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 — 1965(2) — both short-term (4-6 month) commercial paper and (high-grade) long-term corporates averaged approximately 4½%; three and a half years later — in 1968(4) — 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 1969-1970 highs for short- and long-term rates were more than double their 1965 level, and long rates in 1970(2) 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(4). 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.[1]

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 *result.* 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 *result.*

We shall proceed as follows: The interest rate developments in the 1960's, in the 1969-1970 recession, and since the 1970(4) 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), thte natural rate (Wicksell), the real rate (Fisher), or the supply price of capital (Tobin). For a discussion of these real rates, see D. I. Fand, "Keynesian Monetary Theories, Stabilization Policies, and the Recent Inflation", in *Journal of Money, Credit and Banking,* August 1969.

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 below.

inflation rate are analyzed in section III. The neo-Keynesian model of capital boom, tight money, and high real rates and inflation is elaborated in section IV. The monetarist scenario of easy money, inflationary expectations, tight credit, and high nominal rates is developed in section V; our conclusions are presented in section VI.

I. 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 1

SUMMARY OF MAJOR YIELD PEAKS AND TROUGHS OF HIGH-GRADE LONG-TERM BONDS, 1965-1971

	Governments %	Corporates (New Issues) %	Prime Municipals %
1/65	4.24	4.45	3.20
9/66	5.06	6.15	4.25
11-12/67	5.75	6.65	4.30
8/68	5.10	6.25	4.05
6/70	7.59	9.40	7.00
3/71	5.74	6.95	5.10
8/13/71 [1]	6.25	8.15	5.95
12/29/71	5.95	7.30	5.00

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

Source: S. Homer, R. Johannesen, J. J. McKeon, *Annual Review of the Bond Market, 1970* (Salomon Bros., 1971). H. Kaufman and R. Johannesen, *1971 Annual Review of the Bond Market* (Salomon Bros., 1972).

review of the stock market developments in the 1969-1970 recession and the subsequent recovery.

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 495 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%.[2]

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 4.25% 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.

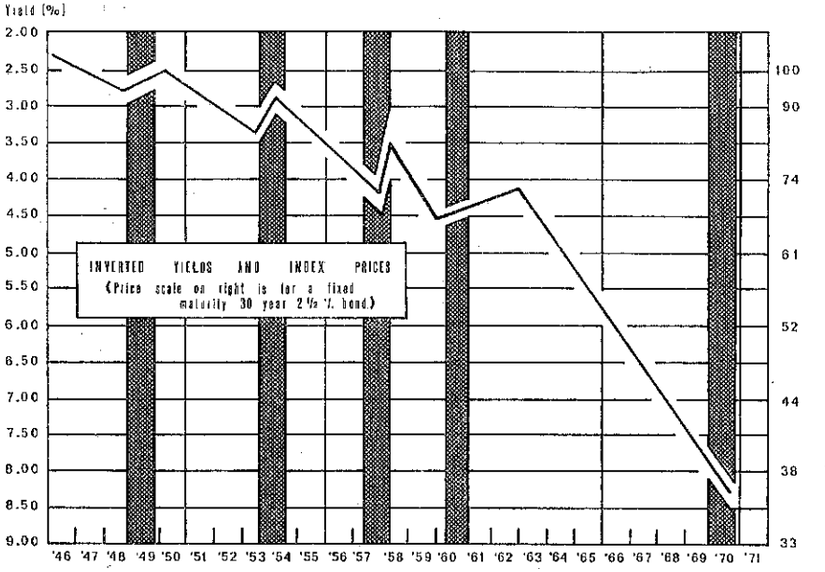
The 1965-1970 rise in long rates may be viewed as an extension of a bond price decline starting in 1963; and, pursuing this line of thought, the 1963-1970 bond price decline may, in turn, be viewed as a continuation of the major secular interest rate rise starting some 25 years ago, at the end of World War II. Bond yields in 1946 fell to historic lows, with corporates 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.[3] The cyclical yield fluctuations for the period 1946-1970 are shown in chart 1.

2 This interest rate rise was a world-wide phenomenon, as bond yields reached record-high levels in the latter half of the 1960's. This extraordinary escalation of long rates was particularly sharp in the U.S., in the U.K., and in other Western European countries. See S. Homer and R.I. Johannesen, *The Price of Money 1946-1969* (Rutgers University Press, 1969); J.R. Hicks, "Inflation and Interest", *This Review*, September 1970, J.R. Hicks, "Expected Inflation", *The Three Banks Review*, September 1970; and P. Volcker, "World Inflation and the International Payments System", in M. Levy (ed.), *Containing Inflation in the Environment of the 1970's* (The Conference Board, 1971).

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.

Chart 1

PRIME LONG CORPORATE BONDS SINCE 1949



Source: H. Kaufman and R.I. Johannesen, *1971 Annual Review of the Bond Market.*

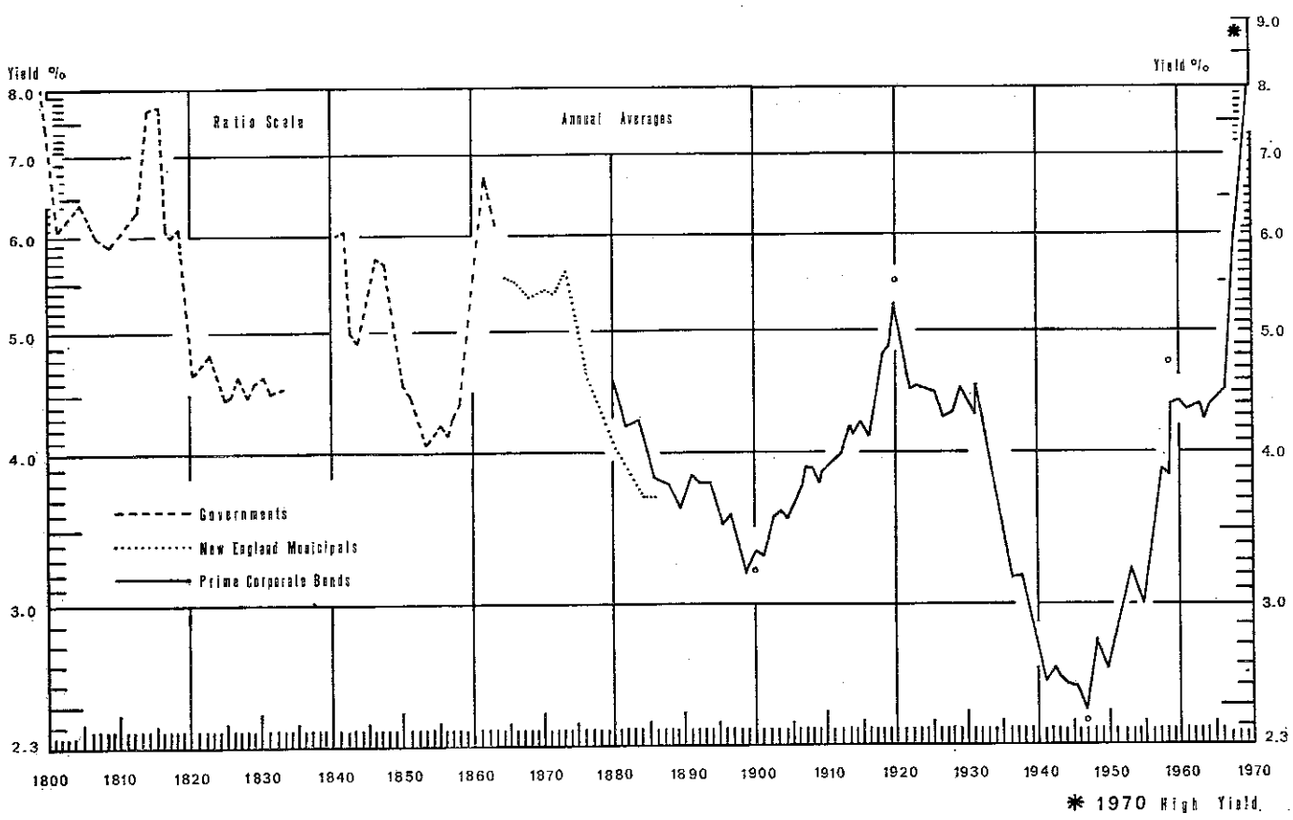
This chart of postwar yields also suggests that the successive bond market rallies have been weaker, and briefer, than the preceding rally, while the successive declines have been steeper, and of longer duration. Indeed, the 1963-1970 bond price decline is by far the most severe, and the longest, of the postwar cyclical declines.[4]

American long-term rates since 1800, shown in chart 2, show a succession of longer-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 1967. Bond yields continued rising after 1967, 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

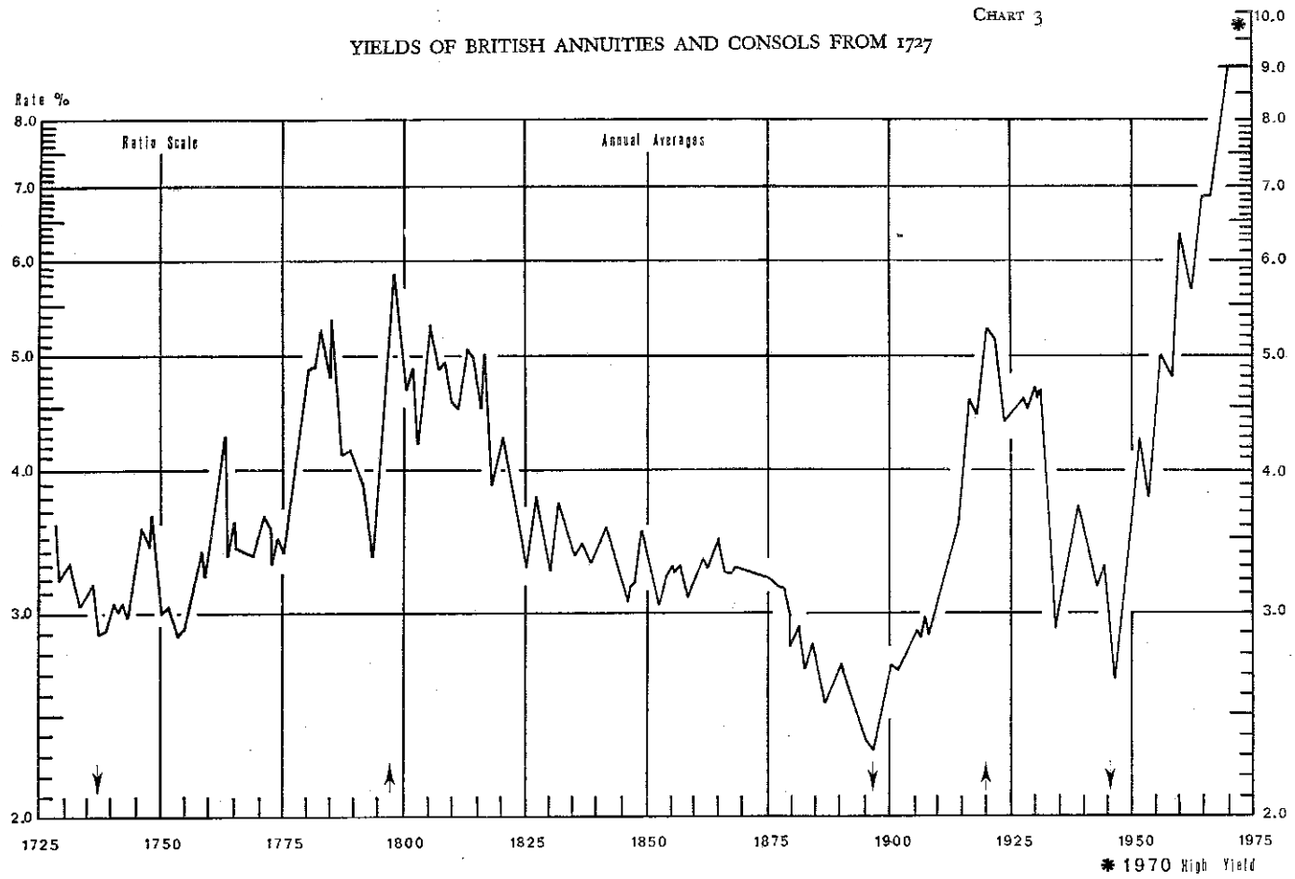
CHART 2



Source: S. HOMER and R.I. JOHANNESEN, *The Price of Money 1946-1969.*

CHART 3

YIELDS OF BRITISH ANNUITIES AND CONSOLS FROM 1727



Source: S. HOMER and R.I. JOHANNESEN, *The Price of Money 1946-1969.*

Viewed in this long-term historical perspective, the 1946-1970 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 1951 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 1952-1963 period, except for 1959 when it increased to 3.5%.[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 1965(4), to a 3.9% rate for the period 1965(4) to 1969(2), and to a staggering 5.1% rate for the period 1969(2) to 1971(3). 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]

5 The 3.9% and 4.2% money stock increases in 1964 and 1965 are the largest increases in the entire period 1952-1965.

6 For an analysis of the 1960's interest rate escalation, see M. Friedman, "Factors Affecting the Level of Interest Rates", in *Savings and Residential Financing 1968 Conference Proceedings* (Chicago, 1968); H. C. Wallich, "Fiscalists vs Monetarists", *Financial Analysts Journal*, September-October 1970; A. M. Okun, *The Political Economy of Prosperity* (Brookings, 1970); J. R. Hicks, "Expected Inflation", *op. cit.*; J. R. Hicks, "Inflation and Interest", *op. cit.*; D. I. Fand, "Monetarism and Fiscalism", *This Review*, September 1970, and D. I. Fand, "The 1969-1970 Slowdown", *Financial Analysts Journal*, February 1971. See also the papers by R. Eisner, W. E. Gibson, T. Sargent, W. Yohe and D. Karnosky in W. Gibson and G. G. Kaufman (eds.), *Monetary Economics* (McGraw Hill, 1971).

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 FRB 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.

7 See A. M. Wojnilower, "Can Capital-Market Controls be Avoided in the 1970's", in *Containing Inflation in the Environment of the 1970's, op. cit.* The National City Bank, in its *Monthly Economic Letter* for November 1970, described he 1969-1970 recession interest rate movements in the following terms:

"In the long-term market, rate spreads continue to be abnormal. Corporate bond rates have not receded enough to open up any meaningful spread in favor of mortgage rates. Thus, institutional investors still have little direct incentive to acquire mortgages 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 followers alike insist 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.

	November 1969 %	July 1970 %
Corporate bonds	8.85	9.40
Municipal bonds	6.70	7.12

— 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 15, 1971, when President Nixon announced his NEP, and for December 29, 1971.

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

YIELDS ON SELECTED INTEREST RATES

	1970 Peak %	1971 Low %	Aug. 13, 1971 %	Dec. 29, 1971 %
Short-term				
Treasury bills	8.12 [1]	3.24	5.14	3.74
Commercial paper . . .	9.25 [1]	4.00	5.88	4.50
Long-term				
Aa corporate bonds . . .	9.40	6.95	8.15	7.30
Municipal bonds	7.12	5.10	5.95	5.00

1 Dec. 1969.

— 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(2), when money was growing at an extraordinary 10% rate and the substantial post-NEP interest rate decline occurring when money was flat, may suggest that expectational 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

May 29, 1970, to over 103 in April of 1971, very close to the December 1968 peak of 106.[8] The index fell from 103 in April to 97 in August, and to 93 in November, before staging a sharp comeback in December.

The stock price movements in the 1969-1970 recession and in the subsequent recovery are of interest for two reasons: first, the magnitude of these movements and their potential impact on the economy are sufficiently large to justify analysis; second, since stock prices should respond differently to changes in inflation and to changes in real rates, an analysis of stock price movements may shed some light on the relative magnitudes of these two forces affecting market interest rates. Our review of stock prices will therefore focus on the following:[9]

— the 30% stock price decline from May 1969 to June 1970;

— the remarkable recovery from June 1970 to April 1971;

— the slump from April to November 1971, and the subsequent recovery of stock prices in December.

We shall also consider how an increase in the expected inflation rate may affect corporate profit projections and stock prices, and compare these effects with those that would follow from an increase in the real rate of return on investment.

II. Real and Nominalist Theories of Inflation and Interest Rates

We have two competing theories to explain the interest rate escalation since 1965, one emphasizing real forces, the other, changes in nominal values. The real approach highlights a capital boom, rising investment demand, and focuses on a succession of events starting with the Vietnam escalation, the budget deficits, and the

8 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 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 action affects security prices, see B. W. Sprinkel, *Money and Markets* (Irwin, 1971).

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 2.4% in 1965 to 15.6% in 1967, to 13.8% in 1968; it declined to —4.0% in 1969, and rose again to 14% in 1970.[11] Private and public borrowing, as a share of the GNP, increased from 9% in 1965 to

10 John M. Mason, "Behavior of Interest Rates During Economic Slowdowns", *Economic Commentary*, Federal Reserve Bank of Cleveland, November 2, 1970, discusses the factors most often cited to explain the stickiness 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.

almost 11% in 1968 and has declined since 1969 to approximately 9%. Because many demands for funds were not met or were financed in short-term markets, there was continuous upward pressure on interest rates; and if any substantial yield reduction did temporarily emerge, it would elicit a flood of new corporate and municipal offerings. The very elastic demand for funds prevented any significant decline in long rates, even when the economy slumped in the 1969-1970 recession.[12]

The continuing rise in plant and equipment expenditures is a second explanation for the interest rate hike prior to, and during, the 1969-1970 recession. The 1964 tax cut, the Vietnam escalation, and a booming economy induced business to sharply expand its capital equipment. Gross private domestic investment climbed sharply from approximately $94.0 billion in 1964 to $126.5 billion in 1968, and to $139.8 billion in 1969, even when the slowdown was clearly evident. Apparently many corporations were anticipating only a short adjustment and a mild pause, and because they were "looking across the valley" did not scale down their 1969-1970 capital expenditure plans significantly. Moreover, some corporations were seeking to add new labor-saving plant and equipment in order to offset sharply rising labor costs and in order to regain their declining profit share. In any event, corporate plant and equipment expenditures rose from $54.8 billion in 1965 to $69.7 billion in 1968, and continued to rise to $78.4 billion in 1969 and to $81.6 billion in 1970. The large, and growing, corporate demand for investment funds is held to be a key factor for rising interest rates until 1969 and for their failure to come down in a lagging economy.[13]

The emerging liquidity squeeze is a third factor cited to explain why interest rates, especially long rates, did not decline in 1969 and in the first half of 1970. Widespread concern about corporate liquidity developed in 1969 and 1970 as the evidence of financial imbalances emerged. Although corporate fixed investment

12 See A. Okun, H. Fowler and M. Gilbert, *Inflation* (New York University, 1970); A. Okun, *The Political Economy of Prosperity, op. cit.*; G. Ackley, *Stemming World Inflation* (The Atlantic Institute, 1971); O. Eckstein and R. Brinner, *The Inflation Process in the United States*, A Joint Economic Committee Study (Washington, 1972).

13 For a recent study, see B. Bosworth, "Patterns of Corporate Financing", *Brookings Papers on Economic Activity*, 1971(2). *See also* V.G. Massaro, "Is the Liquidity Squeeze Over?", *The Conference Record*, July 1971.

increased from $69.9 billion in 1968 to $79.8 billion in 1969, bond financing declined by over $2 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 cause 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

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 restructuring of corporate debt. It is of interest to note that gross private investment has fallen sharply from a 15% expansion rate in 1967(2) to 1968(2), to a 10% rate in 1968(2) to 1969(3), and to a 4.9% rate of *decline* in 1969(3) 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 $7.8 billion and net new stock issues rose by $2.3 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 H. Kaufman and J. McKeon, *Supply and Demand for Credit in 1972* (Salomon Bros., 1972).

rates. And, unlike the real theories, it also implies that market rates will decline only when we succeed in curtailing 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,

15 See M. Friedman, *Dollars and Deficits* (Prentice Hall, 1968); D.I. Fand, "A Monetary Interpretation of the Post-1965 Inflation in the U.S.", *This Review*, June 1969; B.W. Sprinkel, *Money and Markets, op. cit.;* L.C. Andersen, "A Monetarist View of Demand Management: The United States Experience", *Review* Federal Reserve Bank of St. Louis, September 1971; A.J. Meig, *Money Matters* (Harper & Row, 1972).

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 real 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.[16]

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

16 For definition of the *natural rate*, the *real rate*, and the *SPC*, see K. Wicksell, *Interest and Prices* (MacMillan, 1936); J.M. Keynes, *A Treatise on Money* (MacMillan, 1930); I. Fisher, *Appreciation and Interest* (MacMillan, 1896), and J. Tobin, "Money, Capital, and Other Stores of Value", *American Economic Review*, May 1961, and "An Essay on the Principles of Debt Management" in *Fiscal and Debt Management Policies* (Prentice Hall, 1963).

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

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.

stream of services in perpetuity, and there is no problem of maintenance, depreciation, or obsolescence. The $8 yield on this capital asset now has a market value of $8.40; and the machine which formerly sold for $200 now has a $210 price tag. The dollar return on the asset is $18.40, consisting of $8.40 in service yield and

TABLE 2

A COMPARISON OF NOMINAL AND REAL RATES OF RETURN IN THREE REGIMES

(No debt financing permitted)

	Rate of return in a regime of			
	Stable prices	A fully anticipated 5% inflation	An increase of 5.2 percentage points (520 basis points) in the natural rate	
			Existing Machines	New Machines
Price of new or existing machine	$200	$200	$87	$200
Dollar return on new or existing machine	$8	$8.40 [1] + 10.00 = $18.40	$8	$18.40
(Implicit) nominal rate of interest	4%	9.2%	9.2%	9.2%
Natural rate of interest	4%	4.0% [2]	9.2%	9.2%
Real rate of interest	4%	4.0% [2]	9.2%	9.2%
Supply price of capital, the real rate of return on $100 in equity	4%	4.0% [2]	9.2%	9.2%
Equity prices	$200	$200	$87	$200

1 $10.00 is the capital gain on the asset.

2 Let r = real rate, i = inflation rate, and n = nominal rate,

$$\text{then } r = \frac{n - i}{1 + i}$$

$10 in capital gain, and the implicit nominal rate of return on these machines is therefore 9.2%. On the other hand, the natural rate of interest is still only 4%, since the $8.40 yield is 4% return on a machine which now has a replacement cost — and a value — of $210; and the real rate of interest and the SPC are, similarly,

equal to 4%.[18] (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%.[19] The dollar return on a new machine will also rise to $18.40, but in this case both nominal and real rates will rise to 9.2%. Since the yield on existing machines remains at $8 and since the return on investment on new machines is now 9.2%, 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

18 In two years the annual yield will rise to $8.82 and the machine price will rise to $220.50, so that the real return on the machine is still 4%, and similarly for subsequent years.

19 We are comparing a 5% inflation rate and an "equivalent" rise in the natural rate, both causing the same observable increases in nominal interest rates. The natural rate may rise either because innovations are raising the productivity of capital or because there is a relative shrinkage of savings and only the most productive investments can be financed. If the natural rate is rising because of technological advance, it should be associated with a capital boom; but if the natural rate is rising because of a shortage of savings, it should be associated with a slowdown, and deceleration, in investment expenditures. We assume, in our discussion, that the natural rate is rising because of innovations embodied in new equipment, since it is intended to rationalize the capital boom of the 1960's.

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 $36.8.[22] 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 levered equity.

21 While the *ex-post* 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 3% real rate of interest and a 5.15% inflation premium.

prices rise from 100 to 150.[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 (520 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 3% to 8.2%, and bond prices will fall from $100 to $36.5.[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 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

23 While the differential between the *real* rate of interest and the real return on equities is still 200 basis points, the differential between the nominal bond yield and the nominal equity return rises with the inflation rate to 210 basis points, as shown in table 3.

24 The 50% 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 $15.40 return in perpetuity. In general, the equity owner will have to refinance at some point and his return will then approximate 10.25%.

25 The difference between the $36.50 bond price in this case and the $36.80 in the inflation case is artificial and related to the difference between the 8.15% and 8.20% market rates in the two cases.

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.

TABLE 3

A COMPARISON OF NOMINAL AND REAL RATES OF RETURN IN THREE REGIMES

(All assets financed 50% in equity and 50% in debt)

	Rate of return in a regime of				
	Stable prices	A fully anticipated 5% inflation		An increase of 5.2 percentage points (520 basis points) in the natural rate	
		Existing Machines	New Machines	Existing Machines	New Machines
Price of new or existing machine	$200	$200	$200	$87	$200
Dollar return on new or existing machine	$8	$8.40 [1] + 10.00 = $18.40	$8.40 [1] + 10.00 = $18.40	$8	$18.40
Dollar return to bondholder	$3	$3.00	$8.15	$3	$8.20
Dollar return to equity holder	$5	$15.40	$10.25	$5	$10.20
Market (nominal) rate of interest on $100 bond	3%	8.15%	8.15%	8.20%	8.20%
Market (nominal) rate of return on $100 in equity	5%	10.25%	10.25%	10.20%	10.20%
Natural rate of interest	4%	4% [2]	4% [2]	9.20%	9.20%
Real rate of interest on bonds	3%	3% [2]	3% [2]	8.20%	8.20%
Supply price of capital, the real rate of return on equity	5%	5% [2]	5% [2]	10.20%	10.20%
Bond prices	$100	$36.8	$100	$36.5	$100
Equity prices	$100	$150	$100	$49	$100

1 $10.00 is the capital gain on the asset.

2 Let r = real rate, i = inflation rate, and n = nominal rate,

$$\text{then } r = \frac{n = i}{1 + i}$$

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 price expectation effect. Estimates of the real rate are obtained by substracting 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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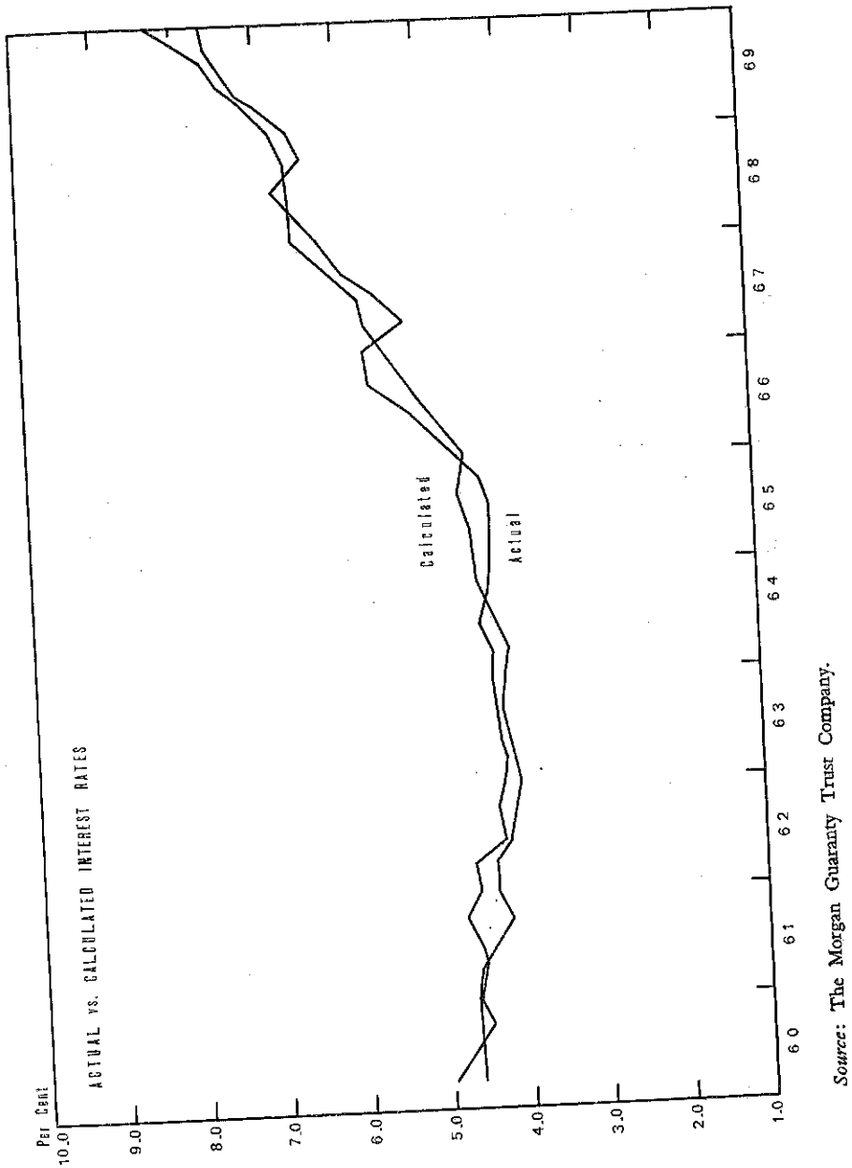
26 This assumption, that the real rate is normally around 3%, is rationalized as follows:

"It is interesting, however, that in the one extended period of price stability recent enough so that we have fairly good records of both rates and prices, the idea of a basic three percent rate seems to be supported. The economic history of the last half of nineteenth-century England reveals that by and large it was a period free of inflationary pressures, and that the consumer's shilling bought approximately as much at the end of the century as it did in the 1850's. Long-term British issues fluctuated around a three percent yield during the entire half-century; in fact, the rate 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.F. Leach, "Inflation and Interest Rates: A Long Observed Link", *The Morgan Guaranty Survey*, January 1970, page 7.

27 William P. Yohe and Denis S. Karnosky, "Interest Rates and Price Level Changes, 1952-69", *Review*, Federal Reserve Bank of St. Louis, December 1969, develop the St. Louis procedure for decomposing the nominal rate into a real rate and a component for inflation and use this technique to estimate a real rate of interest from the corporate triple A rate. See also L. Andersen and K. Carlson, "A Monetarist Model of Economic Stabilization", *Review*, Federal Reserve Bank of St. Louis, April 1970, and M. Fedstein and O. Eckstein, "The Fundamental Determinants of the Interest Rate", *The Review of Economic Studies*, November 1970.

CHART 4

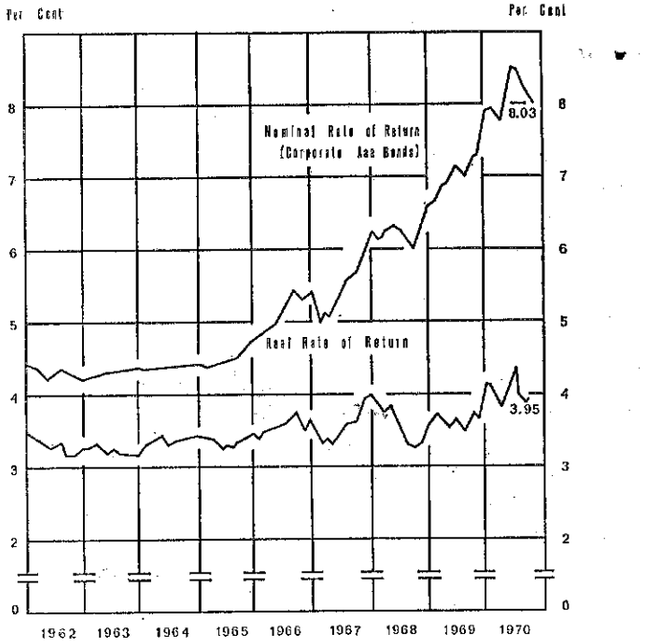


Source: The Morgan Guaranty Trust Company.

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

CHART 5

A COMPARISON OF NOMINAL AND REAL RATES OF RETURN



Source: Federal Reserve Bank of St. Louis.

may enable us to discriminate between an increase in the natural rate and an increase in the inflation rate.[28]

28 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. Considerable 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. ROLL, "Interest Rates on Monetary Assets and Commodity Price Index Changes" forthcoming in the *Journal of Finance*.

When inflation is the *cause* and high interest rates are the result, one should expect to find evidence of accelerated monetary growth as an independent, and causal, factor generating the inflationary process. On the other hand, when a rise in the natural rate is the *cause* and inflation is the *result*, monetary growth is either a *by-product* or a *result* of the inflation but certainly not a *cause*. The temporal sequence of monetary acceleration, inflation, and rising interest rates should be different in the two cases. A rise in the natural rate necessarily implies increasing *real* and *nominal* returns on new machines, an increase in productivity, and a corresponding reduction in the market price of all existing assets — bond prices, equity prices and machine prices should all fall. An increase in the inflation rate raises nominal returns relative to real returns on both new and existing machines and should be associated with a decline in bond prices and a rise in equity prices on existing assets.[29]

An increase in the natural rate should be associated with higher nominal and real rates of return on investment, some evidence of increasing productivity and profits, and lower prices for existing assets; an increase in the inflation rate should be associated with higher nominal rates relative to real rates on both new and existing machines, lower bond prices and higher equity prices on existing assets, with new and existing machine prices rising with the inflation rate.

A direct comparison of nominal and real rates, if it were possible, would provide a discriminating test to distinguish between a rise in the inflation rate and a rise in the natural rate. In addition the following data may also prove helpful: an analysis of nominal and real rates of return on new assets relative to existing assets, of productivity, of the profits' share in business product, of prices on existing and new assets, of bond prices and equity prices on existing assets, and of the contribution of money stock growth to the inflation process. These factors provide some of the evidence needed to distinguish the two cases.

There are other kinds of indirect evidence which may be suggestive. If inflation is the cause and high interest rates the

29 As a first approximation, we may say that inflation does not affect the price of unlevered equities. The 50% rise in equity prices in table 3 is due to the specific assumption that all capital is financed 50% in perpetual consols, so that the equity owner can receive the $15.40 return in perpetuity.

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 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 rationalized 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 Eclectic View", in S. W. Rousseas (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. Fowler and M. Gilbert, *Inflation, op. cit.*; A. Okun, *The Political Economy of Prosperity, op. cit.*; G. Ackley, *Stemming World Inflation, op. cit.*; and M. Levy (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 application 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 preference 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(4) and 1971(1) — the first two recovery periods?

31 For recent discussions, see R. J. Gordon, "The Recent Acceleration of Inflation and Its Lessons for the Future", *Brookings Papers on Economic Activity*, 1970(1); G. L. Perry, "Changing Labor Markets and Inflation", *Brookings Papers on Economic Activity*, 1970(3); and M. Levy (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 1970(4) and why interest rates began climbing again at the end of 1971(1). 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 been exerting 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 1971(2) 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]

32 James Tobin, in an unpublished note, shows that the market valuation of capital fell relative to its replacement cost, from 1.36 at the end of 1968 to .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.

The July 1970-April 1971 stock market recovery is also consistent with the neo-Keynesian interest rate analysis. Stock prices continued going up from mid-1970 until April 1971, roughly corresponding to the period that interest rates, and especially long rates, were declining. Neo-Keynesians would rationalize the increase in both stock and bond prices as due to a reduction in the real rate following the substantial increase in monetary growth.

The decline in stock prices starting in April 1971 may similarly be rationalized by pointing out that it coincided with a rise in interest rates. But why should a substantial rise in the real rate take place in a sluggish economy with a substantial gap between potential and actual output, with a high unemployment rate, and in the presence of a strong liquidity effect?

The neo-Keynesian theory thus does not, at the same time, readily rationalize both the very dramatic recovery in the stock market starting in June 1970 up until April 1971 and the subsequent stock market setback in the period from April to August of 1971. For if a strong liquidity effect served to lower the real rate of interest and thereby stimulate both the bond market and the stock market in the period June 1970 to April 1971, why should the even higher monetary growth rates in the subsequent period depress these markets? Neo-Keynesians would presumably have to introduce inflationary expectations to explain the April-August 1971 interest rate rise and other factors to explain the decline in equity prices.

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

33 See A.M. Okun and G. Perry, "Notes and Numbers on the Profits Squeeze", in *Brookings Papers on Economic Activity*, 1970(3); A. Okun, "The Personal Tax Surcharge and Consumer Demand", *Brookings Papers on Economic Activity*, 1971(1); L.S. Ritter and W.L. Silber, *Money* (New York, 1970); R.J. Gordon, "Inflation in Recession and Recovery", *Brookings Papers on Economic Activity*, 1971(1); and J. Tobin's Presidential Address, "Inflation and Unemployment", forthcoming in the *American Economic Review*, March 1972.

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]

34 Irving Fisher's exposition of the quantity theory of money, his theory of money, prices, and interest rates, and his rationalization of the positive association between money and interest rates and between interest rates and prices are presented in *Appreciation and Interest* (MacMillan, 1896); *The Purchasing Power of Money (Revised)*, (MacMillan, 1913); and *The Theory of Interest* (MacMillan, 1930). For the development of the modern quantity theory and of monetarism, consult the writings of L. W. Mints, C. Warburton, M. Friedman and A. J. Schwartz, D. Patinkin and H. G. Johnson. See also K. Brunner, "The Role of Money and Monetary Policy", *Review*, Federal Reserve Bank of St. Louis, July 1968; D. I. Fand, "Some Issues in Monetary Economics", *This Review*, September 1969, and "Money, Interest and Prices", in *Savings and Residential Financing 1970 Conference Proceedings* (Chicago, 1970); B. P. Pesek and T. R. Saving, *Money, Wealth, and Economic Theory* (MacMillan, 1967); T. Mayer, *Monetary Policy in the United States* (Random House, 1968); Axel Leijonhufvud, *On Keynesian Economics and the Economics of Keynes* (Oxford, 1968); R. Clower (ed.), *Monetary Theory* (Penguin, 1970); W. Gibson and G. Kaufman, *Monetary Economics, op. cit.*; and J. Boorman and T. Havrilesky, *Money Supply, Money Demand and Macroeconomic Theory* (Allyn and Bacon, 1972).

For a recent critique of monetarism, see P. A. Samuelson, "Reflections on the Merits and Demerits of Monetarism", in J. J. Diamond (ed.), *Issues in Fiscal and Monetary Policy: The Eclectic Economist Views the Controversy* (De Paul University, 1971); R. Teigen, "A Critical Look at Monetarist Economics", *Review*, Federal Reserve Bank of St. Louis, January 1972; and J. Tobin's Presidential Address, "Inflation and Unemployment", *op. cit.*

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 neatly

35 See P. W. McCracken, "Review of Our Experience in Administering Fiscal Policy", in *Fiscal Policy and Business Capital Formation* (Washington, 1967); M. Friedman, "The Role of Monetary Policy", *American Economic Review*, March 1968; L. C. Andersen and J. Jordan, "Monetary and Fiscal Actions: A Test of Their Relative Importance in Economic Stabilization", *Review*, Federal Reserve Bank of St. Louis, November 1968; A. Meltzer, "Controlling Money", *Review*, Federal Reserve Bank of St. Louis, May 1969; D. I. Fand, "Keynesian Monetary Theory, Stabilization Policy and the Recent Inflation", *Journal of Money, Credit and Banking*, August 1969, and "A Monetarist Model of the Monetary Process", *Journal of Finance*, May 1970; G. Kaufman, *Current Issues in Monetary Economics and Policy: A Review*, Bulletin No. 57 (New York University Institute of Finance, May 1969). See also G. Kaufman and R. Laurent, "Stimulation Policy Strategies Under Two Alternative Monetary Regimes", in *The Quarterly Review of Economics and Business*, Winter, 1970; H. G. Johnson, "Recent Developments in Monetary Theory - A Commentary", in D. Croome and H. G. Johnson (eds.), *Money in Britain 1959-69* (Oxford, 1970); W. Poole, "Alternative Paths to a Stable Full Employment Economy", in *Brookings Papers on Economic Activity*, 1971(3); D. I. Fand, J. Bubhler and J. Draper, "Prosperity for 1971? The $1,065 Billion GNP Forecast", *The Arizona Review*, April 1971; R. D. Laurent, "Interest Rates - The Volatile Price of Credit", *Business Conditions*, Federal Reserve Bank of Chicago, August 1971; and H. C. Wallich, "The Fed at the Crossroads", *The Morgan Guaranty Survey*, October 1971.

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 8.1% 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 1965-1968 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 underpredictions 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; (iii) 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 expectational emphasis attempts to explain why long rates continued to rise for some eight months after the recession started.[36]

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 operating, 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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36 See G. Garvy and M. R. Blyn, *The Velocity of Money* (Federal Reserve Bank of New York, 1969); Federal Reserve Bank of Boston, *Controlling Monetary Aggregates* (Boston, 1969); W. Poole, "Gradualism: A Mid-Course View", in *Brookings Papers on Economic Activity*, 1970(2); D.I. Fand, "Monetary Policy in the United States", *Business Economics*, January 1971, and "The 1969-1970 Slowdown", *Financial Analysts Journal*, February 1971; B.W. Sprinkel, *Money and Markets, op. cit.*; G.L. Bach, *Making Monetary and Fiscal Policy* (Brookings, 1971); G. Terborgh, *Essays on Inflation* (M.A.P.I., 1971); "The Anatomy of Interest Rates", *Monthly Economic Letter*, First National City Bank, November 1971; A.J. Meigs, *Money Matters, op. cit.*; O. Eckstein and R. Brinner, *The Inflation Process in the United States, op. cit.*

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 1960'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 1960's stock prices were almost constant, profits rose by a mere 8½%, but interest rates jumped a whopping 80%. This analysis suggests that the post-1965 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-1965 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]

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37 See M. W. KERAN, "Expectation, Money, and the Stock Market", *Review*, Federal Reserve Bank of St. Louis January 1971. An increase in the expected rate of inflation causing 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.

For a comprehensive discussion of recent contributions to capital asset pricing theory, see I. FRIEND, "The Economic Consequences of the Stock Market" forthcoming in the *American Economic Review*, and M. BLUME and I. FRIEND, "A New Look at the Capital Asset Pricing Model", *Wharton School Working Paper*.

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* and high interest rates the *result*.[38]

38 See, however, A. Burns and P. A. Samuelson, *Full Employment, Guideposts and Economic Stability* (Washington, 1967); A. F. Burns, *Inflation: The Fundamental Challenge to Stabilization Policies*, May 1970, *The Basis for Lasting Prosperity*, December 1970, *Two Key Issues of Monetary Policy*, May 1971, and *Statement to the Joint Economic Committee*, February 1972; and R. N. Cooper, *The Economics of Interdependence: Economic Policy in the Atlantic Community* (McGraw Hill, 1968).

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 etiology. 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.

The interest 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 expectational 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 1971(1), it does not account for the interest rate rise in 1971(2) and 1971(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 expectational effects and 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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