all eight classes combined, using G/T as an independent variable. Equation 10 aggregates all eight classes, but expected grade per unit of time (G1/T) was used as an independent variable in place of the actual grade per unit of time (G/T). Equations for individual classes using expected grade per unit of time (eG1/T) were not included in the study because their results were not unlike the first eight equations in Table I.

"F" values were significant for nine of the ten equations in Table I, indicating that a significant amount of the total variance was explained by the model. However, the explanatory statistical significance of the subjective learning (SL) variable offered a surprising reevaluation of the original hypothesis that SL would be insignificant. On the other hand, the G1/T variable, which was hypothesized to be positively related to faculty evaluation scores was not significant in eight of the equations, and was just marginally so in the remaining two. The empirical evidence leads to two conclusions:

1. The hypothesis that students in introductory courses are seeking a high grade per unit of time spent in the course, and that they rate instructors primarily on this criterion is true, and
2. Students rate instructors according to their perception of actual learning during the course. Subjective learning seems to be a highly significant variable affecting students' perception of instructor performance.

The major emphasis of this study was to determine whether faculty evaluation scores can be deflated by the G/T ratio to provide a more accurate assessment of faculty performance. Apparently, deflating faculty evaluation scores by this ratio would serve no purpose because such a ratio does not have a significant positive relationship to faculty evaluation scores. The G/T ratio is statistically significant in equation 9, but is not significant in seven of the eight previous equations. Implementation of any deflation tool requires that it be done on a class-by-class basis; thus, even if G/T is statistically significant for the aggregation of all classes, it is not worthwhile to implement such a procedure if it does not apply to individual faculty class sections.

Rejection of the original hypothesis suggests that faculty evaluation scores need not be deflated by a G/T ratio to make them more indicative of actual teaching performance. Indeed, since the subjective learning variable is highly significant, the question might well be, "Does anything need to be done with raw faculty evaluation scores?" It should be remembered that the SL variable in this study is not a measure of actual learning (as in the Soper study), but is a measure of students' perception of learning in the classroom.

This study has contributed to the literature because time has now been considered empirically as it determines (along with the grade) the faculty evaluation score. Apparently, such a G/T effect is not significant. While discovering what is not significant is not as exciting as finding something unusually novel and significant, it does illuminate the corridors of future research. The magnitude of the R² values for the above equations shows that factors other than subjective learning might also affect students' perception of instructor performance. Clearly, more research needs to be done to determine what other factors motivate a student on faculty evaluation day.

The Dynamics of Interest Rate Adjustment in Response to Monetary and Fiscal Changes

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One of the central issues facing policy makers is the empirical relation between monetary and fiscal changes and the rate of interest. Does the equilibrium interest rate fall, remain unchanged, or rise as a result of a monetary or fiscal disturbance? Alternatively, we may ask whether in the Hicksonian framework the IS curve is downward sloping, horizontal, or upward sloping? Its slope has implications not only for the conduct of monetary policy but also for the much discussed "crowding out" effect and the effectiveness of fiscal policy.

In a paper considered by many to have considerably advanced our understanding of the money-interest relationship, and which continues to be widely cited by economists of a monetarist persuasion (Laidler 1978 and Frenkel 1975, for example), Gibson 1970 empirically investigates the dynamics of the money-interest relationship and in particular the time path of interest rate change in response to a change in the money stock. He essentially uses a simplified version of the Hicksonian IS-LM construct to produce theoretical results that are sensitive to some special assumptions, and the test of his simplified theoretical model depends mainly on whether the structure of coefficients generated by regressing the interest rate variable on the logarithm of current and logged money variables corresponds to the lag structure proposed by the model. In this study we question the empirical relevance of his emphasized (theoretical assumptions as well as his statistical inferences since the latter are based on the former. This is done in Section I. In Section II we extend Gibson's results in a couple of directions and in so doing point to some possible limitations of his statistical methodology. Section III has a summary with some concluding comments.

I. An Overview of Gibson's Approach

Gibson's theoretical approach is summed up in the following quotation:

The economy is initially at point F₂, where money stock is M₂ and real (and nominal) interest rates are r₂. If income does not rise immediately following an increase in the money stock to M₂ the economy will move immediately to point P₁ along the curve L₁, drawn for a given level of income and expected rate of price change. This full of interest rates from r₁ to r₂ is the liquidity effect. As income increases, the L₁ curve will shift rightward until it reaches the position L₂, which intersects M₂ at E₂, where interest rates are again at r₁. We may call the movement from P₁ to E₂ the income effect, and it obviously just balances the liquidity effect.

If now the expected rate of price change increases, L₁ will shift to the left L₁, lowering real interest rates to r₁. Nominal rates will exceed real rates by the expected rate of price increase.

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As Gibson recognizes, there is no compelling reason why the income effect should just balance the liquidity effect. In order to shift from point P one has to know the magnitude of the interest sensitivity of investment, the response of consumption to income, interest, and wealth, the state of capacity utilization and the values of the investment multiplier and accelerator. Other influences would be fiscal and foreign trade sector impacts, as well as the effects of induced changes in the money supply. The magnitude of the change in income following an increase in the money supply cannot be determined unless we know the magnitude of these separate effects on income. Given this change in income and/or prices, the new level of interest rates will also depend on the income elasticity of the demand for money, which will determine the extent of the shift of the L schedule.† The Hickian framework suggests that the extent of the equilibrium change in income and interest rate due to a monetary disturbance is also sensitive to the assumed value of the income elasticity of the demand for money.

Gibson’s major hypotheses are:

1. “The primary direction of influence runs from the money stock to interest rates.”

2. For liquidity effects to be observed at all, the coefficient of the logarithm of M, should be negative. “A positive coefficient would imply that income effects have balanced liquidity effects and that only positive effects should follow.”

3. “With full employment, the cumulative liquidity and income effects should be equal so that the initial negative coefficient should be matched by a sum of positive coefficients for past M, raising interest rates to their initial levels. If the economy initially had unemployed resources the positive coefficients from the income effect may sum to less or more than the absolute value of the negative coefficient, depending on the shape and shifts of the investment schedule.”

Gibson’s major conclusions are:

1. “For quarterly data, the coefficient of the past quarter’s money stock is positive and of the same order of magnitude as the current period’s negative coefficient. More often than not the first positive coefficient exceeds the negative coefficient in absolute value.... The algebraic sum of the coefficients shows no marked tendency to exceed zero.”

2. “Since the coefficients imply that interest rates return to their former levels three to five months after a once and for all change in the money stock, they imply that income changes in about the same proportion as money in three to five months.”

Gibson’s analysis and conclusions rest on the assumptions of a unit income elasticity of the demand for money, constancy in the expected rate of inflation over the sample period (1947–66), and a proportional change in money and nominal income, which is recognized to hold only at full employment. These, however, are very strong and unjustifiable assumptions, and one cannot rely on historical data (1947–66) to prove such special cases of full employment, and Ladier (1978) has shown that the value of the money multiplier on nominal and real income is the same only in the unique, and empirically most unlikely, case of a zero interest elasticity of the demand for money and an infinite interest elasticity of investment demand. Moreover, excess demand, when it prevailed, could also have been due to fiscal actions and some price changes could have originated on the supply side. For instance, equilibrium interest rates would rise if the increase in the money supply is less than the amount required to finance the higher income arising from an exogenous increase in government expenditures.

Velocity growth is not a constant. There is accumulating evidence that the income elasticity of money demand is much less than

**II. Some Evidence**

The above qualifications are consistent with the empirical evidence (Goldfeld 1973, Moosa 1977a, Ladier 1978 and Hendelshott 1968) and supported by the magnitudes of the observed changes over the sample period (1947–66) of some of the relevant variables. This is shown in Figures 1, 2, and 3 display the behavior of capacity utilization, the excess of the rate of growth of the nominal money supply Dm over the rate of growth of real output DY, and
the rates of growth of velocity $DV_t$, prices $DP_t$ and real government expenditures on goods and services $D_y$.[2] The prime following a variable represents its systematic component and the method used to extract the systematic component of a time series is a lag-adjusted improvement of the Almon (1965) procedure.

Our measure of capacity utilization $q$ is the Wharton capacity utilization index. The other data were obtained from the Federal Reserve Bulletin and the Survey of Current Business. Our measure of money is M1, real output is represented by real GNP, real government expenditures include federal, state and local government expenditures, the price level $P$ is represented by the annual 3-year Treasury bond rate. $D_v$ in Table 1 is the rate of growth of the interest rate. A prefix $D$ indicates a proportional rate of growth.

Note that the proper measure of excess demand is the rate of growth of real and not nominal government expenditures (see, for example, Sims 1978).

Utilizing a second-degree polynomial with the beginning and end lag points constrained to be zero. The accuracy of this method is seen by comparing, for example, the mean values of $DP_t$ and $D_y$, which are 1.78 and 1.75 respectively, and are consistent with the theoretically expected value of zero of the systematic component. Its usefulness for comparative purposes is supported by evidence of its ability to provide unbiased estimates of the systematic component of variables in the quantity theory identity $DM = DV - DP + Dy$. Observe for example that, in Fig. 2, when $(DM - DY) = 0$, $DP = DV_t$ is the estimate of the fourth variable, $DV_t$. As a further illustration of the efficiency of this procedure Figure A1 in the Appendix plots the values of $DP_t$ and $D_y$; the only reason for using filtered values is to facilitate the graphical exposition, and the polynomial smoothed Almon variables are ideally suited for illuminating the main underlying relationships in the variables. The extent of monetary stimulus is measured by $(DM^* - D_y)$ under the assumption of a unit income elasticity of the demand for money, and by $(DM^* - D_y)$ under the assumption of economies of scale in the holding of money balances, where $DM^* = 0.60Dy^*$.

Figures 1, 2, and 3. Table 1 show that capacity was not always fully utilized, at times substantially underutilized, and that even though monetary policy was generally contractionary $(DM^* = D_y < 0)$ price increases and hence their expectation were not constant and at times substantial, though on average quite small, that the rate of growth of velocity was large in both the short and long run: that fiscal policy was generally.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|c|c|c|c|c|c|}
\hline
\textbf{Year} & \textbf{q} & \textbf{Dv} & \textbf{Dy} & \textbf{Dp} & \textbf{DM - Dv} & \textbf{DM - D_y} & \textbf{DM - D_y}^* & \textbf{q} & \textbf{DM} \\
\hline
1947.1-1964.4 & 0.79 & 4.05 & 2.35 & 6.56 & -1.71 & -0.11 & 87.59 & 2.28 & 2.24 \\
1947.1-1964.4 & 0.59 & 4.31 & 2.44 & 6.62 & -1.48 & -0.03 & 89.48 & 2.11 & 3.79 \\
1958.1-1964.4 & 0.48 & 3.75 & 1.76 & 4.29 & -1.79 & -0.20 & 85.29 & 2.49 & 1.37 \\
\hline
\end{tabular}
\caption{Average Values}
\end{table}

See footnote 2 for data sources and definitions.
expansory; that $Dg$, $Dv$ and $DP$ had a U-shaped trend and ($DM - Dv$) and ($DM - DM^*$) had a U-shaped trend. The data suggest that, over the sample period, it was fiscal policy that was largely responsible for the growth in output and prices and this was made possible by the substantial growth in velocity induced mainly by government-expenditure-related increases in income and interest rates (Table 1). Monetary policy, which was generally contractionary ($DM - Dv - 0$) had a restraining influence on both output and prices.

An analogue of the above in a dynamized Hicksonian framework would be large rightward shifts of the IS curve and relatively smaller leftward shifts in the LM curve causing increases in output, prices and interest rates. Gibson's conclusions are based on shifts of the LM curve along an assumed horizontal IS curve causing income to change while leaving equilibrium interest rates unaffected. The data suggest, instead, that, in general, large rightward shifts of the IS curve and relatively smaller leftward shifts of the LM curve caused both income and interest rates to increase. The initial impact of these fiscal changes on the bond market reinforced the impact of the initial "liquidity effect" (of relative monetary contraction), exerting upward pressure on the interest rate. The subsequent fiscal multiplier effects on income evidently counteracted and dominated the later "income effects" (of monetary contraction) exerting additional upward pressure on the interest rate causing the equilibrium interest rate to increase.

Gibson's (admittedly) mis-specified reduced form equations, that have the interest rate depend only on the logarithm of current and past money stock, may not dynamically disentangle these monetary and fiscal influences on the interest rate. In ignoring the impact of fiscal influences on the interest rate, his specification ignores completely an apparently dominant force responsible for interest rate changes over the sample period. The interaction of these separate monetary and fiscal effects provides reasons to doubt the power of the adopted reduced form method of employing current and lagged values of the money stock to explain the dynamics of money stock changes in the normal interest rate where the more recent money stock variables are expected to have a negative coefficient (the liquidity effect) and the less recent money stock variables are expected to have a positive coefficient (the income effect). The unidirectional influence from money to interest need not be dominant and the author's simple regression test to determine two-way causality is suspect. Gibson's inclusion to accept the lesser estimate of the income effect (positive in M6 because the signs of the lagged money stock variables fit the proposed hypothesis) over the slightly better estimates of the money on current and past interest rates is evidently unjustified. The highly significant positive influence of the current interest rate of in M1, could suggest the importance of a quick enogenous response of the money supply.

Gibson's typical regressions using monthly data are:

\[
\begin{align*}
\Delta L &= 0.0033^* + 0.0057^* - 0.0140^* - 0.0035^* \\
\Delta S &= 0.1693^* - 0.0690^* - 0.0202^* - 0.0860^* \\
\Delta M &= 0.2701^* - 0.1510^* \\
\Delta Y &= 0.0047^* - 0.0484^* - 0.0130^* \\
\Delta P &= 0.0114^* - 0.0215^* - 0.0679^* \\
\Delta M^* &= 0.0385^* - 0.0385^* - 0.0385^* \\
\Delta Y^* &= 0.0010^* - 0.0025^* - 0.0025^* \\
\end{align*}
\]

\[
\begin{align*}
\Delta L &= 0.0033^* + 0.0057^* - 0.0140^* - 0.0035^* \\
\Delta S &= 0.1693^* - 0.0690^* - 0.0202^* - 0.0860^* \\
\Delta M &= 0.2701^* - 0.1510^* \\
\Delta Y &= 0.0047^* - 0.0484^* - 0.0130^* \\
\Delta P &= 0.0114^* - 0.0215^* - 0.0679^* \\
\Delta M^* &= 0.0385^* - 0.0385^* - 0.0385^* \\
\Delta Y^* &= 0.0010^* - 0.0025^* - 0.0025^* \\
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\Delta P &= 0.0114^* - 0.0215^* - 0.0679^* \\
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\Delta Y^* &= 0.0010^* - 0.0025^* - 0.0025^* \\
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\]

\[
\begin{align*}
\Delta L &= 0.0033^* + 0.0057^* - 0.0140^* - 0.0035^* \\
\Delta S &= 0.1693^* - 0.0690^* - 0.0202^* - 0.0860^* \\
\Delta M &= 0.2701^* - 0.1510^* \\
\Delta Y &= 0.0047^* - 0.0484^* - 0.0130^* \\
\Delta P &= 0.0114^* - 0.0215^* - 0.0679^* \\
\Delta M^* &= 0.0385^* - 0.0385^* - 0.0385^* \\
\Delta Y^* &= 0.0010^* - 0.0025^* - 0.0025^* \\
\end{align*}
\]

Next we pursue Gibson's methodology and regret, using quarterly data, the 3-5 year Treasury bond rate on the current and lagged values of the logarithm of M1. This is shown in Table 2. Unlike Gibson, however, we present regressions with lag distributions of different lengths and, unlike Gibson's neglect of the log of his own theoretical construct, break down our sample period into periods of relatively higher and lower capacity utilization and rates of growth of government expenditures, velocity, prices and income (1947.1-1957.4 and 1958.1-1966.4). Unlike Gibson our method of estimation also involves a serial correlation correction using the generalized least squares procedure of Cochrane-Orcutt (1949). The first, second and third row of each cell represent the coefficient of the earlier, later and full periods respectively. Also shown is the sign distribution for the coefficient of the lag variable(s).

The results in Table 2 show that the sum of the coefficients is substantially positive irrespective of the period studied and irrespective of the length of the lag distribution. The sign structure in the earlier period, when the rates of growth of government expenditures, velocities, prices and interest rates were relatively much larger (Table 1), is contrary to the prediction of the Gibson model in that, irrespective of the length of the lag distribution, the coefficient of the current money variable is positive followed by a negative coefficient. In the later period we do have a positive coefficient of period t-1 following a negative coefficient of period 1. However, the structure of coefficients up to the period t-3 for even the later period is inconsistent with the requirements of the model because negative coefficients exceed positive coefficients in number (antepeeudicate column, Table 3). The sum of the lag coefficients beyond lag t-3 is also negative irrespective of the length of the lag distribution and again the number of negative coefficients exceeds the number of positive coefficients. For the ten-period lag we find that, despite their positive sum, eight out of the eleven coefficients are negative. The only positive coefficients are the coefficients of period t-1, t-8 and t-9.

These results are inconsistent with the predictions of the Gibson model and the (negative) pattern in the later period is not consistent with an expected cyclical adjustment of the interest rate due to permanent income instead of current income being the relevant variable in the demand for M1 function. However, recent evidence (Goldfield 1973, Moosa 1977a) rules out a cyclical adjustment because it suggests that M1 is held mainly for transaction purposes with current income rather than permanent income being relevant in the demand-for-M1 function. If so, the fluctuating coefficients of the earlier period cannot be readily explained.

When we compare the lag structures of the earlier and later periods (for the ten-period lag) we observe that except for the fourth and seventh periods the matching lag coefficients have opposite signs suggesting that the full period results may be hybrid. When the

\[\text{Note that the (not) positive sum of the lag period is very heavily weighted by the positive coefficients of period t-1.}\]

\[\text{The holding period for M1 is likely to be quite short. Consequently price expectations can be expected to form largely on the basis of the most recent inflation experience. As such the positive coefficients could reflect not only the income effect but also some price separation effect. However, not only is the empirical magnitude of the latter likely to be quite small (Goldfield 1973, Moosa 1977a), making the heavy reliance on the price expectations effect unjustifiable, but also the effect of inflation expectations on money demand cannot be detected over the later sub-period (Moosa 1977a), apparently because of the relatively low rates of inflation experienced (Johnston, 1973).}\]

\[\text{The formal procedure of the Chow test (Chow 1960) indicates that the dependent variable was governed by the same relationship in both the periods. The Chow test may, however, give misleading results when used on estimates estimated with a serial correlation correction.}\]
Table 2: Sign Structure of Coefficients

<table>
<thead>
<tr>
<th>Lag</th>
<th>Coefficients of 3-5 year Treasury bond rate</th>
<th>Sign Dist. (±)</th>
<th>Negative Coeff. %</th>
<th>Coef. Signs of Terms Bill Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.06 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td>0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.00</td>
<td></td>
</tr>
</tbody>
</table>

Gibson used the rates on three month Treasury bills and a Treasury and Corporate Aaa bonds of more than ten years to maturity as proxies for the interest rate, and he found no significant differences in the results using these alternative interest rates. We have instead used the rate on intermediate term Treasury bonds of three to five years maturity. As a check on whether our different results could have been due to our use of a different interest rate variable the rate on three month Treasury bills was also tried. No significant difference emerged as can be seen by an examination of the results using the bill rate which, to conserve space, are presented in the last column of Table 2 (for only the two-period lag) for the full as well as both sub-periods. Neither were the additional results reported below found to be qualitatively different when the Treasury bill rate replaced the Treasury bond rate as the proxy for the theoretical interest rate. This similarity in the results might of course be expected because of the high correlation between these rates. 8

Next, we try to estimate the sum and structure of the coefficients of the money variable holding constant the effect of government expenditure changes on the interest rate. Our method is to regress the interest rate variable (represented by the 3-5 year Treasury bond rate) on the logarithms of current and past M1 and real government expenditures (on goods and services) using the Almon (1963) procedure. 9 If on the basis of

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8 Note the positive correlation in Table 1 between the rates of growth of government expenditures, interest rates and velocity in the earlier and later periods. Despite the presence of a contractionary monetary policy (FDM – D) in the interest rate variable increased in velocity growth due to increases in the rate of growth of government expenditure and the provision of an alternative measure of excess demand (Staats 1978).

9

**Note:** The first and second row of each cell represent the coefficients of the periods 1945–1953 and 1954–1964 respectively. A plus (+) means that the coefficient is significant at the five percent level.

**Breakdown is for lag periods 1 to 3, 1 to 4, 1 to 5 and 1 to 6.**
recent evidence (Goldfield 1973 and Moosa 1974) we rule out permanent income as the
money variable in the demand-for-M1 function
then a cyclical adjustment to equilibrium
must be ruled out. As such we use a ten-
period second-degree polynomial and again
estimations are estimated using the Cochrane-
Orcutt (1949) serial correlation correction.13

Figure 4. The solid line tracks the coefficient of the money variable and the broken line tracks the coefficient of the
government expenditure variable and is measured on the right-hand vertical axis.

figure 4 plots the coefficients of the lag
structure and also shows the estimated equa-
tions for the earlier (1947.1-1957.4) and later
1958.1-1966.4 periods. The solid lines track
the coefficients of the money variable and the
broken lines the coefficients of the govern-
ment expenditure variable. The sum of both
lag coefficients in both sub-periods is statisti-
cally significant with the sum of the lag coef-

cients of the money variable being positive
and the sum of the lag coefficients of the
government expenditure variable being nega-
tive.14 Such a (sign) relationship can be
rationalized by assuming that the expenditure
curve (IS) was upward sloping and inter-
sected the LM curve from above. It would be
a counterfactual assumption, however, be-
cause it implies an unstable system (Modi-
gliani 1944) and it does not explain the
observed positive (U-shaped trend) relation
over the simple period between the rates of
growth of government expenditures and real
output (Figures 2 and 3). This casts doubt on
the power of the empirical model to provide
unbiased estimates of the dynamics of interest
rate adjustment in response to monetary and
fiscal shocks and one may be skeptical about
whether the structure of lag coefficients
reflects liquidity and income effects.15

Neither can the ability of the earlier period

13 The sum of the lag coefficients of the money variable is significantly positive even when the government expenditure
variable is left out of the equation. This is to be expected given the results of Table 2.

14 It is unlikely that this unexpected sign and sign structure of coefficients of the monetary and fiscal vari-
ables reflects effects of anticipated inflation because, according to Gibson’s criteria, this will imply that mon-
etary policy was deflationary, which is implausible, and the fiscal policy was deflationary, which is contrafactual;
Table 1 and Fig 4 show that (DM – Dy) was negative (and large) and the rate of growth of govern-
ment expenditures positive and relatively large, as was the rate of growth of velocity. If, according to the mon-
etary model, inflation was directed or ultimately fiscal-induced it was apparently weakly accommodated rather
than money-accommodated, and there is no evidence to suggest that velocity growth was in turn money-induced.
Gibson’s reduced form approach is however, incapable of determining such a causal chain because that would
require a structural dynamic macro-economic model that is in full feedback mode.

percent of the mean value of the interest rate of
5.11 for the period 1958.1-1974.4. For
1974.4 the actual and predicted values differ
by a little more than one hundred percent.

III. Summary and Conclusions
We followed in this study the identical
statistical method of Gibson of regressing
the current interest rate on the logarithm of
current and past values of the money stock.
However, unlike Gibson, who indiscrimi-
ately applied a full employment model to
situations of less than full employment, but
according to the requirements of Gibson’s
theoretical model, we broke down our sample
period into one of higher and lower capacity
utilization and rates of growth of government
expenditures, prices, interest rates, and veloc-
ity, and improved upon Gibson’s statistical
procedure by estimating the regressions using
a serial correlation correction. By Gibson’s
own criteria the size and/or the sign structure of
coefficients is found to be inconsistent with
the predictions of his model and there is no
reason to infer from our results, as does
Gibson from his, that causality is unidirec-
tional from money to interest, that the income
effects just balances the liquidity effect and
that the lag in the effect of money on income
is between one and two quarters. Moreover,
when the government expenditure variable,
omitted by Gibson, is added to the estimated
equation the results are no more encouraging.
The positive coefficient of the money variable
may be rationalized by assuming an upward
sloping expenditure curve but the negative
coefficient of the government expenditure
variable is disturbing because it is inconsis-
tent with widely accepted assumptions about
the parameters of the real and monetary
sector equations and with the observed stabil-
ity of the economy, causing some skepticism
about whether the size and sign structure of
lag coefficients of the money variable gener-
ated by the particular statistical method

\[
\begin{align*}
1947.1-1957.4 \\
1958.1-1966.4 \\
1967.1-1974.4 \\
1975.1-1984.4
\end{align*}
\]
represents a reliable measure of liquidity and income effects. On the other hand if the lag coefficients are considered plausible then the consequences of monetary and fiscal changes were radically different from those currently assumed.

In short, the results of this paper are significant for two related reasons. First, because knowledge of the empirical relation between monetary and fiscal disturbances and the subsequent amount and time path of changes in the interest rate is important for the conduct of economic policy and second, because of the continuing widespread reference to the Gibson results (for example, Frenkel 1975 and LaIdler 1978) when making policy prescriptions, as well as use of some variant of this empirical method for the generation of additional results (Sims, 1970). Our results show that there is room for considerable skepticism about the empirical relation between monetary and fiscal disturbances and subsequent changes in interest rates if we are left to draw inferences solely from an examination of the sum and sign structure of coefficients on current and lagged values of explanatory variables. This forces one to fall back on a priori reasoning.

Reference