by the Federal Reserve.
4/**Since** the appearance of the Friedman-Schwa framework, there have been several studies which have examined the relationship between the monetary base and the money stock. Two of these are **Allan Meltzer,** "Controlling Money," Federal Reserve Bank of St. Louis *Review,* May 1969; and Albert E. Burger, "Money Stock Control," *Controlling Monetary Aggregates II.*

control of the monetary base, however, there is reason to question whether the money stock can be controlled because variations in the multiplier might cause the money stock to fluctuate in an undesirable manner. If this occurs, money stock control might still be achieved if the monetary authorities were to offset fluctuations in the multiplier through variations of the monetary base. This presupposes, however, some knowledge about the interaction between the base and the multiplier, a matter which has not been the subject of extensive research.

Complicating an analysis of the multiplier-base approach is that some recent studies have employed a concept of the base adjusted for changes in reserve requirements and shifts of deposits between different classes of deposits. This concept, hereafter referred to as the adjusted base, was developed by Karl Brunner and popularized by the Federal Reserve Bank of St. Louis.[5] Their adjustments, however, tend to overstate the case for the control of money through variations in the base because the adjustments reduce the observable effect the multiplier has on the money stock and thereby amplify the effect of the adjusted base.

This article examines the statistical relationship between the money stock and the adjusted base as well as the unadjusted base.[6] The article also examines the interaction between the base and the multiplier and the effect the multiplier has on the money stock. In these examinations, some relatively new statistical techniques are employed, including spectral analysis. The money stock concepts that are related to the base are the narrowly defined money stock, M1 (currency held by individuals plus demand deposits), and the more broadly defined money stock, M2 (M1 plus time deposits at commercial banks less large negotiable certificates of deposit).

RELATIONSHIP BETWEEN MONEY AND THE BASE

One of the problems encountered in examining the relationship between the money stock and the base is that both have strong upward trends. When relationships between variables with a strong upward trend are estimated by ordinary statistical tools, the resulting estimates tend to be biased toward acceptance of the hypothesis that the variables are related when indeed they may not be. Thus, before the relationship between the money stock and the base can be estimated properly, the trend must be removed from each series.

Panel A of Chart 1 shows the strong upward trend that exists in the original monthly observations for M1. To remove the trend from such a series, one technique commonly employed is to convert the original series showing levels into a series showing changes in levels. This technique, however, is frequently defective in removing the trend. Panel B, which contains a series on changes (A) in M1, shows clearly that there still exists an upward trend in the series. A second technique for removing the trend is to remove that part of the series that can be predicted from its own past history.' Panel C shows the results of applying this technique to the M1 series. As can be seen, this technique is far superior in removing the trend and, consequently, it is employed in this article.[8]

5/See Karl Brunner, "A Schema for the Supply Theory of Money," *International Economic Review,* Vol. 2, No. 1, January 1961, pp. 79-108; and Leonall C. Anderson and Jerry L. Jordan, "The Monetary Base Explanation and Analytical Use," Federal Reserve Bank of St. Louis *Review,* August 1968.

Two exceptions to the use of the St. Louis adjusted base are Friedman and Schwartz, *A Monetary History of the United States;* and Philip Cagan, *Determinants and Effects of Changes in the Stock of Money 1875-1960* (New York: Columbia University Press for the National Bureau of Economic Research, 1965).

6/Data for the unadjusted base, i.e., not adjusted for reserve requirement changes, etc., were kindly furnished by Anna J. Schwartz of the National Bureau of Economic Research.

7/Essentially this is accomplished by regressing a variable on its past values. The significant lags are retained and the regression is rerun. Inasmuch as significant lags sometimes become insignificant on the rerun, it is necessary to run the regressions several times until a set of lags are found whose coefficients maintain their significance. The residual from the regression in which all remaining lags are significant is then used as the new series to run the statistical tests. In the tests run here, all variables were first converted to natural logarithms. A reference to the technique used here may be found in Marc Nerlove, "A Comparison of a Modified 'Hannan' on the BLS Seasonal Adjustment Filters," *Journal of American Statistical Association,* June 1965, pp. 442-91.

8/Note, too, that there is some evidence of increasing variance for the more recent figures.

Chart 1
LEVEL, PARTLY DETRENDED, AND TOTALLY
DETRENDED VALUES OF M1
(Monthly, 1947-73)

Billions of Dollars

PANEL A: Level

PANEL B: M1 Partly Detrended

WNEL C: M1 Detrended
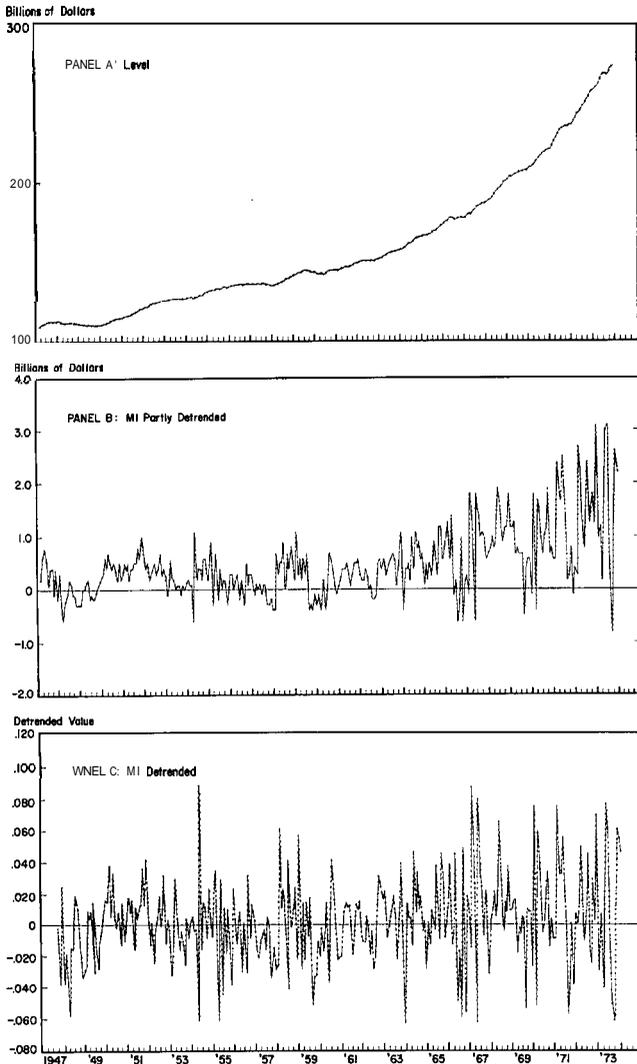
NOTE: The detrended value is not in the same scale as the level and first differences
See footnote 7 for derivation of the detrended value.

The pitfalls of incorrect trend removal can be found in Table 1. This table shows the correlation coefficients $(R^2$'s$)$ between various measures of money and the base when each series is correctly and incorrectly detrended.[9] In the case of the inadequately detrended adjusted

base, there appears to be a strong relationship—evidenced by the relatively high R^2—between it and the money stocks. By itself, the high R^2 would confirm the hypothesis that the money stock is correlated with the adjusted base; not unexpectedly the relationship for the unadjusted base is somewhat weaker than for the adjusted base. When the more effective method of trend removal is used, however, virtually no relationship is found between the base and the money stock. Thus, the use of the more effective trend removal technique would appear to lead to rejection of the hypothesis that the money stock is correlated with the base be it the unadjusted or the adjusted base.

Table 1

A COMPARISON OF THE R^2 IN REGRESSIONS
OF ADEQUATELY DETRENDED DATA
AND INADEQUATELY DETRENDED DATA

Adequately Detrended		Inadequately Detrended	
B*	B$_A$*	ΔB	ΔB$_A$
M1* .0097	.0399	ΔM1 .1642	.3268
M2* .0143	.0508	ΔM2 .2894	.4893

NOTES:
1. The asterisk (*) indicates that the data have been detrended by a regression on the natural logarithm of the original data. This removes the portion of the variable which can be predicted from its own past history. The delta (Δ) indicates that the variable has been detrended by first differencing, which is accomplished by subtracting the past value of the variable from the current value (i.e., $\Delta B_t = B_t - B_{t-1}$).
2. B is the unadjusted base, while B$_A$ is the adjusted base.

Despite the apparent rejection by the regression technique of the hypothesis that the monetary base and the money stock are related, it is possible that a significant relationship may still exist for particular periods of time. To examine this possibility, a more powerful tool called spectral analysis is employed. Spectral analysis, unlike the regression technique, has the

9/In each case these are the R^2's from a regression of the form y = a + bx. Since it made no difference which was the independent and which was the dependent variable, only one R^2 is reported for each combination of money and base variables. For all tests conducted, monthly data were used beginning in January 1947 and terminating December 1973. The Durbin-Watson statistic, a measure of trend (actually serial correlation) in the errors of the regression, indicated no trend in the adequately detrended variables. In the case of first differences, significant trend remained in the errors of the regression except for ΔM1 and ΔB$_A$.

advantage of being able to simultaneously determine the correlation between variables for different lengths of time, or cycle lengths. The statistical measure which reveals the correlation for different lengths of time is the "coherency," which is similar to the R^2 of regression analysis. A coherency of 1 signifies complete association of the two series, while a coherency of 0 signifies no association. In practice, the coherency may be high for some cycle lengths and low for others. The spectral technique also produces a statistic which indicates the degree to which one series leads or lags another series.

The correlation, or coherency, between the unadjusted base and the M1 and M2 definitions of the money stock for various cycle lengths is illustrated in Chart 2.[10] In general, the results of this chart confirm the findings of the regressions made with the adequately detrended data. For most cycle lengths there is no significant relationship between.the monetary base and either definition of the money stock."[11] Unlike the regression results, however, Chart 2 reveals a high coherency for very long cycle lengths between the base and both definitions of the money stock, with the coherency being somewhat higher for the M2 definition.

AN INTERPRETATION OF THE RESULTS OF THE RELATIONSHIP OF THE UNADJUSTED BASE WITH THE MONEY STOCK

The relatively high correlation between money and the unadjusted base for the longer cycles indicates a very long-run stable relationship between the two variables. In shorter cycles, however, the absence of any significant correlation between the two variables suggests that no short-run stable relationship exists between them. The absence of any relationship might, of course, be explained in several ways. One is that the base is not, in fact, related to the money stock, except

Chart 2
COHERENCY BETWEEN THE UNADJUSTED BASE AND TWO DEFINITIONS OF THE MONEY STOCK
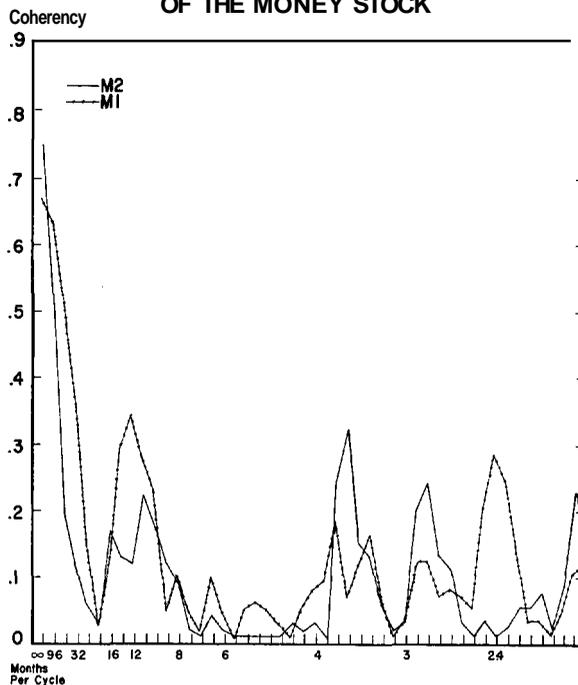
in the very long run, and that the multiplier is the primary determinant of the stock of money. A second possibility is that both the base and the multiplier are determinants of the money stock, but they interact in a manner to offset each other. If the second possibility were true, it would be difficult to discern a statistical relationship between the base and the money stock. To investigate these two possibilities, it is useful to look at the relationship of the multiplier to the money stock and at the interaction of the base with the multiplier.

Chart 3 illustrates the coherency of the multiplier (of the unadjusted base) with the two definitions of the money stock, while Chart 4 illustrates the coherency of the multiplier (of the unadjusted base) with the unadjusted base. It is apparent from Chart 3 that for cycles shorter than about 2½ months the money stock is determined primarily by the actions of the multi-

10/In estimating the cross-spectrum, Parzen weighting was used. The cross-spectrum was estimated on 60 lags and 48 frequency bands.
11/For this and succeeding charts, the coherency must he at least .4 to he statistically significant, except for very long-run cycles (marked ∞) where it must he at least .6.
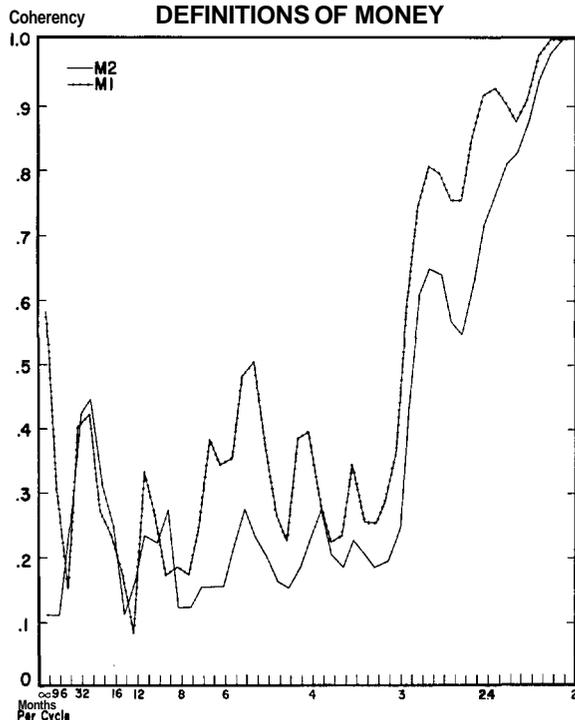
plier. This is supported by evidence that showed a low coherency between the base and the money stock in short cycles (Chart 2) and a low coherency between the base and the multiplier in short cycles (Chart 4).

For cycle lengths in excess of about 2½ months, relationships begin to reverse themselves. In Chart 3, the coherency of the multiplier and the money stock decreases dramatically, while in Chart 4, the coherency of the multiplier and the unadjusted base increases just as dramatically. These results suggest that, between the very long run and the very short run, the base and the multiplier must be neutralizing one another so that neither is determining the money stock.

If the base and the multiplier offset one another during intermediate cycle lengths, the question arises whether the base is countering

Chart 3
COHERENCY OF THE MULTIPLIER OF THE UNADJUSTED BASE WITH TWO DEFINITIONS OF MONEY

the effects of the multiplier or the multiplier is countering prior movements in the base. For clarification of this point it is necessary to determine which of these two variables leads and which lags. From information furnished by lead-lag figures between the base and the multiplier, it appears the multiplier leads the base by a half-cycle length for most cycles.[12] In other words, for cycles in which the base and the multiplier are offsetting, it is the base that is countering the effects of past changes in the multiplier.[13] This suggests that, for the period 1947-73, the policies pursued by the monetary authorities— through variations in the unadjusted base — have had the effect of neutralizing the impact the multiplier exerts on the money stock during cycles of more than 2½ months. It can be inferred from this evidence that the unadjusted base could be a powerful instrument to control money because the authorities could vary the unadjusted base in such a way as to offset fluctuations in the multiplier, while simultaneously achieving the desired growth in money.

THE ADJUSTED BASE

Thus far, the discussion has centered on the unadjusted base. An examination of the synthetically constructed adjusted base, by comparison, paints a related but somewhat different picture.

Chart 5 illustrates the coherency of the

12/The following table lists the lag of the unadjusted base behind the multiplier:

Lag of Unadjusted Base Behind Unadjusted Multipliers of M1 and M2 At Points of Highest Coherency

ml and B			m2 and B		
Cycle Length (months)	Months	Cycle Fraction	Cycle Length (months)	Months	Cycle Fraction
2.40	.33	.14	2.67	.69	.26
3.10	1.03	.33	3.00	.91	.30
4.57	1.89	.41	4.17	1.82	.44
6.00	2.26	.40	6.00	2.44	.41
13.71	5.91	.43	13.71	7.56	.55
24.00	10.09	.33	32.00	10.89	.34

NOTE: Cycle fraction is number of months of lag divided by cycle length; m1 and m2 are the M1 and M2 multipliers, respectively, of the unadjusted base.

13/The high coherency between MI and its multiplier for very long cycles presents somewhat of a puzzle. In this case, the multiplier and the base may be enhancing each other because they both have some correlation with the money stock in these very long cycles.

adjusted base with both M1 and M2. For cycles shorter than 16 months, there is virtually no relationship between the adjusted base and money. For cycles 16 months or more, however, money and the adjusted base are highly correlated

It is somewhat surprising that the adjustments that have been made on this synthetic construct still leave the adjusted base uncorrelated with the money stock for cycles shorter than 16 months, as is the unadjusted base. One would have expected the adjustments to have made it appear that the base and the money stock were highly correlated. For cycle lengths 16 months or more, though, the adjustments on the base have had the very definite impact of raising its correlation with the money stocks.[14]

The higher correlations between the adjusted base and the money stock for longer cycles would appear to suggest that the adjusted base is a more appropriate instrument for monetary control than the unadjusted base. A number of factors, however, would point to the opposite conclusion. First, for some cycles where the adjusted base and the money stock are highly correlated, the money stock *leads* the adjusted base.[15] If, however, the adjusted base is to be used to control the money stock, the adjusted

Chart 4
COHERENCY OF THE UNADJUSTED BASE WITH ITS MULTIPLIER FOR TWO DEFINITIONS OF MONEY

base must lead the money stock. Second, the adjusted base and the adjusted multiplier are significantly correlated for cycles shorter than about a year, and more importantly, for these cycles the adjusted base *leads* the adjusted multiplier. This means that changes in the adjusted multiplier are offsetting changes in the adjusted base, which would make it difficult to control the money stock through the adjusted base. The opposite, it will be recalled, was the case for the unadjusted base and the unadjusted multiplier. That is, the unadjusted multiplier leads the unadjusted base, suggesting that the Federal Reserve has exercised control over money by changing the unadjusted base to offset prior movements in the unadjusted multiplier.[16]

14/Comparing the coherency results in Chart 5 with the R^2 of the regressions of the adequately detrended variables of the adjusted base and the money stock in Table 1 again indicates the power of the spectral technique. The regression does not indicate the source of the R^2, whereas the spectral diagram indicates that it comes from the cycles of 16 months or more.
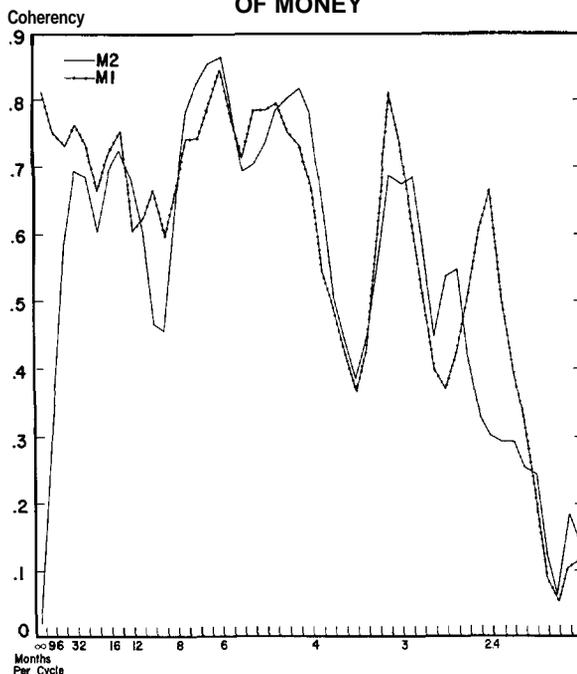
Curiously, the highest coherency for the adjusted base was found with M2 + CD (M2 plus large negotiable certificates of deposit). This appears to contradict other studies which appear to indicate that M1 is more highly correlated with the adjusted base than other monetary aggregates.

15/The following table lists the lead-lag relationship of the adjusted base with M1 and M2 for cycles in which there is a high coherency between the base and the two money stock definitions.

Cycle Lengths (months)	M1	M2
	(months)	
16.0	-4.09	-4.29
19.2	-2.84	-3.65
24.0	-1.15	-2.87
32.0	.16	-1.95
48.0	3.48	.44
96.0	11.14	7.28

NOTE: A positive number indicates that the monetary base leads the money stock; a negative number indicates that the money stock leads the bore. All figures are months, or fractions thereof.
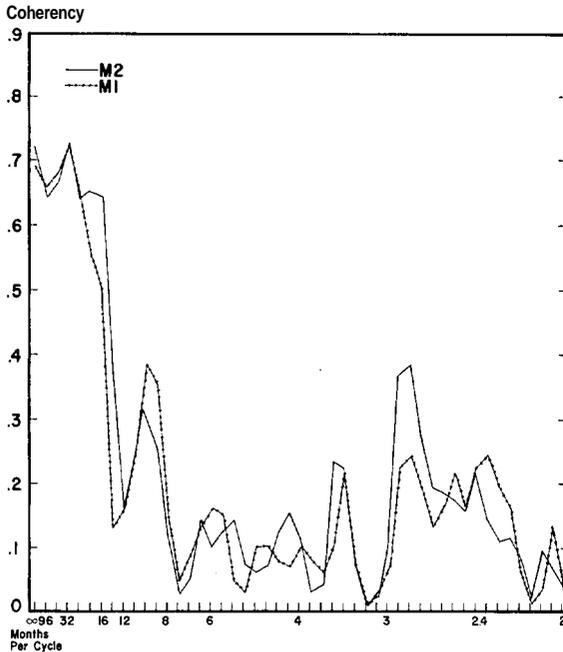
16/Another factor is that. for some cycles, the coherency between the adjusted multiplier and money is higher than between the unadjusted multiplier and money. A high coherency between the multiplier and money suggests that the multiplier exerts considerable influence on money. This would indicate weak monetary control since the Federal Reserve has little control over the multiplier.

Chart 5
COHERENCY OF THE ADJUSTED BASE
WITH TWO DEFINITIONS OF MONEY

Coherency

ly related and that the Federal Reserve had precise control over money when indeed the opposite could be equally true.

CONCLUSION

An important finding of this study is that, in the short run, there is no significant relationship between the money stock and either the unadjusted or adjusted monetary base. For intermediate time lengths, though, money is highly correlated with the adjusted base; and, in the very long run, money is highly correlated with both the adjusted and the unadjusted base. The finding that money and the base are unrelated in the short run is at great variance with most previous research. An important reason for the different conclusion is that the results of this article are based on adequately detrended data; while in previous research on this subject, the trend in the data was inadequately removed.[18]

Despite evidence that the adjusted base is somewhat better correlated with money for certain time periods than the unadjusted base, other evidence suggests the unadjusted base is a better instrument to control money. One reason is that, for some time periods, variations in money lead the adjusted base. This means it would be difficult to control money by first altering the adjusted base. Another reason is that in some time periods variations in the adjusted base are neutralized by movements in the multiplier, while the opposite is true for the unadjusted base. This, too, suggests it would be more difficult to control money with the adjusted base than with the unadjusted base. And, finally, for definitional reasons, the unadjusted base can probably be controlled more easily than the adjusted base. All these factors clearly call into question the ability of the monetary authorities to control the money stock with the adjusted base.

Apart from statistical considerations, it is not entirely clear that the monetary authorities can control the adjusted base as well as they can control the unadjusted base. In calculating the adjusted base, the effects of shifts between deposit classes are netted out of the multiplier in an **ex post** fashion and put into the base. Inasmuch as the Federal Reserve has no direct control over the composition of deposits, it has no control, at least in the short run, over the adjusted base.[17] In the extreme case, one could also net out the effects of shifts between currency and deposits. This would make it appear as if the money stock and the base were perfect-

17/One way to acquire control over the adjusted base. however. would be to subject all deposit classes to the same reserve requirement or possibly have no reserve requirements. In the case of no reserve requirements, the determination of the multiplier would be purely behavioristic and that might be easier to determine than when deposits flow between different classes of deposits.

18/While previous tests would appear to suggest one-way causality from money to the base because money was regressed on past values of the base, they probably would have indicated causality from money to the base if the base were run on past values of the money stock. The reason for this is the trend element common in both variables.

A Labor Market Primer

By Steven P. Zell

After remaining at or below the 5.2 per cent level for the first 6 months of 1974, the national unemployment rate began its long anticipated climb in the third quarter. In the coming months, it is reasonably certain that the economic slowdown will result in a continuing rise in the overall rate of unemployment. The furor and unease which have accompanied this increasing unemployment also are likely to continue to rise.

While the national unemployment rate has long served as an important signal for policymakers, labor economists have repeatedly stressed that this composite unemployment rate has many component parts which must be examined separately. Changes in unemployment generally vary greatly among population groups when these groups are delineated by characteristics such as age, sex, race, and education. Therefore, in assessing the impact of unemployment on the economy, it may be crucial to distinguish in which of these groups the major changes are taking place.

Beyond this, unemployment is not the only measure of the health of the U.S. labor market. Each month, the Bureau of Labor Statistics (BLS) of the U.S. Department of Labor collects and releases statistics on a broad range of labor market characteristics. As the economy continues its struggle with inflation and recession, we may expect increased public exposure to concepts such as the civilian labor force, rates of participation, duration of unemployment, and discouraged workers. Each of these statistics, along with other key data, plays an important role in the interpretation of labor market developments. The object of this article and a subsequent article in a later *Monthly Review* is to provide a guide for interpreting these developments.

WHERE DO THE DATA COME FROM?

Each month the BLS publishes labor market data derived from two independent sources—the household series and the establishment series.[1] Though tending to show the same underlying economic influences, the two series differ in many respects. The most crucial of these differences is that while the household series presents a picture of the work status of individuals, the payroll (or establishment) series is a count of jobs.[2]

The household series data are compiled for the BLS by the Bureau of the Census through its monthly Current Population Survey (CPS). The CPS provides a unique source of detailed data on the economic status and activities of the U.S. population. In addition to providing information on the broad labor market concepts such as total unemployment, the CPS is designed to provide a large amount of detailed and supplementary data necessary for the interpretation of labor market phenomena. Thus, for example:

> It is the only source of monthly estimates of total employment, both farm and nonfarm; of nonfarm self-employed persons, domestics and unpaid helpers in nonfarm family enterprises as

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1/The principal monthly publications of the BLS are *Employment and Earnings* and *Monthly Labor Review*.

2/See Gloria P. Green, "Comparing Employment Estimates from Household and Payroll Surveys." *Monthly Labor Review*, December 1969, pp. 9-20. Because the establishment series presents only a count of nonagricultural jobs, no cross classification by personal characteristics is possible. Similarly, since only *job* data are presented, statistics on topics such as unemployment are not presented there.

well as wage and salaried employees; and of to-
tal employment, whether or not covered by un-
employment insurance. It is the only compre-
hensive source of information on the personal
characteristics of the total population (both in
and out of the labor force), such as age and
sex, race, marital and family status, veteran
status, and educational background.[3]

The CPS (also known as the household sur-
vey) is the only comprehensive source of data
on the occupation of workers, providing statis-
tics on their industrial distribution as well. Fur-
thermore, detailed information is available on
the characteristics of persons who are not cur-
rently in the labor force, including information
on their past work experience, their reasons for
nonparticipation, and their intentions to seek
work in the future.[4] Because of the wealth of in-
formation on individuals contained in the house-
hold survey and the sharply different emphasis
of the establishment series, attention in this arti-
cle shall be concentrated on the household se-
ries data.

Properties of the Sample

Once each month, in the calendar week con-
taining the 19th of that month, the interview
staff of the Bureau of the Census conducts the
household survey on behalf of the BLS. These
monthly surveys are administered to a sample
of the population scientifically selected to rep-
resent the civilian noninstitutional population
of the United States. The survey is designed to
ascertain the employment status during the cal-
endar week containing the 12th of the month,
of all the individuals 16 years of age and older
residing in the interviewed households.[5] Al-
though a separate questionnaire is prepared for
each individual, any adult member present in
the household is requested to respond for those
not at home at the time of the interview. Exclud-
ed from the regular monthly enumerations are
inmates of institutions (such as prisons and men-

tal hospitals), persons under 14 years of age,
and members of the armed forces. Data on this
latter group are obtained from the Department
of Defense and are included in the published
data in the categories "total noninstitutional
population" and "total labor force."[6]

As it would be financially prohibitive to con-
duct a complete enumeration of the entire pop-
ulation each month, a representative sample is
scientifically selected. The first step in this pro-
cess is the selection of a subset of areas from
the 3,141 counties and cities in the country. The
selected areas are comprised of 924 counties
and independent cities which cover at least some
part of every state and the District of Columbia.
The sample "is designed to reflect urban and
rural areas, different types of industrial and farm-
ing areas, and the major geographic divisions
of the country in the same proportion as they
occur in the nation as a whole."[7]

These areas are further divided into enu-
meration districts of about 300 households and
then into small clusters of about four dwelling
units each. From these clusters, the dwelling
units to be surveyed are chosen by statistical se-
lection and the households living at these ad-
dresses are interviewed. Each month approxi-
mately 47,000 households are interviewed in
this manner, or approximately one household
for every 1,300 in the country.

In order to avoid placing too heavy a bur-
den on the selected families, one-fourth of the
sample is replaced each month. The procedure
consists of interviewing a household for 4 con-
secutive months, dropping it for 8 months, and
then interviewing it for 4 more months before
permanently dropping it from the sample. This
procedure also facilitates year-to-year data com-
parisons and month-to-month continuity of the
sample.[8]

3/"Concepts and Methods Used in Manpower Statistics from the Current Population Survey," BLS Report 313, June 1967, pp. 1-2.
4/Ibid.
5/Statistics are collected and published separately for persons 14 and 15 years of age in these same households. This separation was one of the changes introduced in January 1967. See "Recent Develop-ments . . .," page 14.

6/Employment and Earnings, September 1974, p. 117.
7/"How the Government Measures Unemployment," Report 418, U.S. Department of Labor, Bureau of Labor Statistics, 1973, p. 2.
8/Ibid. For a more detailed description of the sample design and other technical phases, see "Concepts and Methods...," pp. 7-9, and especially U.S. Bureau of the Census, Technical Paper No. 7, "The Current Population Survey—A Report on Methodology," Washington, D.C., 1963.

The questionnaires obtained from these interviews are transferred to the Washington office of the BLS by the end of the week following enumeration. There the data are put on computer tape, checked for consistency and completeness, and adjusted for the fact that no response was received from some of the occupied households. The proportion of sample households for which interviews are not obtained varies between 3 and 5 per cent depending on factors such as weather, vacations, and simple refusal to respond. Following other procedures to improve their reliability,[9] the data are tabulated and released by the Department of Labor in its monthly publication, *Employment and Earnings.*

The Current Population Survey: Origin and Evolution

The CPS was begun in 1940 as a direct result of the mass unemployment of the Great Depression. Prior to the 1930's, there was no direct measurement of unemployment. However, as labor market conditions continued to worsen in the early 1930's, many *ad hoc* measures of unemployment, frequently at great variance with each other, began to emerge. Dissatisfaction with these results, in turn, led research groups and some state and local governments to experiment with direct survey techniques.

In these early surveys, the unemployed were generally identified as those persons who responded that they were not currently working but were "willing and able to work." This definition, however, was judged to be too dependent on the interpretation and attitude of the interviewee and further experimentation continued. In the late 1930's, new concepts were developed which sought to meet these criticisms. Under these new concepts, an individual's classification depended principally upon his actual labor market activity during a specified time period. Some examples of labor market activity were whether he was working, looking for work, or doing something else. In 1940,

these concepts were adopted by the Works Progress Administration for the national sample survey initiated in that year.[10]

Since the survey's inception in 1940, a continuing effort has been under way to clarify and refine the various manpower concepts and to improve available labor market data. Most of the changes which have been introduced to date are a direct outgrowth of suggestions made by the President's Committee to Appraise Employment and Unemployment Statistics (The Gordon Committee) in 1962. The committee was appointed principally due to public pressure to examine labor market concepts in the light of high unemployment and a second recession within 3 years. In its final report, it gave unanimous approval of the scientific objectivity, reliability, and professionalism of the concepts and organizations involved in the collection and publication of U.S. labor market statistics. It further made a number of recommendations for improving these statistics, most of which have already been incorporated by the BLS.[11]

THE HOUSEHOLD SURVEY: CURRENT CLASSIFICATION METHODOLOGY AND DEFINITIONS

As noted above, each month the Department of Labor releases statistics derived from the household survey (CPS) conducted in the previous month. The most widely quoted of these data pertain, of course, to the number of persons employed or unemployed and to the rate of unemployment. These and other important concepts can best be understood in terms of how they are generated from the survey itself.

Perhaps the most important point to emphasize is that interviewees are never asked to classify themselves nor, in fact, are they directly classified by the interviewer. Instead, a carefully structured questionnaire is filled out for each eligible person, with the final classification done by computer according to official cri-

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9/*Employment* and Earnings, September 1974, pp. 120-21 and February 1974, pp. 6-9.

10/"Concepts and Methods...," p. 4.
11/John E. Bregger. "The Gordon Committee 10 Years Later," *Statistical* Reporter. August 1974, No. 75-2, pp. 17-19. See also "Recent Developments . . .," page 14.

teria. What then, are the criteria for this classification?

The survey is designed to ascertain the principle activity or labor market status during the week containing the 12th of the month (the survey week) for all noninstitutionalized civilians 16 years of age or older. The central goal is to delineate persons as either Employed, Unemployed, or Not in the Labor Force. The sum of these three categories constitutes the Civilian Population while the sum of the Employed and the Unemployed comprises the Civilian Labor Force. Thus, the Civilian Population consists of persons either in the Civilian Labor Force or Not in the Labor Force. Those in the labor force are also said to be labor force participants and the ratio of the number of participants to those in the population is referred to as the Participation Rate. Similarly, the Unemployment Rate represents the number Unemployed as a per cent of the Civilian Labor Force.[12]

At the simplest level, employed persons are individuals with jobs, while unemployed persons did not work during the survey week but are both looking for and available for work. Clearly, many people are easily classified under these definitions. For example, a person who reported working 40 hours as a carpenter for a construction company in the week of the 12th was clearly employed. Similarly, an assembly line worker who lost his job when the factory he worked at closed and who has been visiting other local factories recently seeking employment can be classified as unemployed. Finally, a woman who reports that she worked as a housewife and did not seek outside employment is thus not in the labor force.

12/For example, in September 1974, the following seasonally adjusted data were reported by the BLS:

Civilian (Noninstitutional) Population =	149,150,000
Civilian Labor Force =	91,850,000
Employed =	86,538,000
Unemployed =	5,312,000
Not in the Labor Force =	57,300,000
Participation Rate = $\frac{\text{Labor Force}}{\text{Population}} \times 100 =$	61.6%
Unemployment Rate = $\frac{\text{Unemployed}}{\text{Labor Force}} \times 100 =$	5.8%

However, a great many cases are not so easily classified. Some persons have more than one "labor market status" during the survey week, as for example, a man who works part-time and attends school the rest of the week. How are such persons classified?

The Employed

The method used is one which sorts people *not* by hours spent in a particular status but, rather, by a pre-established priority system. Thus, people who did *any* work at all during the survey week for pay or profit, irrespective of time spent in any other status, are counted as employed. Similarly counted as employed are persons who worked 15 hours or more without pay in a family-operated enterprise. These persons are known as "unpaid family workers" if they held no other paying job. If a person worked less than 15 hours in this activity and was otherwise neither employed nor unemployed (see below for definition), he is counted as outside the labor force.

Finally, five other categories of persons are counted as employed. These are individuals who held a job but did not work during the survey week because they were either (1) on vacation, (2) temporarily ill, (3) involved in a labor dispute, (4) prevented from working due to inclement weather, or (5) taking time off for various personal reasons. These persons are both counted among the employed and tabulated in the category "with a job but not at work," which is presented separately in BLS publications.

Persons who are not employed must be classified as either Unemployed or Not in the Labor Force, and it is the first of these categories which has the higher classification priority.

The Unemployed

The unemployed may be divided into two basic groups. The first consists of persons who are either waiting to start a new job within 30 days or workers waiting to be recalled from lay-off. Each of these criteria alone is sufficient to classify a person as unemployed.

The second and far larger group consists of individuals neither on layoff nor waiting for a job to start who satisfy three specific criteria

which are identified through a series of questions on the household questionnaire. These criteria are first, not having a job during the survey week; second, actively looking for work during the past 4 weeks; and third, being available during the survey week to accept employment. Actively seeking work consists of at least one of the following specific activities: (1) registering at a public or private employment office, (2) meeting with prospective employers, (3) checking with friends or relatives, (4) placing or answering advertisements, (5) writing letters of application, and (6) being on a union or professional register.[13] If a person is found to have searched for work through one of these specific activities within the past 4 weeks, he is then asked whether there was any reason he could not have accepted a job during the survey week. If no reason (other than temporary illness) is given, the person is then counted as unemployed. The process of classifying a person as unemployed is therefore seen as consisting of a series of questions, all of which must be answered appropriately. If any of these conditions are violated, the person is counted as Not in the Labor Force.

Not in the Labor Force

Persons identified as Not in the Labor Force are further divided into four groups: "in school," "keeping house," "unable to work due to disability," and "other." This last category includes mostly retired persons or persons reported as too old to work; seasonal workers who are not reported as unemployed and are in the "off" season; unpaid family workers who worked less than 15 hours in the survey week; and persons who choose not to work, referred to as the voluntary idle. The significance of this latter group shall be discussed later in the section entitled "Discouraged Workers . . .".

13/"How the Government...," p. 4. Clearly, persons waiting for a new job to start, or waiting to be recalled from temporary layoff, would have no reason to seek another job and are thus not required to have been engaged in one of these activities in order to be classified as unemployed.

Recent Developments in the Household Survey

This multi-step determination of unemployment was one of several important changes in the CPS introduced in January 1967 as an outgrowth of recommendations made by the Gordon Committee. Prior to this time, a single question, "Was. . .looking for work?" was asked to interviewees about persons who were not employed. An affirmative answer was sufficient for the person to be counted as unemployed.

The new procedure introduces three new elements into this process. Not only must a person be looking for work, but he must have done so during a specific time period of 4 weeks. Furthermore, he must have **actively** attempted to find work and lastly, he must have been **available** for work if a job had materialized.

These changes were introduced for several reasons, but most generally, they were introduced in order to eliminate some of the ambiguity from the classification process. For example, the 4-week period was included because respondents to the previous single question "could have interpreted 'looking for work' to imply either 'last week' or some vague earlier period. Similarly, the introduction of the specific jobseeking method requirement (not asked, of course, of persons on layoff or those waiting to begin a new job within 30 days) [was designed to screen out] those for whom jobseeking is more a state of mind rather than an overt action."[14] Finally, the "availability" criterion was introduced principally to correct for the fact that a number of high school and college students who began to look for summer work in April or May were counted as unemployed at that time although they were not available for employment until June or July.

Some of the other important additions and changes introduced in the January 1967 *Employment and Earnings* were as follows:

1. Persons with a job during the survey week who were absent because of strikes, bad weather, etc., are now classified as em-

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14/John E. Bregger, "Unemployment Statistics and What They Mean," *Monthly Labor* Review, November 1971, p. 27.

ployed even if they were looking for other employment at this time. Previously they were classified as unemployed.

New probing questions are asked to increase the reliability of information obtained on duration of unemployment, number of hours worked, and self-employment status.

Additional information is now being obtained which permits in-depth analysis of several important characteristics of persons both within and outside of the labor force.

a. A new question collects information on the reason for unemployment, i.e., whether the person lost his job, quit, or entered the labor force either in search of employment for the first time or after a period of nonparticipation.

b. Much more information is obtained for persons not in the labor force. Data are now collected on when they last worked; their reasons for leaving employment, and the industry and occupation in that last job; whether they want to work at the present time and, if so, why they are not seeking employment; and their intentions for seeking work in the next 12 months.

4. Finally, the new definition of unemployment *excludes* individuals who report that they would have looked for employment except for their belief that none was available in their line of work in the community. Previously, though no specific question was asked, persons who volunteered this information were included as unemployed in an attempt to capture what was referred to as "discouraged workers." Now recorded among the "voluntarily idle," this group is excluded from the unemployed by means of the 4-week and active search criteria discussed above. This is done because of the very subjective nature of worker "discouragement." Instead they are included among persons

Not in the Labor Force, while information on the reason for nonparticipation is collected and analyzed.[15]

DISCOURAGED WORKERS AMONG THE VOLUNTARILY IDLE: THE HIDDEN UNEMPLOYED

The special survey questions probing the reasons why persons outside the labor force did not participate in the job market were introduced in response to one of the Gordon Committee's strongest recommendations. The committee noted in 1962 that "the relatively simple dichotomy between those in and out of the labor force... [no longer provides]... a satisfactory measure of the labor supply."[16]

This conclusion was based on empirical evidence for the post-World War II period which showed that millions of persons entered and left the labor force each year and that the labor force expanded more slowly during economic downturns than it did over the long run. This slowdown in labor force growth, the result of an increased number of dropouts or a decreased number of entrants into the labor force, or some combination of the two, was interpreted as the "discouragement" effect of the cyclical downturn.[17] The possibility that vast numbers of "discouraged workers" languished outside of the labor force in a pool of "hidden unemployment" caused the committee to recommend that special efforts be made to collect detailed information on persons not in the labor force, with emphasis on the so-called "discouraged workers."

The introduction of the probing questions in the January 1967 CPS and their quarterly publication since late 1969 provided an important opportunity to examine this issue directly, through use of the survey technique. Though

15/Robert L. Stein, "New Definitions for Employment and Unemployment," *Employment and Earnings*, February 1967, pp. 5-8. For a discussion of the effect of all of these changes on the historical comparability of labor force data, see *ibid*, pp. 10-13. Also see *Employment and Earnings*, October 1974, pp. 135-36, for a brief discussion of changes made in the CPS both before and after 1967 and their effect on statistical comparability.
16/Paul O. Flaim, "Discouraged Workers and Changes in Unemployment," *Monthly Labor Review*, March 1973, p. 8.
17/Jacob Mincer, "Determining who are the 'hidden unemployed'," *Monthly Labor Review*, March 1973, p. 27.

major difficulties exist in the identification of subjective phenomena like "worker discouragement," the methodology adopted by the BLS has provided much useful information since the initial publication of these data in late 1969. Basically, a person not in the labor force is identified as a discouraged worker if he "wants a regular job now, either full time or part time" and if his principal reason for not looking for work is that he either (1) believes that no work is available in his line of work or area, (2) had tried but could not find work, (3) lacks necessary schooling, training, skills, or experience, (4) employers think he is too young or-too old, or (5) has other personal handicaps in finding a job.[18]

The first two of these factors are generally referred to as "job market factors" and the remainder as "personal factors," and, as might be expected, it is this first series which appears to be directly related to cyclical changes in the labor market. In particular, a high correlation has been found between this series and changes in the rate of unemployment.[19] Contrary to conclusions drawn from earlier econometric analyses, however, the survey results do not indicate the existence of large numbers of discouraged workers.[20] Furthermore, only a small percentage of discouraged workers are adult males, with the great majority consisting, instead, of teenagers, housewives, and the elderly.[21]

Research into the phenomenon of worker discouragement has revealed some interesting results for the interpretation of labor market behavior. Studies have shown that in the face

of cyclical downturns, the growth of the labor force has slowed while the number of discouraged workers has risen. Contrary to expectations, however, this shrinkage or slowdown in labor force growth has been due primarily to reductions in labor force entries and reentries rather than to increases in labor force withdrawals. Furthermore, while the number of discouraged workers generally increases in cyclical downturns, a countercyclical flow of "added workers" is always present. For example, in families whose heads are unemployed, the rate of participation of other family members increases more than in households whose heads are employed.[22] Generally, though, the discouragement effect is the dominant one.

If economic conditions develop, however, where this cyclical behavior is changed, and participation remains high in the face of recession, the rate of unemployment can be expected to worsen relative to previous experience. This, in fact, appears to be the case with the present "stagflation." In the present economic downturn, as in the past, increased unemployment of household heads has stimulated some "added" secondary worker participation. In addition to this, the high rate of inflation has also stimulated greater participation as families attempt to maintain their level of real income. In a period when employment is falling, however, this increased participation can only result in greater unemployment. One important indicator of the existence of this trend is continuing high rates of participation among women and teenagers in the face of high and rising unemployment. Another is the atypically small number of persons currently classified as discouraged workers. Thus many persons who, under ordinary recessionary conditions would be outside of the labor force, possibly as discouraged workers, now appear to be entering or remaining in the labor force in an attempt to circumvent the negative effects of recession and inflation on real family income.

18/Paul O. Flaim, "Discouraged Workers...," p. 9.
19/Ibid, pp. 9-12.
20/For examples of the early econometric analyses, see A. Tella. "The Relation of Labor Force to Employment," Industrial and Labor Relations Review, April 1964, pp. 454-69, and T. Demburg and K. Strand, "Cyclical Variation in Labor Force Participation," Review of Economics and Statistics, November 1964. See also Joseph L. Gastwirth, "Estimating the number of hidden unemployed," and Jacob Mincer, "Determining who . . .," Monthly Labor Review, March 1973, for discussions of the contrast between the econometric and survey results.
21/In the third quarter of 1974, there were 57.6 million persons outside the labor force and 5.0 million unemployed. Of the nonparticipants, only 592,000, or 1 per cent, were discouraged workers with only 383,000 of these discouraged for job market reasons. Finally, adult males, 25-59, represented only 52,000 or less than 1 per cent of all discouraged workers.

22/Jacob Mincer, "Determining. . .," pp. 27-30.