High Interest Rates and Inflation in the U. S.: Cause or Effect?

Introduction

The extraordinary interest rate rise since the mid-sixties rivets attention on this remarkable period in recent U.S. financial history: In the second quarter of 1965 — 1968(2) — both short-term (4-6 month) commercial paper and (high-grade) long-term corporates averaged approximately 4 1/2%; three and a half years latter — in 1968(2) — the commercial paper rate rose to 6%, while the corporate long-term rate rose to an unprecedented 6.7%.

Short- and long-term interest rates continued to rise, reaching historic highs in 1969 and 1970. The commercial paper rate climbed 450 basis points from 1965 to December 1969, while the corporate long rate increased by 450 basis points from 1965 to July 1970. The 1965-1970 highs for short- and long-term rates were more than double their 1965 level, and long rates in 1970 recorded the highest peaks ever before attained in U.S. history. Without question, this is one of the most dramatic interest rate escalations in our recorded financial history.

Three related aspects of the U.S. interest rate experience in the 1960's need to be analyzed: The first, and most basic, issue is to identify the underlying factors responsible for the extraordinary rise in interest rates in the 1960's; a second issue is to rationalize the stickiness of long rates during the 1969-1970 recession and its relation, if any, to the stock prices decline; a third, and final, issue is to interpret the interest rate movements in the recovery starting in 1970(4).

* Financial support from the National Science Foundation and from Wayne State University is gratefully acknowledged.
We have two distinct analytical frameworks to explain the interest rate developments in the 1960's, in the 1969-1970 recession, and in the recovery starting in 1970(a). One approach stresses real forces in the economy affecting the return on investment, and affecting investment demand relative to savings propensities. The steep market rate climb since 1965 is associated with an intense demand for capital, and the investment boom is attributed to an increase in the natural rate of interest. A second approach stresses the role of accelerated monetary growth and highlights a sequence of easy money, tight credit, and high interest rates. The interest rate escalation in the latter half of the 1960's is attributed to the very high rates of monetary growth, to inflationary expectations, and to resulting tight credit markets.

The real and the nominal interpretation of the interest rate escalation are in fact derived from their respective analyses of accelerating inflation. The real approach highlights increasing returns on investment, innovations, a capital boom, strong investment demand, as the basic factors responsible for the inflation. An increase in the rate of return on investment — in the natural or real rate of interest — is the cause and inflation is the results. The nominal approach highlights accelerated monetary growth as the key causal factor in the inflation and in the resulting inflationary expectations. An increase in inflationary expectations is the cause and high market interest rates are the results.

We shall proceed as follows: The interest rate developments in the 1960's, in the 1969-1970 recession, and since the 1970(a) recovery are summarized in section I. The real (neo-Keynesian) and the nominal (monetarist) theories and their implications for the cause and effect relation between inflation and interest rates are summarized in section II. The relations among real rates of return and between the real and nominal interest rates and their responses to changes in the natural rate and "equivalent" changes in the

1 The natural rate of interest is the interest rate of aggregative theory at which desired saving and investment would be equal and which is consistent with high employment, a stable price level, and macroeconomic equilibrium. This rate is sometimes defined as the long rate (Keynes), the natural rate (Wicksell), the real rate (Fishler), or the supply price of capital (Tobin). For a discussion of these real rates, see D.I. Yash, "Keynesian Monetary Theory, Stabilization Policies, and the Recent Inflation", in Journal of Money, Credit, and Banking, August 1970.

The relations among the natural rate, the real rate, the supply price of capital and between real and nominal interest rates are elaborated in section III.

High Interest Rates and Inflation in the U.S.: Cause or Effect?

1. Interest Rate Movements since the Mid-Sixties

In this section, we shall first view the 1965-1969 rise in both short-term and long-term rates in some historical perspective and also highlight the simultaneous rapid growth in the money stock in this period. The interest rate escalation in the 1960's cannot, in our view, simply be attributed to a restrictive monetary policy. Second, we review the 1969-1970 recession interest rate movements, comparing them with previous postwar economic slowdowns. Third, we summarize the interest rate developments following the recovery in November 1970. These include the spectacular rate decline in the first two recovery quarters, the subsequent run-up in rates from April to August 1971, and the decline in interest rates following Nixon's announcement of his New Economic Policy (NEP) on August 15, 1971. We conclude this section with a

<table>
<thead>
<tr>
<th>Date</th>
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<th>Corporate</th>
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<td>12/71/71</td>
<td>5.95</td>
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</tr>
</tbody>
</table>

1 Market rates just prior to Nixon's announcement of his NEP on August 15, 1971.


A. Some historical perspective on the 1965-1969 period. — From the 1965 Vietnam escalation until 1970, long-term interest rates rose dramatically, as illustrated in table 1, summarizing the successive peaks and troughs in bond yields since 1965. From January 1965 to their 1970 peaks, governments increased by 335 basis points, seasoned utilities by 419 basis points, new utility bonds by 469 basis points, and prime municipals by 380 basis points. Bond prices fell some 40-50% in the 1965-1970 period, as long rates rose to the highest recorded levels in our financial history. The June 1970 corporate and municipal yields of 9.40% and 7.59% were more than double the 1965 lows, while governments increased from 4.24% to 7.59%.

The 1965-1970 escalation of long rates is also manifest in the 1965-1969 rise in short rates. The Treasury bill rate and the commercial paper rate skyrocketed up from 3.83% and 4.28% in 1965 to their 1969 year-end peaks of 8.12% and 9.25%; an increase of between 400 and 500 basis points above their respective 1965 levels. Short-term rates follow pretty much the same pattern as long rates.

The 1965-1970 rise in long rates may be viewed as an extension of a bond price decline starting in 1963; and, pursuing this line of thought, the 1963-1970 bond price decline may, in turn, be viewed as a continuation of the major secular interest rate rise starting some 25 years ago, at the end of World War II. Bond yields in 1946 fell to historic lows, with corporations yielding 2.37%, governments, 2.17%, and municipals, 1%. This 25-year rise in bond rates was interrupted by four market rallies in 1948, 1953, 1957 and 1960. The cyclical yield fluctuations for the period 1946-1970 are shown in chart 1.


3 The rise in bond prices in late 1966 preceding the "mini-recession" of 1967 may be viewed either as a fifth rally, or possibly a pause.

This chart of postwar yields also suggests that the successive bond market rallies have been weaker, and briefer, than the preceding rally, while the successive declines have been steeper, and of longer duration. Indeed, the 1963-1970 bond price decline is by far the most severe, and the longest, of the postwar cyclical declines.

American long-term rates since 1860, shown in chart 2, show a succession of long-term trends which last from a decade up to 40 years. This long-term chart also reveals that the postwar bond yields exceeded the 1920 peak yield, for the first time, in 1969. Bond yields continued rising after 1969, and soon exceeded the Civil War peak and the peak rates reached during the War of 1812. Similarly, British long-term rates follow the same postwar pattern, as shown in chart 3, tracing British yields back to 1727.

4 While the 1960's bond price decline may have started in 1963 or in 1964, in the remainder of this paper we shall treat the interest rate escalation as having started in 1965.
YIELDS OF LONG-TERM HIGH GRADE AMERICAN BONDS

Chart 2

YIELD %

Scale

Yield %


YIELDS OF BRITISH ANNUITIES AND CONSOLS FROM 1777

Chart 3

YIELD %

Viewed in this long-term historical perspective, the 1945-1970 interest rate rise appears as one of the sharpest secular movements in recent economic history, while the interest rate escalation since the mid-sixties appears as one of the sharpest cyclical bond price declines.

It may be tempting to attribute this extraordinary rise in American interest rates in the 1960's to a restrictive tight money policy. This presumption is not supported by data which indicate that money stock was growing at a much higher rate in the second half of the 1960's than in any other period since the 1957 Accord. For example, the rate of monetary growth averaged 2.1% from 1952(1) to 1962(3), 3.7% from 1962(3) to 1966(4), reaching a jumbo-size growth rate of 6.1% from 1966(4) to 1971(3). In contrast, the annual increase in the money stock averaged close to 2% in the 1952-1965 period, except for 1959 when it increased to 3.5%. Monetary growth since 1963, and especially since 1965, appears to have been exceedingly high as compared with the 1950's and early 1960's.

We cannot attribute the interest rate rise in the 1960's to tight money, if we gauge monetary policy by the growth of the monetary aggregates; indeed, the policy posture since 1965 must be characterized as one of easy money, evidenced by the high monetary growth rates. Except for the brief decline in 1966, and for the sharp deceleration in 1969, the money stock has been growing at an exceedingly high rate for most of the period from 1964 until July 1971.

The accelerating inflation starting in 1965 also suggests that money growth may have been excessive in the latter part of the 1960's. The inflation rate rose sharply from a 1.8% rate for the period 1951(1) to 1964(4), to a 3.5% rate for the period 1965(1) to 1969(2), and to a staggering 5.1% rate for the period 1969(3) to 1971(2). Acceleration in the inflation rate thus appears to follow pari-passu with the acceleration in money stock growth. We cannot assume that interest rates were rising in the latter half of the 1960's because of a restrictive monetary policy. On the contrary, they may have been responding to accelerated monetary growth and inflation.6

B. The 1969-1970 recession. — Interest rates, especially long-term rates, did not decline with the onset of the economic slowdown and, in fact, continued to rise in the 1969-1970 recession. The interest rate movements in the first eight months of the recession were difficult to analyze, interpret or explain. At their June 1970 peaks, long-term rates were at the highest recorded levels in U.S. financial annals, and there were many suggestions to institute capital controls and establish social priorities for the allocation of credit.7 The 1969-1970 recession interest rate developments do not appear to conform to our postwar experience in the following respects.

— Long rates were significantly higher in 1970(4) than most analysts had expected them to be one year after the November 1969 peak in economic activity (the NBER preliminary estimate) and some 15 months after the PRB Industrial Production Index leveled off in the third quarter of 1969. The November 1970 long-term rates, after one year of recession, were essentially at the November 1969 rate levels.

— Long-term rates continued to rise for almost eight months after the November 1969 recession. High-grade corporates increased by over 50 basis points and municipals by over 40 basis points in this period.

6 The 3.5% and 4.5% money stock increases in 1964 and 1965 are the largest increases in the entire period 1952-1969.


"In the long-term market, rate spreads continue to be abnormal. Corporate bond rates have not record high enough to open up any meaningful spread in favor of mortgage rates. Thus, institutional investors have little direct incentive to acquire mortgage rather than corporate bonds. Some observers have attributed this to the very heavy volume of corporate bond issues. However, while the Treasury has issued no long-term obligations whatsoever, the spread between yields on corporates and governments has not changed materially this year. This is consistent with historical precedent: fluctuations in corporate bond rates do not seem to be significantly related to the volume of issues, although "common sense" and the market fewers alike "feel" that they are."
— The corporate Aaa rate (new issues) barely declined until the end of 1970. Indeed, the 8.42% rate in November 1970 was almost 100 basis points above the rates obtaining in July and August of 1969 and almost 50 basis points above the September and October rates.

<table>
<thead>
<tr>
<th></th>
<th>November 1969</th>
<th>July 1970</th>
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<tr>
<td>Corporate bonds</td>
<td>8.85%</td>
<td>9.40%</td>
</tr>
<tr>
<td>Municipal bonds</td>
<td>6.70%</td>
<td>7.12%</td>
</tr>
</tbody>
</table>

— The commercial paper rate did not keep pace with the Treasury bill rate during the first ten months of the recession.

— The interest rate decline in the 1969-1970 slowdown fell far short of the cyclical pattern experienced in the postwar recessions.

— The spreads between short-term and long-term rates and the relations between market-determined and partially administered rates (such as the prime rate) in the 1969-1970 recession are also somewhat different from our previous recession experience.

C. Interest rates since November 1970. — Long-term rates peaked in June and July 1970 and did not decline significantly until the first two recovery quarters — 1970(4) and 1971(1) — when they fell approximately 200 basis points. Short-term rates peaked in December 1969 and January 1970. The interest rate declines if calculated from the mid-1970 peak levels to the March 1971 lows are, of course, even larger.

The 1970 peak rates and the 1971 lows (mainly March 1971) are exhibited for two short-term rates and two long-term rates in the table below. Also shown are the rates for August 25, 1971, when President Nixon announced his NEP, and for December 20, 1971.

The interest rate movements from the 1970 peaks and following the 1970(4) recovery are noteworthy in the following respects:

— An extraordinary 250 basis point decline in corporate long rates from June 1970 to March 1971. The sharpest previous postwar recession rate decline was approximately 150 basis points.

— A decline of almost 500 basis points from the (Dec. 1969) 8.12% Treasury bill rate to the 3.24% rate in March 1971. The steepest bill rate decline in the previous postwar recessions was only 300 basis points.

— Increases of almost 200 basis points in short-term rates and almost 100 basis points in long rates from March 1971 until August 1971 in the early phase of a relatively sluggish economic recovery.

— A post-NEP drop of approximately 150 basis points for short rates and 100 basis points for long rates, even though monetary growth during this period was relatively flat.

— The interest rate rise in 1971(3), when money was growing at an extraordinary 20% rate and the substantial post-NEP interest rate decline occurring when money was flat, may suggest that expectations effects dominated the liquidity effects.

D. Stock prices in the recession and recovery. — The Standard and Poor common stock index peaked in May 1969 at 104.6 and reached a June 1970 low of 75.6, as stock prices fell approximately 30% from May 1969 to June 1970. The common stock index climbed from a low of approximately 72.7 for the week ending
intense capital goods demand, and leading up to the extraordinarily heavy volume of new issues and the 1969-1970 liquidity squeeze. Since ex-ante investment demand and uses of funds were growing relative to savings and sources of funds, the war-related capital boom is seen as the primary factor causing the real rate of interest to rise. Following this approach, a rise in the natural rate of interest and in the return on investment is the cause and inflation is the result.

The nominalist approach highlights accelerated monetary growth as the key factor responsible for the inflation and treats inflationary expectations as the cause of the high, and rising, interest rates. This approach distinguishes between nominal and real interest rates, and explains a rise in market rates—relative to real rates—in terms of an inflation premium. This nominalist approach, in contrast with the real approach, does not assume a rise in the natural rate of interest and the real return on investment.

A. The evolution of the real approach. Initially, the interest rate escalation starting in 1965 was attributed to the Vietnam war, to the burgeoning budget deficits, to ambitious capital expenditure programs, and to heavy corporate long-term borrowing; in more recent years, the emphasis has been shifting towards inflationary expectations. Some analysts have introduced additional factors such as the Cambodian incursion, the campus rioting, the inventory liquidation by security dealers, the Penn Central crisis, and a developing liquidity squeeze to explain the 1970 interest rate hike in a sagging economy.10

Mounting budget deficits which placed increasingly heavy demands on the credit markets are cited to explain the initial interest rate hike in the mid-sixties. For example, the government's share of the funds raised by the nonfinancial sector increased from 24% in 1965 to 15.6% in 1967, to 13.8% in 1968; it declined to 4.0% in 1969, and rose again to 17% in 1970.11 Private and public borrowing, as a share of the GNP, increased from 9% in 1965 to

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9 Although the monthly index reached a low in June, the stock market actually began to recover by the end of May 1970.

9 A monetary action should presumably affect both bonds and stock prices similarly. An increase in monetary growth should lower the yields on both bonds and equities, while a reduction in monetary growth should raise these yields. In contrast, a change in inflationary expectations may affect bond prices without changing equity prices, while other non-monetary disturbances may affect equity prices without changing bond prices. For an excellent analysis of how monetary actions affects security prices, see B. M. Stiglitz, Money and Markets (Irwin, 1971).

10 John M. Muso, "Behavior of Interest Rates During Economic Slowdowns", Economic Commentary, Federal Reserve Bank of Cleveland, November 8, 1979, discusses the factors most often cited to explain the tightness of long-term rates in the 1969-1970 recession.

11 The federal budget was in surplus and the government supplied funds to the capital market in 1969.
increased from $650 billion in 1968 to $798.8 billion in 1969, bond financing declined by over $3 billion and long-term financing (including stocks) increased by only $2.5 billion. Accordingly, the additional $10 billion capital equipment expenditure in 1969 was financed primarily with short-term borrowing. When profits deteriorated in the 1969-1970 recession, some corporations were in an exposed position, when holders of their short-term liabilities demanded payment or failed to renew their loans. And confidence was, of course, even more seriously undermined by the Penn Central crisis.14

B. The nominalist approach. — A fourth, and entirely different, explanation of the interest rate escalation since 1965 highlights the key role of inflationary expectations and suggests that nominal rates were rising relative to real rates. This nominalist rationalization assumes that a widespread rise in the expected rate of inflation will necessarily raise market interest rates to rise, even if the natural rate of interest and the return on investment are relatively constant. Lenders, concerned that the value of money is eroding, demand an inflation premium in the form of high nominal interest rates; and borrowers — expecting perhaps a higher inflation — are willing to pay this insurance premium. Moreover, as such inflationary expectations take root and spread, they will raise nominal interest rates, even if a sagging economy and accelerated monetary growth are operating independently to lower both real rates and nominal rates. This nominalist approach rationalizes the post-1965 interest rate climb in terms of market rates rising relative to real rates.

14 The factor that was most often cited to explain the stickiness of long rates in the 1969-1970 recession is the very large volume of new long-term issues coming to the market. This is not, however, a complete explanation, for we must go on to consider whether the increase in new issues is associated with new capital spending or whether it represents a restructurings of corporate debt. It is of interest to note that gross private investment has fallen sharply from a 12% expansion rate in 1969(3) to 1969(4), to a 10% rate in 1969(4) to 1970(1), and to a 4% rate of decline in 1970(2) to 1970(3). An analysis of corporate sources and uses for 1970 reveals that nonfinancial corporations have restructured their liabilities, shifting from bank and finance company loans and commercial paper to bonds and stock. Net new bond issues increased by $3.1 billion and net new stock issues rose by $2.4 billion in 1970, while corporate borrowings at banks, from finance companies, and from the commercial paper market, were $11.8 billion less than in 1969. See E. Kaufman and J. McKKim, Supply and Demand for Credit in 1970 (Brookings, 1973).
rates. And, unlike the real theories, it also implies that market rates will decline only when we succeed in curtailting inflationary pressures and thereby reduce the expected inflation rate.15

The real and nominalist interpretations of the post-Vietnam interest rate developments may be identified with the neo-Keynesian and monetarist theories: the neo-Keynesian liquidity preference theory is attuned to treating market rates as proxies for real rates; and the monetarist theory is attuned to the Fisherian distinction between nominal and real rates.

Neo-Keynesians rationalize interest rate movements in a paradigm relating money, interest rates, and prices (or output). Interest rates typically rise whenever real rates rise because of change in investment demand, changes in the money demand function, or because of changes in the money supply function. A rise in the natural rate of interest, an increase in investment demand, and an increased demand for money will raise both real interest rates and market interest rates; and it will be associated with rising inflation and escalating market interest rates. A rise in the natural rate is the cause and inflation is the result. A restrictive monetary policy and deceleration in money stock growth will also cause real rates and market rates to rise but it, unlike a rise in the natural rate, will be associated with deflationary tendencies.

Monetarists assume that the demand for money (function) is fairly stable and relatively independent of money stock changes. Interest rate movements are related to money stock growth in a paradigm which relates money, prices (or output), and interest rates, and which takes account not only of the initial effects of monetary growth on interest rates but also the feedback effects. Inflationary expectations causing nominal rates to diverge from real rates is the key factor in the post-1965 rise in market interest rates; accelerating inflation is seen as the cause and escalating interest rates as the result.

The neo-Keynesian and monetarist theories lead to quite different interpretations of the interest rate movements since 1965.


as we shall indicate in this paper. To examine the implications of these theories in greater detail, we shall first consider the relations between real rates and nominal rates.

III. The Natural Rate of Interest, real Rates of Return, and Nominal Interest Rates

We would like to discriminate between an interest rate rise due to inflation and inflationary expectations and an interest rate rise due to a capital boom and an increase in the natural rate of interest. This requires that we first distinguish between real interest rates, or the market return on investment, and nominal interest rates, or the market rate on loans and fixed-claim liquid assets: real rates correspond to the productivity of capital and the rate of return on real assets; market rates correspond to the rate of interest on loans, bonds, and other fixed-claim financial assets denominated in nominal units. The real interest rate is conceptually related to the Wicksellian natural rate of interest, the Fisherian real rate of interest, or Tobin’s supply price of capital (SPC). The nominal interest rate is the market yield on loans and debt instruments traded in the capital markets, and reported in the financial press. The natural rate, the real rate, and the SPC are determined by available technology and cannot be observed directly; they represent alternative measures of return on real capital; and, as a first approximation, should remain relatively invariant to the inflation rate and to other money market developments. The nominal bond rates also reflect the underlying return on investment: but, unlike the real rates, they are influenced in the short run by demand and supply forces in the capital markets, by the budget, by monetary policy, by investor psychology; and they may be modified for longer periods by the inflation rate.

While the three real rates of return move with the productivity of capital, they are designed to measure slightly different aspects

of the return on productive assets. Market interest rates on financial assets denominated in nominal units are determined by the productivity of capital in conjunction with demand and supply in the capital markets.

To distinguish the interest rate effects of an increase in inflation and of an equivalent increase in the natural rate in our modern and complex economy, it may be helpful to review the relations among these three real rates of return and between real and nominal interest rates in idealized conditions. In section A we consider the case where all capital assets must be owned outright; in section B we consider the case where all capital assets are financed 50% in equity and 50% in debt; and, in section C, we summarize the factors that would enable us to distinguish between the inflation effect and the natural rate effect for these two cases.

We assume that the capital assets yield a perpetual stream of services, that the income from these assets is all paid out in dividends, and we also abstract from the influence of taxes and leverage.17

A. No debt financing permitted. — Consider first the case where all capital must be owned directly (or in the form of equities), where no bonds may be issued or sold, and where the “expected” or “average” return on investment is 4%. A $200 machine yields a stream of services each year with a market value of $8 in perpetuity. We are assuming that the natural rate of interest is 4%, and that this rate will bring high employment saving and investment into equality at a stable price level. Since all assets must be owned outright and no debt financing is permitted, the 4% return on capital is also the real rate of interest and the SPC. Finally, the 4% return is also the market rate of interest that converts the perpetual $8 annual yield of the machine into its market price of $200.

Suppose that this society is characterized by a steady 5% inflation, and that the inflation is fully anticipated. To simplify the analysis, we assume that these machines yield the same annual

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17 The relations between the bond interest return and the SPC, the equity return, and between the nominal and real returns on both bonds and equities, may be affected by personal and corporate income taxes, by changes in debt-equity ratio and leverage, and by the proportion of income which is retained and paid out in dividends. We shall abstract from these effects in the following analysis of real and nominal rates.
equal to 4.7% (See table 2). Both new and existing machines yield the same flow of services and will therefore have the same market value. Machine prices and equities will rise each year by the inflation rate.

The inflation-induced interest rate rise may be compared with an "equivalent" rise in market rates due to technological advance. Assume that innovations embodied in new equipment raise the natural rate of interest by 5.2 percentage points (i.e., 520 basis points), and that market rates rise from 4% to 9.2%.

The dollar return on a new machine will also rise to $18.90, but in this case both nominal and real rates will rise to 9.3%. Since the yield on existing machines remains at $5 and since the return on investment on new machines is now 9.4%, prices of existing machines will fall. An increase in the natural rate will cause nominal interest rates and all real rates of return to rise to 9.2%, and existing machines and equity prices will fall from $200 to $87 in order to equalize the return on new and existing equities. In contrast, an inflation-induced increase in nominal rates relative to real rates does not generate higher returns on new machines and the price of existing machines and equities rises with the inflation rate.

B. All assets financed 50% in equity and 50% in debt. — Let us now remove the restriction on debt financing and permit the owners of productive assets to sell bonds to others who thereby acquire, in effect, some indirect ownership of these capital goods. To simplify the analysis, assume that all bonds are of high quality and homogeneous, and that all assets are financed with the same proportion of debt to equity funds to abstract from changes in

leverage.20 We assume that equity returns and bond yields will normally move together, for otherwise the incentive to buy bonds is diminished; but we do not assume that bond interest rates and equity yields will necessarily tend to equality in the long run.

The bond rate, in our example, is not expected to converge to 4%. The equity holders, those who own the real assets, must, in effect, guarantee the annual interest income to the bondholders and take on any, and all, residual risk; and they will typically demand, and receive, a higher rate of return. As a consequence, a rate differential between the "variable" yield on equities and the "guaranteed" interest return on bonds will necessarily emerge in the market; and its magnitude will vary with the proportion of wealth owners who seek "guaranteed" interest income relative to "variable" dividend income. To simplify matters, we assume that an ex-ante rate differential of 2 percentage points (200 basis points) equilibrates wealth owners' preferences for "guaranteed" and "variable" income from capital. Capital market equilibrium requires therefore that the (guaranteed) interest yield on bonds is 3% and the ex-ante (variable) dividend return on equities is 5%.21

In a regime of stable prices, the 4% return on real investment is the natural rate of interest, the 3% bond rate is the real rate of interest as well as the market rate of interest, and the 5% rate of return on capital (equities) is the SPC.

Inflation will change nominal yields and market rates, even if the return on real investment remains at 4%, and the real interest rate and the SPC remain at 3% and 5%, respectively. When the inflation is fully anticipated — when actual and expected inflation coincide — and when the capital market is fully adjusted to the 5% inflation rate, the market or nominal rate of interest on bonds will increase from 3% to 8.15% and bond prices drop from $100 to $76.82. The nominal rate of return on equities on both new and existing machines will also rise from 5% to 10.25% and equity

20 An increase in the proportion of debt to equity funds increases the risk and the leverage and should raise the earnings of the lowered equity.

21 While the ex-ante equity return is 5%, the return on a particular machine may temporarily be above or below the 5% average return. This introduces variability in dividend income.

22 This nominal rate of 8.15% may be thought of as the sum of two components: a 5% real rate of interest and a 3.15% inflation premium.
prices rise from 100 to 150.\textsuperscript{23,24} The 5% inflation rate is assumed not to affect the 4% real return on investment (the natural rate of interest), the 3% real rate of interest (on bonds), and the 5% real rate of return on equities (the SPC). While bond prices will fall, the prices of both new and existing machines and equities rise pari passu with the inflation rate, as shown in table 3.

Technological advance raising the productivity and the rate of return on new equipment will increase both real and nominal interest rates. More specifically, suppose that there is an increase of 5.2 percentage points (50 basis points) in the natural rate which brings about an “equivalent” rise in market interest rates. An increase in the natural rate of interest from 4% to 9.2% will raise the nominal and the real rate of interest from 7% to 8.2%, and bond prices will fall from $100 to $65.\textsuperscript{25} It will also raise the nominal and the real rate of return on equities—the SPC—from 5% to 10.2%, from $100 to $49. The 200 basis point differential between the real rate of interest and the real rate of return on equities is identical to the differential between the nominal bond rate and the nominal equity return. (See table 3.) Since new machines now yield $18.40 while the annual yield on existing machines remains at $8, their price should fall from $200 to approximately $87; similarly, the price of existing equities should fall from $100 to $49.

An increase in the natural rate raises the return on new machines and raises both the real rate and the market rate of interest by an equivalent number of basis points; it does not, however, raise the annual yield on existing machines. Since capital market equilibrium requires that both nominal rates and the real rates on all assets be equalized, an increase in the natural rate should be associated with a reduction in the prices of existing machines, in bond prices, and in equity prices. An increase in the inflation rate raises the nominal return relative to the real return on both new and existing machines, and market rates relative to real interest rates; it should be associated with a decline in bond prices and a rise in equity prices of existing assets, but the prices of existing and new machines should rise with the inflation rate. See summary in table 3.

\begin{table}[h]
\centering
\caption{A Comparison of Nominal and Real Rates of Return in Three Regimes}
\begin{tabular}{|c|c|c|c|c|}
\hline
\multicolumn{5}{|c|}{(All assets financed 90% in equity and 10% in debt)} \\
\multicolumn{5}{|c|}{Rate of return in a regime of} \\
\multicolumn{5}{|c|}{\textbf{Stable Prices}} \\
\hline
\textbf{ Existing Machines} & \textbf{ New Machines} & \textbf{ Existing Machines} & \textbf{ New Machines} \\
\hline
\textbf{Price of new or existing machine} & $600 & $600 & $59 & $59 \\
\hline
\textbf{Dollar return on new or existing machine} & $8.40 & $8.40 & $8 & $8.40 \\
\hline
\multicolumn{5}{|c|}{=$18.40} & \multicolumn{5}{|c|}{=$18.40} \\
\hline
\textbf{Dollar return to bondholder} & $3 & $8.15 & $3 & $8.15 \\
\hline
\textbf{Dollar return to equity holder} & $5 & $15 & $5 & $15 \\
\hline
\textbf{Market (nominal) rate of interest on $100 bond} & 5% & 8.15% & 5% & 8.15% \\
\textbf{Market (nominal) rate of return on $100 in equity} & 3% & 10.20% & 3% & 10.20% \\
\textbf{Natural rate of interest} & 4% & 8.20% & 4% & 8.20% \\
\textbf{Real rate of interest on bonds} & 3% & 8.20% & 3% & 8.20% \\
\textbf{Supply price of capital, the real rate of return on equity} & 5% & 8.20% & 5% & 8.20% \\
\hline
\textbf{Bond prices} & $600 & $600 & $59 & $59 \\
\hline
\textbf{Equity prices} & $18.40 & $18.40 & $18.40 & $18.40 \\
\hline
\end{tabular}
\end{table}

\textsuperscript{23} While the differential between the real rate of interest and the real return on equities is still 50 basis points, the differential between the nominal bond yield and the nominal equity return rises with the inflation rate to 250 basis points, as shown in table 3.

\textsuperscript{24} The 5% rise in equity prices follows from the very specific and unrealistic assumption, in our example, that the equity owner does not have to refinance his bonds and can therefore realize the $18.40 return in perpetuity. In general, the equity owner will have to refinance at some point and his return will then approximate 8.15%.

\textsuperscript{25} The difference between the $25.94 bond price in this case and the $35.69 in the inflation case is artificial and related to the difference between the 8.15% and 5.0% market rates in the two cases.

\textsuperscript{1} $100.00 in the capital gains on the asset.

\textsuperscript{2} Let \( r = \text{real rate}, i = \text{inflation rate}, \) and \( n = \text{nominal rate}, \) then \( r = \frac{i}{1+i} \)

\textbf{C. An increase in the inflation rate or an increase in the natural rate?} — In this highly oversimplified example we assume that all machines last forever, that all earnings are paid in dividends, and
we abstract from the influence of taxes, of leverage, of maintenance and depreciation in our discussion of real and nominal rates. We also introduce the following simplifying assumptions: (1) that the natural rate — the rate which brings savings and investment into equality with high employment and stable prices — is 4%, and is, initially, the actual rate of return on investment; (2) that a 200 basis point differential between the real equity return — the SPC — and the real interest rate on bonds accommodates wealth owners' desires for "guaranteed" and "variable" income from capital; (3) that the nominal differential between the nominal bond and equity yields is the real differential adjusted by the inflation rate; (4) that inflation does not change real rates of return; (5) that changes in the natural rate or in the inflation rate do not affect the propensities for "guaranteed" and "variable" interest income; (6) that the annual yield and the market price of machines will rise by the rate of inflation, and (7) that the discount rate used for determining the prices of physical assets, equities, or bonds, rises with the inflation rate.

Is it possible with simplifying assumptions to distinguish an increase in the natural rate from an increase in the inflation rate? So far as market rates of interest are concerned, an increase in the natural rate or in inflation will have identical effects. Similarly, a natural rate increase will presumably bring about a capital boom, and an inflationary environment, and its price level effects may not be so readily distinguishable from an independent increase in the inflation rate resulting from accelerated monetary growth.

The most direct test of the two hypotheses would be to compare market rates relative to the natural rate, the SPC, or the real interest rates. While this test would be decisive, we cannot unfortunately, observe real rates of return directly. We may, however, estimate real interest rates if we are willing to assume that they may be approximated by the nominal bond yields in periods of stable prices. One specific approach is to assume that the market interest rate [on high-grade (riskless) debt instruments] prevailing over an extended period of reasonable price stability is the real rate of interest. A second approach generalizes this idea to apply to an economy experiencing inflation; this approach postulates that if the inflation rate is accelerating and if expectations are being revised, the market rate should equal the real rate of interest plus the expected inflation rate. Both of these notions are used in developing estimates of the real rate.

The Morgan Guaranty Bank, following the stable price level approach, has developed a method which produces a reasonably good approximation of actual market rates. Their method assumes that the real rate of interest is 3% when prices are stable. Long-term market rates, at any given time, are the sum of this basic 3% return plus an increment based on investors' expectations of future inflation. Chart 4 compares actual and calculated interest rates.26

The St. Louis Fed uses the expected inflation approach. Estimates of the real rate are obtained by regressing nominal interest rates on a number of variables. The deflated money stock and the output variables are used to determine the real rate, while current and lagged price changes are introduced as a measure of the long-term price expectation effect. Estimates of the real rate are obtained by subtracting the expected inflation variable from the nominal rate. The St. Louis estimates of the real interest rate have usually oscillated between 3% and 4%, except in a few recent months when they were slightly above 4%. See chart 5 for a comparison of nominal and real interest rates.27

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26 This assumption, that the real rate is normally around 3%, is rationalized as follows:

"It is interesting, however, that in the one extended period of price stability which we have so far enjoyed, prices tend to be much smaller in both directions, while the real long-term rate seems to be supported. The economic history of the last half of the nineteenth century in America shows that when the interest rate level has reached a certain level, and then dropped back to 3%, it has tended to decline as the period of price stability lengthened. What this suggests is that long-term interest rates at any given time are the product of two things: a basic return of something approximately three percent plus some additional percentage based on investors' expectations of future inflation." See R. P. Loge, "Inflation and Interest Rates: A Long-Run Observation," The Morgan Guaranty Survey, January 1976, page 7.

High Interest Rates and Inflation in the U.S.: Cause or Effect?

While these approaches do suggest that much of the interest rate rise since 1965 is due to inflation, this evidence is, by itself, not conclusive. Accordingly, we have to look for other factors that may enable us to discriminate between an increase in the natural rate and an increase in the inflation rate.\(^2\)

\(^2\) The expected rate of inflation is often estimated as a distributed lag function on past price changes, but this functional form may not be the proper vehicle to capture expectational influences. The expectational variable may not be properly specified to the extent that expectations operate with a threshold effect and require a filter. Considerably econometric experimentation with alternative formulations may be necessary in order to test these alternatives. For a critical analysis and review of several recent studies seeking to estimate the expected inflation rate and the inflation premium, see R. R. Rees, "Interest Rates on Monetary Assets and Commodity Price Index Changes," forthcoming in the Journal of Finance.
result, this characteristic should be common to all industries. On the other hand, if an increase in the natural rate is the cause of high interest rates, we may expect it to be somewhat selective, operating strongly in some industries, and possibly not at all in others. Similarly, if inflation is the cause and high interest rates the result, the interest rate escalation should tend to be world-wide. Excessive monetary growth in one country will spill over to other countries in a world of relatively fixed exchange rates. But if an increase in the natural rate is the cause of high interest rates, it is not so clear how rapidly this would be transmitted to other countries, and especially if the innovations tend to be embodied in the new equipment.

We conclude this discussion with a cautionary note. We have assumed a fully anticipated inflation to simplify the analysis because the effects of inflation will vary with the extent to which actual and expected inflation diverge. But if the public is not fully adjusted to the inflation, the range of outcomes is wider and depends on the degree of adjustment, and the analysis would have to allow for these possibilities.

IV. The Neo-Keynesian Model: Capital Boom, Tight Money, High Real Rates, and Inflation

Neo-Keynesians assume that an increase in money will typically lower interest rates, stimulate aggregate demand, and increase either output or prices, depending on the degree of slack in the economy. The Keynesian liquidity preference theory of interest rates does not emphasize the distinction between the nominal interest rates that are inflation responsive and the real interest rates that are (relatively) invariant to inflation and changing price expectations. It was natural, from this viewpoint, to appraise the post-1965 interest rate escalation as due primarily to an investment boom and a rise in the natural rate, or in the real rate of interest. Neo-Keynesians were, of course, puzzled by the fact that interest rates were rising sharply since 1965, at the very time when a rapidly growing money stock should have been driving them down. They rationalized the simultaneous occurrence of accelerated monetary growth and rising interest rates by inferring a sharp increase in the demand for funds.
for money which raised interest rates and more than offset the
liquidity effect of rapid money stock growth.30

A. Interest rates in the 1965-1969 period. — Neo-Keynesians
analyze the 1965-1969 interest rate rise as if it was primarily due
to a capital boom, an increase in investment demand relative to
savings. Market rates were rising in response to a rise in real
interest rates resulting from an increase in the natural rate of
interest. The natural rate may change because innovations raise
the real rate of return on investment, because budget deficits take
up funds that would otherwise be available for investment, or
because of changes in savings preferences. The natural rate may
rise because of an increase in the productivity of capital and in the
demand for investment, or because of a reduction in the supply of
savings available for private capital formation. The 200 basis point
rise in long rates in the 1965-1968 period was generally interpreted
as evidencing an investment boom, an increase in the return on
investment, and an associated increase in the demand for money.
The rise in the natural rate was seen as the propelling force in the
capital boom.

The 100 basis point rise in long rates in 1969 was also ratio-
nalized as due to a rise in real rates, but attributed to the tight
money policies — the sharp cutback in monetary growth in 1969.
Neo-Keynesians deemphasize the idea of an increasing inflation
premium and stress instead a rise in the real rate in rationalizing
the interest rate escalation: For in the 1965-1968 period, market
rates were rising because of an increase in the natural rate; for
the 1969 period, market rates were rising because of tight money.
Neo-Keynesians do not, of course, deny that market rates may rise
relative to real rates because of increasing premium for inflationary
expectations, but their analysis has tended nevertheless to stress
the rise in real interest rates.

30 R.M. Solow, “Recent Controversy on the Theory of Inflation: An Econo-
Mic View,” in E.W.债券 (ed.), Inflation, Its Causes, Consequences, and Control (New
York University, 1968); R.M. Solow, Price Expectations and the Behavior of the Price
Level (Manchester University Press, 1969). See also A. Okun, H. Freeman and M. Green,
Inflation, op. cit.; A. Okun, The Political Economy of Prosperity, op. cit.; G. Acska,
Strengthening World Inflation, op. cit.; and M. Laver (ed.), Containing Inflation in the
Environment of the 1970’s, op. cit.

Summing up, the neo-Keynesian interpretation of the 1965-1969
interest rate escalation is that it was due primarily to a rise in the
real rate of interest: In the 1965-1968 period, the real rate was
rising because there was an increase in the natural rate of interest
and an increased demand for money; in the 1969 period, the real
rate of interest was rising because of tight money.

B. The 1969-1970 recession. — It is a straightforward applica-
tion of neo-Keynesian theory to attribute a good deal of the
almost 200 basis points rise in short rates and the 100 basis points
rise in long rates, in 1969, to the very sharp deceleration in money
stock growth. This is a natural application of their liquidity prefer-
ce theory, and has much to commend it as an explanation for
much of the 1969 rise in interest rates.

Restrictive monetary policy does not however explain why long
rates continued to rise after the economy peaked in 1969, and why
they did not drop significantly for the first eight months of the
1969-1970 recession. Some of the 1970 rise in long rates may be
attributed to special circumstances such as the Cambodian incursion
and the Penn Central crisis. But neo-Keynesians still need to
introduce a variable, similar to inflationary expectations, to explain
why long rates continued to rise in the period November 1969-
July 1970, the first eight months of the recession. Once we introduce
the expected inflation rate as an independent influence on market
rates, it is also necessary to distinguish between nominal and real
rates; and this distinction does require some modifications of the
standard neo-Keynesian analysis.31

Neo-Keynesians, in common with others, also need to explain
several other distinguishing features in the 1969-1970 recession
interest rate movements.

C. Interest rates in the recovery. — How do neo-Keynesians
rationalize the extraordinary (over) 400 basis points decline in short
rates and 200 basis points decline in long rates in 1970(1) and
1971(1) — the first two recovery periods?

31 For recent discussion, see R.L. Gordon, “The Recent Acceleration of Inflation
and Its Lessons for the Future,” Brookings Papers on Economic Activity, 1970(1); G.
Activity, 1970(1); and M. Laver (ed.), Containing Inflation in the Environment of the 1970’s,
op. cit.
Acceleration (deceleration) of money growth should lower (raise) interest rates. Neo-Keynesians could therefore point to rapid monetary growth starting in February 1970 and the liquidity effect to rationalize the dramatic interest rate decline in 1970-1971 and especially in the first two quarters of economic recovery.

But there is nevertheless a remaining problem to explain why long rates did not begin falling until 1970Q4 and why interest rates began climbing again at the end of 1971Q1. Monetary growth in the first six months of 1971 was very high, averaging 11.6%. Although the economy was beginning to recover, there was still considerable slack in the economy, evidenced by an over-$60 billion gap between potential and actual output and a 6% unemployment rate. This substantial degree of slack in the economy should have exerted a depressing influence on interest rates, and it is not clear what factors generated this sharp increase in rates, given that the recovery was so mild.

Neo-Keynesians may again introduce inflationary expectations and changes in the inflation premium as a factor causing market interest rates to rise in the face of a weak economy and a strong liquidity effect. But this would also mean that the 11.7% monetary growth rate in 1971Q2 may have been counterproductive—that the induced price expectations effect was strong enough to cause interest rates to rise, offsetting both an income effect and liquidity effect operating to lower them.

D. Stock prices. — The 1969-1970 decline in stock market prices is consistent with, and seems to support, the neo-Keynesian view that the real rate of interest (i.e., the supply price of capital) was rising in 1969. Indeed, the neo-Keynesian hypothesis that the 1969 rise in market rates reflected a rise in real rates of interest provides a unified explanation for the observed 1969-1970 decline in bond and stock prices. In contrast, the monetarist hypothesis that market interest rates were rising relative to real rates cannot explain the stock price decline without introducing additional assumptions.32

E. Summary. Several factors do not fit the neo-Keynesian model. An increase in the natural rate should be associated with a permanent increase in the rate of investment, but this evidence must make some allowance for the retarding effect of the economic slowdown and recession. The productivity shortfall and the corporate profit squeeze in the latter half of the sixties would also seem to argue against an increase in the natural rate as the propelling factor in the boom.33 Prices of existing and new assets

32 James Tobin, in an unpublished note, showed that the market valuation of capital fell relative to its replacement cost, from 1.96 to 1.96 in June 1970. He interprets this as a measure of the increasing cost of capital, and a reflection of the 1969-1970 rise in the real rate of interest.

do not provide the evidence of an increase in the natural rate, if we assume that innovations tend to be embodied. It would be reasonable to expect evidence of remarkable innovations and technological advances in particular industries, if there was a significant increase in the natural rate. Finally, the fact that the interest rate rise was a world-wide phenomenon would also suggest that inflation, rather than an increase in the natural rate, was the cause.

V. The Monetarist Scenario: Easy Money, Inflationary Expectations, Tight Credit and High Nominal Rates

Monetarists postulate a causal sequence leading from money to prices, from unanticipated inflation to expected inflation, and from rising interest rates to high interest rates. They highlight the expected inflation rate as an independent influence on market rates, and distinguish between nominal and real interest rates. A positive association between money and interest rates emerges when the feedback effects of monetary growth (including price expectations) offset the initial negative liquidity effect. The interest rate relation to changing price expectations is highlighted in the Fisherian distinction between rising interest rates — the market response to an accelerating inflation rate — and high interest rates — the market effects of a fully anticipated inflation.

The Fisherian model, starting with excessive monetary growth and leading up to inflation and high rates, can rationalize the substantial rise in interest rates since 1965 without introducing a prior increase in investment demand, an increased demand for money, and a concomitant rise in real interest rates. The Fisherian theory emphasizes accelerated monetary growth, accelerating inflation, and inflationary expectations. Market rates rise relative to real rates when the public expects an increase in the inflation rate; and the interest rate rise since 1965 is therefore interpreted as incorporating an increasing premium for the expected rate of inflation. Following this approach, the market rate may be decomposed into a real rate and an inflation premium.34

The Fisherian script of market rates rising with inflation and in response to accelerated monetary growth seems capable of explaining much of the interest rate escalation since 1965. There is no need to postulate any independent, and substantial, rise in real rates to explain the observed rise in market interest rates. Whether this is a source of strength or a weakness in the monetarist theory will be taken up in this section.35

A. Interest rates in the 1965-1969 period. — The rise in long-term rates on new issues — from 4.5% in mid-1965 to 7.05% in December 1968 and to 8% in October 1969 — conforms very nearly


to the monetarist theory linking market rates with inflation. After six years of moderate but steady growth, in which prices were rising at a 1.6% rate, the economy reached full-employment in 1965. But with the beginning of the Vietnam build-up in 1965, severe excess demand pressure developed quickly. Federal expenditures accelerated sharply and the budget deficit grew progressively larger, reaching a total in excess of $25 billion in fiscal 1968. Spending grew at an 8.2% annual rate from early 1965 to mid-1969, far in excess of the growth in potential output, which was increasing at approximately 4%. As a result, prices, which were rising at a trend rate of 1.6% annually in the early 1960's, started rising at a 3% rate from mid-1965 to mid-1967, a 4% rate over the next year, and then at almost a 5% rate to mid-1969. In four years the rate of price increase had more than tripled and apparently became a major factor in economic decision-making.

While the monetarist theory can explain the 1969-1968 interest rate rise in terms of inflation, it needs to allow for the effect of the restrictive money policy, introduced at the end of 1968, on the 1969 interest rate rise. Some part of the 1969 rise in both short- and long-term rates was due, without question, to tight money and a temporary liquidity effect. Monetary growth was reduced from an 8% rate in the second half of 1968 to a 4.3% rate in the first half of 1969, and further reduced to a 2% rate in the second half of 1969. The effect of monetary deceleration in raising interest rates is, of course, emphasized by the neo-Keynesians.

B. The 1969-1970 recession. — Monetarists emphasize the spreading and deepening inflationary expectations to explain why interest rates, especially long rates, continued to rise in the 1969-1970 recession. Inflationary expectations spread when the public begins to doubt the government’s ability to implement an effective stabilization policy that will successfully curtail the inflationary pressures. As a rise in the expected inflation rate spreads and takes root, it raises the required inflation premium on fixed claim assets denominated in nominal units and the market rate of interest. The monetarist rationalization of rising and high interest rates in the 1969-1970 recession stresses the increase in inflationary expectations.

One feature of the recession experience which lends credence to the monetarist theory is that almost all the interest rates and the inflation rate forecasts for 1969 and 1970 have turned out too low. To the monetarists, these price level and interest rate predictions during the economic slowdown are two manifestations of a common error: the failure to forecast the increase in the expected inflation rate and the implied increase in required inflation premium. Monetarists therefore suggest (i) that most forecasters failed to allow sufficiently for the increase in the inflation premium in the 1969-1970 recession: hence the underprediction of interest rates and inflation; (ii) that a considerable part of the recession increase in corporate Aaa rates was due to this increase in the expected inflation rate; (ii) that this rise in the inflation premium was, in large measure, due to a loss in confidence in the government's ability to curtail inflation.

While monetarists highlight the important role of changes in the inflation premium, they must also acknowledge that some part of the spring, 1970 rise in rates was possibly due to special factors such as Cambodia and the Penn Central liquidity crisis. The expectation-induced attempts to explain why long rates continued to rise for some eight months after the recession started.

C. Interest rates in the recovery. — The decline in long rates in 1970(4) and in 1971(1) averaged close to 200 basis points, while short-term rates fell approximately 400 basis points. This spectacular interest rate decline is especially remarkable coming as it did in the first two quarters of economic recovery.

Monetarists rationalize this decline in interest rates by suggesting that a reduction in the expected inflation rate may have been occurring, for the first time in several years, to bring interest rates down. The economic slowdown in 1970 and the General Motors strike in the fourth quarter may have had a considerable impact in cooling down inflationary expectations. The looking-

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across-the-valley syndrome was being replaced by an extremely pessimistic outlook, both among businessmen and consumers.

In addition, the rapid growth in the monetary aggregates which started in February 1970 was undoubtedly beginning to exert downward pressure on market interest rates through the liquidity effect. We have noted the stickiness of long-term rates in the first three quarters of 1970. And we have suggested that the monetary growth effect may have been cancelled by an apparent increase in the expected inflation rate and by other special factors (the Penn Central crisis and the Cambodian incursion) in the first half of 1970. Inflationary expectations may have been toned down considerably by the fourth quarter of 1970. The short-term liquidity effect was being reinforced by "recessionary expectations" in pushing interest rates down; and these two factors may have been working in conjunction — for the first time since 1965 — to bring interest rates down.

On the other hand, the substantial rise in interest rates from March-August 1971 may suggest a possible reemergence of inflationary expectations. The very high rates of monetary growth in the first half of 1971 may have been counterproductive, rekindling inflationary expectations among money market experts who developed a heightened sensitivity to monetary growth rates. The interest rate rise from March-August 1971 suggests that the liquidity effects of monetary growth may have been offset, once again, by an increase in the expected inflation rate.

D. Stock prices. — The monetarist explanation of the interest rates rise does not, by itself, account for the simultaneous sharp decline (between 25%-35%) of stock prices in 1969-1970. An increase in the expected inflation rate need not, other things equal, cause any decline in equity prices. Although a higher rate of inflation may raise the rate of interest for discounting earnings, it will also raise estimated unlevered earnings by the same amount (by the expected rate of inflation) so that share prices should not be affected.

The 1969-1970 bond market inflationary expectations need to be reconciled with the expectations that were depressing stock prices. The sharp escalation of interest rates in the bond market seemed to suggest that the public expected a continuation of inflation because it was doubtful of the government's ability to curtail inflation. On the other hand, the stock market expectations seemed to suggest that the government's anti-inflationary policies would succeed and presumably dampen corporate earnings prospects. The rationalization of the 1969-1970 interest rate rise in terms of the expected inflation rate does not account for the sharp decline in the stock market.

The monetarist theory thus needs to explain both the 30% decline in the stock market from early 1969 to mid-1970. It also needs to account for the almost complete recovery from mid-1970 to April 1971. Indeed, the stock market rise in the early months of 1971 is especially puzzling in the face of declines in inventories and industrial production and the sluggish recovery.

A recent study of the stock market points out that in the first half of the 1969's stock prices rose by approximately 50%, while profits rose by 34%, and interest rates declined by approximately 3%; in the second half of the 1969's stock prices were almost constant, profits rose by a mere 8%, but interest rates jumped a whopping 8%. This analysis suggests that the post-1969 inflation in the United States was not a favorable influence on profits and that a rise in the expected inflation rate and in interest rates may therefore have depressed stock prices. While inflationary expectations may raise projections of expected gross revenues in nominal terms, they also tend to raise projections of costs relative to prices, and corporate profit projections in real terms may decline. It would appear that the post-1969 inflation may have had a stronger effect in raising interest rates than in raising expected earnings. The net effect would be to cause a reduction in stock prices.37

See M. W. Kraak, "Expectation, Money, and the Stock Market", Review, Federal Reserve Bank of St. Louis January 1971. An increase in the expected rate of inflation can lead market rates to rise need not necessarily cause any decline in equity prices. Of course, if the increase in the expected inflation rate occurred at a time when corporate profits looked poor, it would not be surprising to observe a sharp decline in the stock prices. But this explanation assumes pessimistic corporate profits expectations; the monetarist theory which thus explains the interest rate rise in terms of inflationary expectations cannot explain the stock market decline without invoking an assumption of pessimistic profit expectations.

E. Summary. The monetarist theory highlights two factors in explaining interest rate movements in the post-1965 inflation: the first is inflationary expectations and the expected inflation rate, a factor causing market interest rates to rise during most of the period; the second is monetary acceleration (deceleration), the short-term liquidity effect which may lower (raise) market interest rates. These two influences were offsetting each other in 1965-1968 and in 1970, but the expectations effect appeared to be the dominant one, and hence the escalation of interest rates. But when the expectations and the liquidity effect were working together either to raise interest rates, as in 1969, or to lower them, as in 1970-1971, the effects were indeed dramatic. Finally, the 1969-1970 decline in real activity may have been an additional factor tending to lower interest rates in 1970-1971.

Several factors appear to support the monetarist view that nominal rates were rising relative to real rates in the transition from unanticipated inflation to expected inflation. The 1971 slowdown in the rate of investment suggests an inflation-induced rise in interest rates, but this evidence is not decisive since we have to make some allowance for any independent retarding effect on investment due to the economic slowdown and recession. The productivity shortfall and the corporate profits squeeze would seem to argue against an increase in the natural rate and for an inflation-induced increase in nominal rates relative to real rates. Prices of existing assets do not appear to have fallen relative to new assets as would be expected if innovations are typically embodied. A substantial increase in the natural rate should manifest itself in some remarkable technological advances, at least in particular industries. Finally, the fact that the interest rate rise was world-wide also seems to support the monetarist view that inflation was the cause of high interest rates the result.

VI. Conclusion

In this paper we review the dramatic bond price decline in the latter half of the 1960's, and summarize the real and nominalist theories relating accelerating inflation and escalating interest rates. The real theory, derived from the neo-Keynesian paradigm, focuses on a capital boom and rising investment demand, and views a rise in the real rate of interest as the cause of inflation. The nominalist theory, derived from the monetarist paradigm, focuses on excessive monetary growth and accelerating inflation, and views inflationary expectations as the cause of rising interest rates.

Neo-Keynesians explain the interest rate rise in terms of an increase in the natural rate and rising real interest rates. Real rates change as a result of changes in the natural rate and in the demand for money, or as a result of money supply changes. While neo-Keynesians may also allow some independent influence for inflationary expectations in order to explain a particular rise in market rates, their overall view is that a rise in the real rate of interest is the cause and inflation is the result.

Monetarists, Fisherians, quantity theorists stress the impact of inflationary expectations on interest rates and distinguish between the nominal and real rates. The interest rate climb since 1965 is viewed largely as a rise in nominal rates relative to real rates. While monetarists acknowledge that the liquidity effect and the income effect may independently change real rates for limited, or possibly longer, periods of time, their overall view is that inflation is the cause and a rise in market rates is the result.

While the two theories use the same building blocks, a liquidity effect, an income effect, and a price expectation effect, they do differ in their analysis of the economy. The neo-Keynesians stress a change in the real rates as the cause and accelerating inflation as the result, while the monetarists stress inflationary expectations as the cause and nominal rates rising relative to real rates as the result.

To highlight the differences between the neo-Keynesian (real) and monetarist (nominalist) interpretations of the accelerating inflation and the escalating interest rates since 1965, we focus on the following three distinct periods: an initial period from 1965(2) to 1968(4), a second period from 1969(1) to 1970(3), and the third period from 1970(4) to the present time.
Reflections on New Currency Solutions

The Washington Agreement

1. The Washington agreement of last December achieved an important result in one respect: through an adequate realignment of major currencies it corrected the overvaluation of the dollar, thus setting in motion a process of reabsorption of the fundamental disequilibrium between the U.S. and its main trading partners, to be completed in two years or so.

The main elements of the agreement are the following:

(a) an average weighted evaluation of the main currencies vis-à-vis the U.S. dollar of the order of magnitude of 10-11 per cent, capable of producing in due course a reversal of the current account balance of the United States of 9-10 billion dollars;

(b) the establishment of a temporary regime under which a member would declare to the International Monetary Fund a new par value or a "central rate" and would be allowed a fluctuation of its currency within margins of 2.25 per cent on either side of the new effective basic parity relationship with the intervention currency. The intervention currency is the currency, normally the dollar, that a monetary authority stands ready to buy or sell in order to perform its obligations regarding exchange stability;

(c) the undertaking by the United States to propose to Congress a devaluation of the dollar in terms of gold to 38 dollars an ounce as soon as the results of the trade negotiations with the EEC, Canada and Japan on short-term issues are available for Congressional scrutiny. In compliance with this undertaking the United States Government has presented on February 9 last a devaluation Bill to Congress, which will presumably act in conformity during the month of March;

(d) the removal by the United States of the 10 per cent. surcharge and of the related provisions of the so-called "Job Development Credit".

Detroit

DANIEL F. FAND

The interest rate rise in the first period 1965(2) to 1968(4) cannot be attributed simply to a tight money liquidity effect, since money was growing at an accelerating rate. Neo-Keynesians therefore postulate an increase in the natural rate, which more than offset the rapid monetary growth, while monetarists attribute the rise in market rates to inflationary expectations. A good deal of the interest rate rise in the second period 1969(1) to 1970(3), and especially in 1969, is due to the substantial deceleration in monetary growth, as emphasized by the neo-Keynesians, but reinforced by an increase in the expected inflation rate, the variable stressed by the monetarists. Moreover, the exceptional influence must be substantial in order to explain why long rates did not decline in the first eight months of the recession even after monetary growth was resumed in February 1970. The interest rate decline in the third period, starting in 1970(4), dramatizes a strong liquidity effect operating to reduce interest rates. But while the easy money liquidity effect may have been sufficiently strong to bring about the extraordinary rate declines in 1970(4) and 1974(1), it does not account for the interest rate rise in 1972(2) and 1973(3) — up until the time that Nixon reversed his course and announced the NEP on August 15. The April-August 1971 and post-NEP capital market developments illustrate the independent, and significant, influence of inflationary expectations on interest rates.

The interest rate movements from 1965(2) to 1968(4) appear to be dominated by inflationary expectation, the variable emphasized by the monetarists, while the 1969 and early 1970 bond yield and stock price behavior appear to be dominated by a liquidity effect, the variable stressed by the neo-Keynesians. The interest rate and stock price movements since 1970(4) dramatize strong liquidity and expectation effects, but do not fit precisely either one of the two theories. On balance, the interest rate escalation since 1965 appears more readily adaptable to a monetarist scenario of accelerated monetary growth, accelerating inflation, inflationary expectations, and of market rates rising relative to real rates.

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The Washington Agreement

1. The Washington agreement of last December achieved an important result in one respect: through an adequate realignment of major currencies it corrected the overvaluation of the dollar, thus setting in motion a process of reabsorption of the fundamental disequilibrium between the U.S. and its main trading partners, to be completed in two years or so.

The main elements of the agreement are the following:

(a) an average weighted evaluation of the main currencies vis-à-vis the U.S. dollar of the order of magnitude of 10-11 per cent, capable of producing in due course a reversal of the current account balance of the United States of 9-10 billion dollars;

(b) the establishment of a temporary regime under which a member would declare to the International Monetary Fund a new par value or a "central rate" and would be allowed a fluctuation of its currency within margins of 2.25 per cent on either side of the new effective basic parity relationship with the intervention currency. The intervention currency is the currency, normally the dollar, that a monetary authority stands ready to buy or sell in order to perform its obligations regarding exchange stability;

(c) the undertaking by the United States to propose to Congress a devaluation of the dollar in terms of gold to 38 dollars an ounce as soon as the results of the trade negotiations with the EEC, Canada and Japan on short-term issues are available for Congressional scrutiny. In compliance with this undertaking the United States Government has presented on February 9 last a devaluation Bill to Congress, which will presumably act in conformity during the month of March;

(d) the removal by the United States of the 10 per cent. surcharge and of the related provisions of the so-called "Job Development Credit".

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