INTEREST RATES IN THE REAGAN YEARS

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ABSTRACT

The Reagan Administration entered office in 1981 with one of the clearest and most ambitious agendas in recent times. The new administration advanced five economic/budgetary goals to rebuild America economically and militarily: (1) reduce inflation, (2) deregulate the economy, (3) cut taxes, (4) increase military spending and (5) reduce nondefense spending sufficiently to balance the budget. Achieving, or not achieving, these economic/budgetary goals likely had a significant impact on interest rates. Six specific hypotheses are investigated in this paper.

During the first Reagan term, the battle to lower inflation acted to maintain the high real interest rates carried over from the Carter years and, while the increase in structural deficits did not raise real rates much, the reduction in private saving due to the unwinding of the second OPEC shock and an aggressive foreign policy that heightened fear of nuclear war raised real interest rates to levels not seen since the late 1920s. Moreover, the increased volatility of interest rates during this protracted battle with inflation raised yields on callable fixed-rate mortgages by over a percentage point relative to the already inflated yields on noncallable Treasuries.

By the end of Reagan's second term, inflation, marginal tax rates, nuclear fear, and interest rate volatility were all down. As a result, nominal Treasury rates have plunged (real bill rates since 1986 are below their average values for the previous quarter century), and yields on callable securities have receded to more normal levels relative to noncallable Treasuries. Yields on tax-exempt securities are one and a quarter percentage points higher relative to Treasuries than in the pre-Reagan years, and yields on fixed-rate mortgages are up by a half percentage point. These constitute an intended reduction in the previous financial subsidies to state and local and household capital formation, respectively.

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The Reagan Administration entered office in 1981 with one of the clearest and most ambitious agendas in recent times. The new administration advanced five economic/budgetary goals to rebuild America economically and militarily: (1) reduce inflation, (2) deregulate the economy, (3) cut taxes, (4) increase military spending and (5) reduce nondefense spending sufficiently to balance the budget. Deregulation and the military buildup were begun under the Carter Administration; major commitments to reduce inflation and to cut taxes and nondefense spending were new.[1]

In its first term, the Reagan Administration successfully achieved the first four goals. However, while nondefense spending was cut, the reduction was insufficient to offset the tax reductions, leaving a substantial structural deficit. In its second term, some progress was made toward reducing this deficit, but the progress was achieved largely by scaling back defense, not nondefense, outlays. In addition, tax reform was passed, but this was a tax shift (household taxes lowered, business taxes raised), not an overall cut. Nonetheless, both personal and corporate marginal tax rates were cut.

Achieving, or not achieving, these economic/budgetary goals likely had a significant impact on interest rates. Six specific hypotheses are investigated in this paper:

a) the cut in the inflation rate from 10 to 4 percent lowered nominal
    interest rates generally by reducing the inflation premium in them,

b) the increased structural deficits raised real interest rates
    generally (Feldstein, 1985),

c) the tight money leading to the inflation reduction was
    unprecedented in severity and caused equally unprecedented high
    real interest rates, (Clarida and Friedman, 1983; Blanchard and
    Summers, 1984),

d) the process by which inflation was cut -- the switch of the Federal
    Reserve from interest rate to money supply targets -- increased the
    volatility of nominal interest rates and thus raised real rates on
    securities with borrower call or prepayment options, such as long
    term fixed-rate mortgages (Hendershott and Buser, 1984),

e) the deregulation of thrift institutions raised rates on fixed-rate
    mortgages relative to those on Treasuries, and

f) the cut in personal and corporate marginal tax rates and "tax
    reforms" raised yields on tax-exempt securities relative to those
    on Treasuries.

The first three hypotheses relate to interest rates generally and are best
addressed by examining yields on noncallable Treasury securities. The
second three pertain to the relationship between yields on Treasury and
other securities and thus require analyses of other yields.

   Our investigation is divided into three parts dealing with Treasury
securities (six-month and ten-year maturities), fixed-rate mortgages, and
tax-exempt securities (one and five years). In each part we begin by
examining how interest rates (or interest rate relationships) have changed
in the 1980s relative to the 1970s and then discuss the role of Reagan
policies in these changes. The first two parts draw heavily on Hendershott
and Peek (1989) and Hendershott and Van Order (1989). We generally find

support for all the hypotheses except those relating to the impact of monetary and fiscal policies on real interest rates. These impacts have been overstated.

I. Treasury Rates

Expected Inflation, Nominal Rates, and Real Rates

The top two series in Figure 1 are the yields on six-month and ten-year Treasury securities, both computed on a bond-equivalent basis, for the 1970s and 1980s. April and October values of the yields are plotted. The bottom two series are expected inflation rates from the Livingston and Hoey surveys on corresponding dates; the latter survey did not begin until September 1978 and was not collected continuously until the 1980s.[2] The long rise in nominal rates up to 1981 is clear, as is the decline since then. The rise and fall correspond to a rise and fall in expected inflation, although the correspondence is far from perfect. The figure suggests about a one-for-one relationship between interest rates and expected inflation, and empirical estimation supports this view.

The term structure of interest rates appears to be related to the term structure of inflation rates. Twice the term structure became inverted (the six-month rate exceeded the 10-year rate), briefly in 1973-74 and for an extended period between 1978 and 1981. Both episodes correspond to a sharp, but temporary surge in inflation. If the temporary nature of this shock was perceived, short-term expected inflation would likely exceed longer-term

expected inflation. We have a long-run expected inflation rate for the second inversion only. During this inversion, the short-term expected inflation rate did exceed the long-term rate, and when the short-term expected inflation rate fell below the long-term rate, the inversion ceased.

Figure 2 plots the pretax real six-month and 10-year Treasury rates and the after-tax real six-month rate. The tax rate is a weighted average marginal tax rate paid by households on interest income.[3] To put these real rates in perspective, we have plotted them for the longer 1964-88 period. Here, the high pretax real rates in the early 1980s, especially relative to the middle 1970s, are obvious. The real six-month Treasury rate averaged 5.5 percent in the 1981-84 period, a level observed previously only in the 1926-30 period, as opposed to 0.2 percent in the mid1974-mid1978 span. Real 10-year Treasury rates appear to have jumped similarly in the early 1980s. Furthermore, real short- and long-term Treasury rates have been similar in magnitude in the 1980s, i.e., the long-term premium has not systematically exceeded the short-term premium.

Also noteworthy is the decline in real interest rates since 1984. The real six-month bill rate in the 1986-88 period was slightly below its average in the previous quarter century. This little recognized fact is particularly remarkable because real activity has been so strong in recent years and real bill rates have historically exhibited a strong procyclical pattern (Hendershott, 1986).

Movements in the after-tax real bill rate are also interesting.
According to this measure, the interest rate puzzle really hasn't been the
high rates in the 1980s so much as the low rates in the 1970s; the after-tax
real rate never exceeded <u>minus</u> one percent for the entire 1974-80 period.
The early 1980s values are quite comparable to those observed throughout the
1960s, and more recent values are roughly half those in the 1960s. In any
event, explaining the jump in real interest rates in the 1980s, either
before or after tax, requires starting with why interest rates were so low
in the middle 1970s (Wilcox, 1983, attributes these low rates to the first
OPEC shock).

<u>Reagan Policies and Real Rates</u>

How did fiscal and monetary policy affect the pattern of real rates in
the 1980s? Figure 3 contains the real interest rate and two fiscal policy
variables: the structural federal deficit as a fraction of middle-expansion
trend GNP and the average marginal tax rate used to measure after-tax real
interest rates.[4] The deficit would appear to be <u>negatively</u> correlated with
real rates in the 1970s and early 1980s. More specifically, the structural
deficit had hardly begun to rise when the real rate peaked in the 1980s, and
the real rate was back down to a normal level before the deficit reversed
course. While the deficit might be badly mismeasured, any reasonable
measure must have risen between 1981 and 1983, just when the real rate was
declining.[5] The tax rate series is positively correlated with the real
rate during the 1977-88 period, as we would expect (the pretax rate rises in

response to an increase in the tax rate in order to maintain the after-tax rate at a given level).

Our multivariate analysis (Hendershott and Peek, 1989) suggests a small positive impact (less than a quarter percentage point) of the 1980s structural deficits on yields. However, the cut in marginal tax rates has an even larger negative impact. Thus fiscal policy, broadly defined, tended to lower Treasury rates, not raise them, during the Reagan years.

Figure 4 plots the real six-month rate against our estimate of the impact of monetary policy on the six-month rate. (Monetary policy is attributed to Reagan, despite the Federal Reserve's "independence," because of his strong support of the Federal Reserve.) Our estimate is obtained by first constructing a proxy for monetary policy and then using this proxy as a regressor in an equation explaining the after-tax bill rate. We developed this proxy because customary money measures are of doubtful validity when effective deposit rate ceilings are changed and/or new "money-like" financial claims are introduced. Our proxy is based on the behavior of the six-month bill rate, which the Federal Reserve can control over short periods, relative to that of the five-year Treasury bond rate, over which the Federal Reserve has decidedly less control. More specifically, we explain the term structure of interest rates with the term structure of expected inflation, the business cycle, and traditional monetary policy variables and then attribute the residual (plus the traditional monetary policy variable's contribution) to monetary policy.

A number of observations follow from Figure 4. First, the decline in
the real rate from two and a half percent in late 1973 to negative one
percent in early 1977 and the rebound to two and a half percent in 1980 are
almost fully accounted for by monetary policy. Second, while changes in
monetary policy explain both the rebound in real rates to normal levels in
the 1978-80 period and much of the decline since 1984, by our estimates
monetary policy does not account for the jump in real rates between 1978-80
and 1981-84. In summary, monetary policy was not noticeably tighter in the
early 1980s than in the 1973-74 period, although the period of tightness,
mid1979 to mid1983, lasted much longer. As a result, the quarter-century
upward trend in inflation was finally broken. Similarly, the recent period
of ease has been longer than any in the last quarter-century and has
contributed to the longest peace-time expansion on record.

Our principal conclusion is that the emphasis on the high real interest
rates in the early 1980s has been overdone. The key to understanding real
interest rates in the last quarter century is the extraordinarily low
interest rates in much of the 1970s owing to the two OPEC oil shocks, which
lowered investment demand and increased world saving by transferring wealth
from the high consuming developed countries to OPEC. Figure 4 clearly
indicates lower real rates relative to the contribution of monetary policy
in the 1974-80 period than either before or after. Monetary policy was
tight for a long stretch in the early 1980s, but only tight enough to cause
real interest rates to be about a percentage point and a half above normal.
Fiscal policy, on the other hand, had little impact, with decreasing

marginal tax rates more than offsetting the increase in structural deficits.
Finally, some evidence suggests that <u>foreign</u> policy -- Reagan's evil empire
posture in his first term -- contributed marginally (about a half percentage
point) to the high real rates by increasing the fear of nuclear war and thus
reducing the private propensity to save.

II. The Yield on Fixed-Rate Mortgages

<u>Volatility and Yields on Fixed-Rate Mortgages</u>

A fixed-rate mortgage differs from a Treasury security with equal
duration because homeowners can call or prepay the mortgage while the
Treasury cannot prepay its debt. For equal coupon securities, investors
will prefer the Treasury; if market interest rates decline, investors in
Treasuries will continue to receive their now above-market coupons, while
investors in mortgages will find their funds repaid and themselves forced to
invest in the now lower market coupons. To compensate for the possibility
of borrowers prepaying when rates decline, investors in fixed-rate mortgages
must receive a higher coupon than investors in Treasuries, the size of this
coupon differential depending on the probability that interest rates will
decline sufficiently to trigger prepayment. This probability, in turn, will
be greater the more volatile are interest rates and the greater is the
expectation that interest rates will decline.

Figure 5 plots the ex post volatility of interest rates and the spread
between the conventional new issue mortgage rate and the seven-year Treasury
rate (comparable duration Treasury).[6] The spread oscillated between about

one and two percentage points in the 1970s before the switch to a more
volatile interest-rate monetary policy in late 1979. From this point, the
spread trended upward until it peaked at over three percentage points in
1981 and 1982. After dipping below two percentage points in early 1984, the
spread again rose to nearly three percentage points in late 1986 before
finally declining to about two percentage points.

That increased interest rate volatility explains some of the increase
in the mortgage-Treasury rate spread is obvious from the figure. Volatility
jumped in late 1979, just when the spread did, and remained high through the
peak of the spread in late 1982. That is, much of the relative increase in
the mortgage rate in 1981-82 simply reflected a more valuable prepayment or
call option. However, more than the rising call value contributed to the
relatively high mortgage rates in the early 1980s.

The Savings and Loans, the Agencies and the Mortgage Rate

Figure 6 plots both the actual conventional mortgage coupon rate and an
estimate of what the rate should have been given seven-year Treasury rates
and the value of the homeowner's call option (Hendershott and Van Order
label this the "perfect-market" coupon rate). As can be seen, the actual
rate was about a half percentage point too low during most of the 1970s, but
then was about a half point too high in the 1982-86 period, giving a total
increase of a full percentage point. Since early 1987, the actual rate has
been equal to the perfect market rate.

In the 1970s, mortgage lending was largely tied to the thrifts.
Portfolio restrictions on savings and loans (no corporate loans, bonds, or

equities) encouraged their investment in residential mortgages, and these investments were especially profitable to thrifts owing to special tax advantages. Thrifts that invested a large fraction of their assets in housing-related loans or liquid assets could transfer a large fraction of their pretax income to loan loss reserves, thereby avoiding taxes. Between 1962 and 1969, this fraction was 60 percent; between 1969 and 1979, the fraction was gradually reduced to 40 percent; the Tax Reform Act of 1986 lowered the fraction to 8 percent. The incentive for mortgage investment provided by the extraordinary transfers to loan loss reserves was substantial in the 1960s and 1970s; savings and loans would have accepted a half to three-quarters of a percentage point lower pretax return on tax preferred housing-related assets than on comparable nonpreferred assets.

Thrifts have shifted sharply out of fixed-rate home mortgages (FRMs) in the 1980s. Most strikingly, the share of savings and loan total assets in home mortgages and agency securities (largely Fannie Mae and Freddie Mac pass-throughs) fell from 72 to 57 percent during the 1982-87 period. Because savings and loans have aggressively added adjustable-rate mortgages (ARMs) to their portfolios, the shift out of FRMs was far greater than 15 percent of the portfolio. These portfolio shifts were in response to the reduced profitability of savings and loans (first due to high interest rates and a maturity mismatch and then due to disinflation and credit losses), the expansion of savings and loan asset powers, and a regulatory-enhanced aversion to interest-rate risk. The reduced profitability eroded the tax incentive for residential mortgage investment, while the expansion of powers

and regulatory risk aversion encouraged thrifts to invest more widely (the latter also encouraged switching from FRMs to ARMs). The net result was the mortgage rate rising from a half percentage point below the perfect-market rate to a half point above.

The half percentage point premium in the early 1980s provided the incentive for the securitization of conventional FRMs by Fannie Mae and Freddie Mac. The premium covered both the start-up cost of the securitizers and the liquidity premium demanded by investors. And securitize Fannie and Freddie did: roughly half of newly-issued conventional fixed-rate mortgages originated in 1986 and 1987 were sold directly to Fannie and Freddie to be packaged into mortgage pools. As the volume of mortgage pools grew, bid/ask spreads were bid down (and thus the liquidity premium fell), and the marginal costs of the securitizers declined. As a result, the yields on conventional loans have fallen back in line with capital market rates.

Nonetheless, conventional FRM rates are still about a half percentage point higher, relative to Treasury rates, than they were in the 1970s. Attributing this half point increase to Reagan policies seems inappropriate, however. The deterioration of the thrifts' relative position as profitable investors can be traced to policy errors, such as regulatory prevention of adjustable-rate mortgages and the imposition of deposit rate ceilings, that date back to the 1960s.

III.   Yields on Tax Exempt Securities

<u>Determinants of Tax-Exempt Yields</u>

Because investors are interested in after-tax returns, the tax-exempt
status of a security will result in its pretax yield being bid down relative
to pretax yields on fully taxable securities. Tax-exempt yields, then, will
only be a fraction of taxable yields, the fraction being greater the less
heavily taxed are returns on taxable securities. The relationship between
default-free yields on exempts (r_{ex}) and taxables (r_{tx}) will depend on the
state of the economy as well as tax rates. A deteriorating economy, for
example, could lead to greater probability of bankruptcy (larger debt
contracting costs) and thus reduced issues of fully taxable debt. Also, the
deterioration could stimulate a flight to quality or greater demand for
Treasury debt. In both cases, fully taxable rates would fall relative to
tax-exempt yields. We thus express the ratio of exempt to taxable rates as

$$r_{ex}/r_{tx} = \phi(t_c, t_p, \rho),$$

where t_c is the corporate tax rate, t_p is an index representing the marginal
personal tax rate schedule, and ρ is a risk adjustment that varies with the
state of the economy.

Figure 7 plots the ratio of one-year exempt to one-year taxable yields
(r_{ex}/r_{tx}), $1-t_p$, and a proxy for cyclical swings in the economy (GAP). The
latter is measured as 100 times the difference between middle-expansion
trend GNP and actual GNP, all divided by trend GNP. The corporate tax rate

is not plotted because it varied so little during this period. The personal

tax rate is the average marginal personal tax rate on interest income earned

(see footnote 3). The broad decrease and then increase in $1-t_p$ reflects

both the bracket creep of the 1970s and the 1980s Reagan tax cuts. Figure 8

plots the same ratio for five-year securities. Here the personal tax rate

is a five-year forward-looking rate (the single tax rate applied to all

future cash flows that gives the same after-tax rate of return as the stream

of after-tax payments based upon the average marginal personal tax rates

that actually evolved). The general correlation of the rate ratios with the

$1-t_p$'s and GAP seems clear.[7]

Closer inspection of the figures suggests two further points. First,

the cyclical impact of GAP seems to be limited to positive values; when GAP

is negative in the 1972-73, 1978-80, and 1986-88 periods, the rate ratios

cease to follow its movements. This is consistent with a risk adjustment

that develops when the economy falls below trend but is fully eliminated

when the economy gets back to trend. Also, the one-period future, rather

than current, value of GAP seems to influence the rate ratio. Second, both

the one-year and five-year rate ratios are too high after about 1984

relative to the pattern existing over the 1970-84 period. More

specifically, the rate ratios are far closer to the $1-t_p$'s than they were

during comparable periods when the economy was above trend (1972-73 and

1978-80).

An alternative or additional proxy for the risk adjustment is the spread between the six-month commercial paper and Treasury bill rates divided by the bill rate (PREM).[8] As Buser and Hess (1986) note, the corporate-Treasury yield spread is a contemporaneous proxy for expected bankruptcy. This variable moves somewhat like GAP, but falls far more abruptly in 1975 and rises much less in the 1980-82 period.

Computing the Impact of Reagan Policies

We have estimated some simple regression equations for the 1970-84 period and extrapolated them through 1988. The equations confirm both the importance of our variables and the unusually high rate ratios in the late 1980s. Representative equations are:

One Year: r_{ex}/r_{tx} = -.179 + 1.012(1-t_p) + .0080 GAPZ + .159 PREM
$\qquad\qquad$ (.107) (0.155) $\qquad$ (.0022) $\qquad$ (.057)

$\qquad$ $\bar{R}^2$ = .709, SEE = .022, DW = 1.69

Five Year: r_{ex}/r_{tx} = -.111 + 1.008(1-t_p) + .0084 GAPZ + .093 PREM
$\qquad\qquad$ (.125) (0.183) $\qquad$ (.0019) $\qquad$ (.050)

$\qquad$ $\bar{R}^2$ = .724, SEE = .019, DW = 1.32

where GAPZ is zero when GAP_{+1} is negative and equals GAP_{+1} otherwise and coefficient standard errors are in parentheses. Note the similarity of the tax rate and GAP coefficients in the two equations and the closeness of that on 1-t_p to unity.

Plots of the actual and fitted/forecasted rate-ratio values are presented in Figures 9 and 10. The one- and five-year rate ratios appear to be roughly 0.08 and 0.06 too high, respectively, in 1986-88. That is, the tax-exempt rates are roughly 50 basis points too high.

The rise in the rate ratios far above those predicted in 1985-88 is likely due to the anticipation and enactment of the 1986 Tax Reform Act. The 1986 Act cut corporate tax rates from 0.46 to 0.34 (the impact of the personal rate cut is already included in the forecasted rate ratio), disallowed all bank interest expense allocable to newly-acquired tax-exempt bonds, enacted an alternative minimum tax with tax-exempt interest included in the base, and substantially restricted future issues of business industrial revenue and household mortgage revenue bonds (since the end of 1985, the quantity of these bonds outstanding has declined by 10 percent). The rate cut, the disallowance of bank interest expense, and the alternative minimum tax should all reduce commercial bank demand for tax-exempts (Neubig and Sullivan, 1987). In fact, commercial bank holdings of tax-exempts have declined from $231 billion at the end of 1985 to $152 billion at the end of 1988. The increase in the rate ratios in 1985 reflected a surge in tax-exempt issues in anticipation of the Tax Act. Tax-exempt debt outstanding rose by $139 billion in 1985 ($98 billion in the fourth quarter alone) versus $51-54 billion in 1983 and 1984.[9]

What do we conclude about the impact of Reagan policies on tax-exempt yields? In effect, we can attribute all of the 0.17 increase in the rate-ratios since 1980 to Reagan policies, first the 1981 rate cuts and later the 1986 Act. At a 7.5 percent taxable rate, this amounts to a one and a quarter percentage point increase in tax-exempt yields. Of course, if the Reagan tax cuts themselves lowered taxable rates by nearly a percentage point, as we are prepared to argue, then the net increase in tax-exempt yields is only about three-quarters of a percentage point.

IV. Summary

During the first Reagan term, the battle to lower inflation acted to maintain the high real interest rates carried over from the Carter years and, while the increase in structural deficits did not raise real rates much, an aggressive foreign policy increased them by half a percentage point by heightening nuclear fear and thus reducing private saving. These factors, strongly reinforced by the unwinding of the second OPEC shock, raised real interest rates to levels not seen since the late 1920s. Moreover, the increased volatility of interest rates during this protracted battle with inflation raised yields on callable fixed-rate mortgages by over a percentage point relative to the already inflated yields on noncallable Treasuries.

By the end of Reagan's second term, inflation, marginal tax rates, nuclear fear, and interest rate volatility were all down. As a result, nominal Treasury rates have plunged, and yields on callable securities such

as fixed-rate mortgages have receded to more normal levels relative to noncallable Treasuries. Real Treasury rates since 1986 are below their average values for the previous quarter century. Yields on tax-exempt securities are one and a quarter percentage points higher relative to Treasuries than in the pre-Reagan years, and yields on fixed-rate mortgages are up by a half percentage point. These constitute an intended reduction in the previous financial subsidies to state and local and household capital formation, respectively.

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Footnotes

1. While the period of tight money began well before Reagan took office, his support of that policy allowed it to continue until inflation was substantially reduced. Numerous previous administrations had begun attacks on inflation, but all had backed off before inflation was permanently lowered.

2. The interest rate series are the April and October monthly averages of daily secondary market six-month Treasury bill rates (converted from a discount basis to a bond-equivalent yield) and the ten-year constant maturity Treasury bond yield, both from the Federal Reserve Bulletin. The April and October observations were selected to correspond with the approximate date at which respondents to the semiannual Livingston survey form their expectations. The six-month Livingston expected inflation rate series was provided by the Federal Reserve Bank of Philadelphia. The ten-year expected inflation rate series is from the Decision-Makers Survey conducted by Richard B. Hoey at Drexel Burnham Lambert, Inc. This series is not available for every April and October; when necessary, it has been interpolated from the data for nearby months.

3.   The ex ante six-month pretax real interest rate is
calculated as the six-month Treasury bill rate less the six-month
Livingston expected inflation series.   The ex ante ten-year
pretax real rate is from the Decision Makers Survey.   Missing
April and October observations have been interpolated from the
data for nearby months.   The after-tax real rate is calculated as
the after-tax nominal rate less expected inflation.   The tax rate
on interest income is an average marginal tax rate constructed
from data contained in annual editions of <u>Statistics of Income,</u>
<u>Individual Income Tax Returns</u> as a weighted average of the
statutory marginal personal income tax rate for each adjusted
gross income class.   The weight for each class is equal to its
share of the total interest received by all income classes.

4.   Both the real interest rate and the tax rate were described
in footnote 3.   The deficit measure is the cyclically-adjusted
federal budget deficit as a percentage of middle-expansion trend
GNP and is based on the series constructed by the Bureau of
Economic Analysis.   Our measure is an average of this series for
the quarter beginning in April (or October) and the subsequent
quarter to correspond to the time span covered by the six-month
Treasury bill rate.

5.   An inflation-adjusted measure of the deficit would exhibit an
even sharper increase between 1981 and 1983 because the inflation
rate was falling.   However, any particular deficit measure will
suffer from a number of problems.   On general measurement issues,
see, for example, Eisner (1989) and Kotlikoff (1986).

6.   The seven-year Treasury rate is the constant maturity series
from the Federal Reserve Bulletin.   The mortgage rate and the
volatility measure are both based on data from Hendershott and
Van Order (1989).   The mortgage rate is the conventional
commitment mortgage coupon rate adjusted for points, where that
adjustment is equal to (Points-1)/(4.2 + .106 slope - .69 vol),
where slope is the difference between the seven-year and six-
month Treasury rates and volatility (vol) is one-half the
cumulative absolute change in the seven-year Treasury rate over
the previous 20 weeks.   We plot semiannual averages of weekly
data.

7.   The five-year rate ratio exceeds the one-year ratio by about
0.05 on average.   This could reflect the value of the tax-trading
option (let capital gains run but take capital losses) of the
longer term securities (Hendershott, 1985, pp. 158-60).

7. The commercial paper rate is for firms with bond ratings of
Aa or equivalent, from the <u>Federal Reserve Bulletin</u>.

8. Part of the 1985 surge was matched by an increase in
commercial bank demand -- an increase of $57 billion in 1985 ($49
billion in the fourth quarter) versus $11 billion in 1984 -- as
banks stocked up in anticipation of the 1986 Act.

Figure 1

Six-month and Ten-year Nominal Treasury Rates and
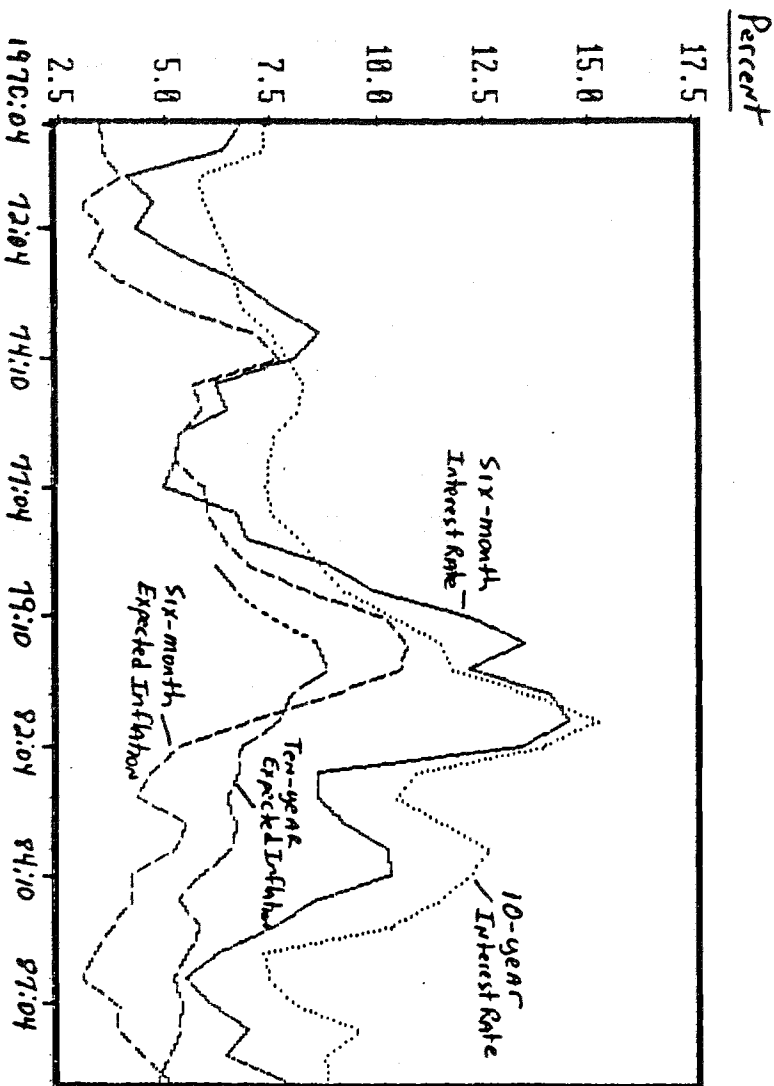Six-month and Ten-year Expected Inflation Rate

Figure 2

Ex Ante Pretax and After-tax Real Interest Rates

Percent

10.0
7.5
5.0
2.5
0.0
-2.5
-5.0

1964:04 67:04 69:10 72:04 74:10 77:04 79:10 82:04 84:10 87:04

Six-month Pretax

Six-month After-tax

10-year Pretax
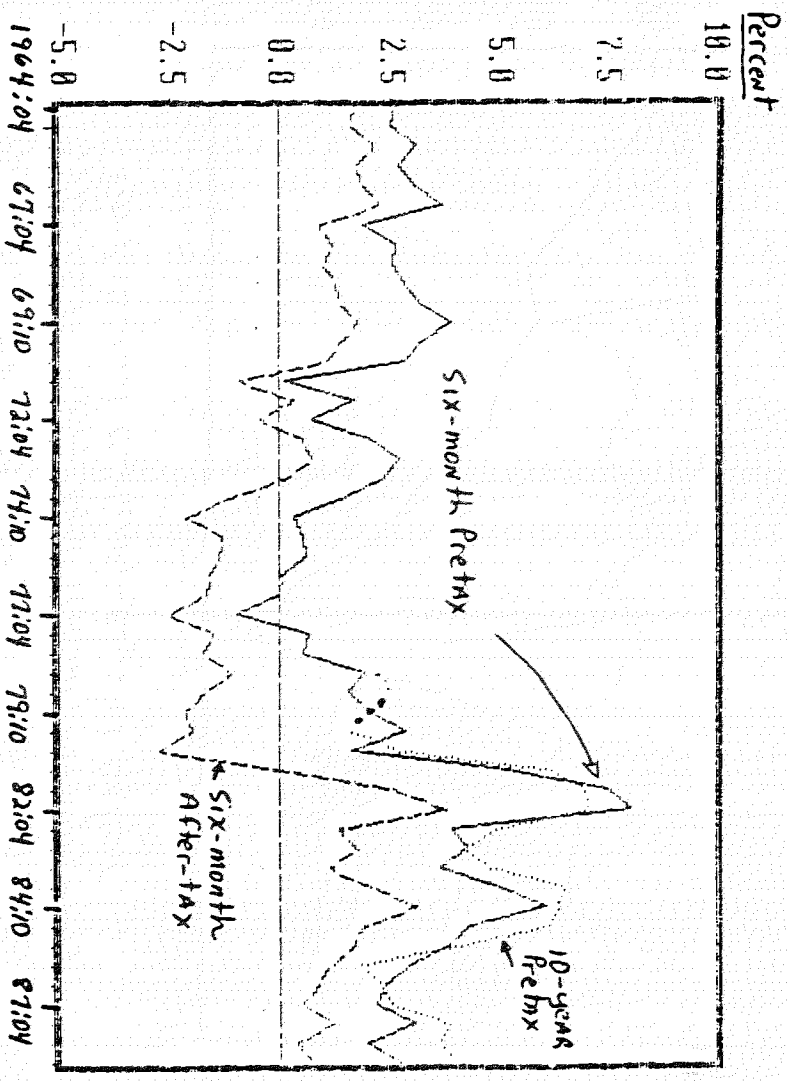
Figure 3

Six-month Pretax Real Treasury Bill Rate, Marginal
Tax Rate and Cyclically-Adjusted Deficit
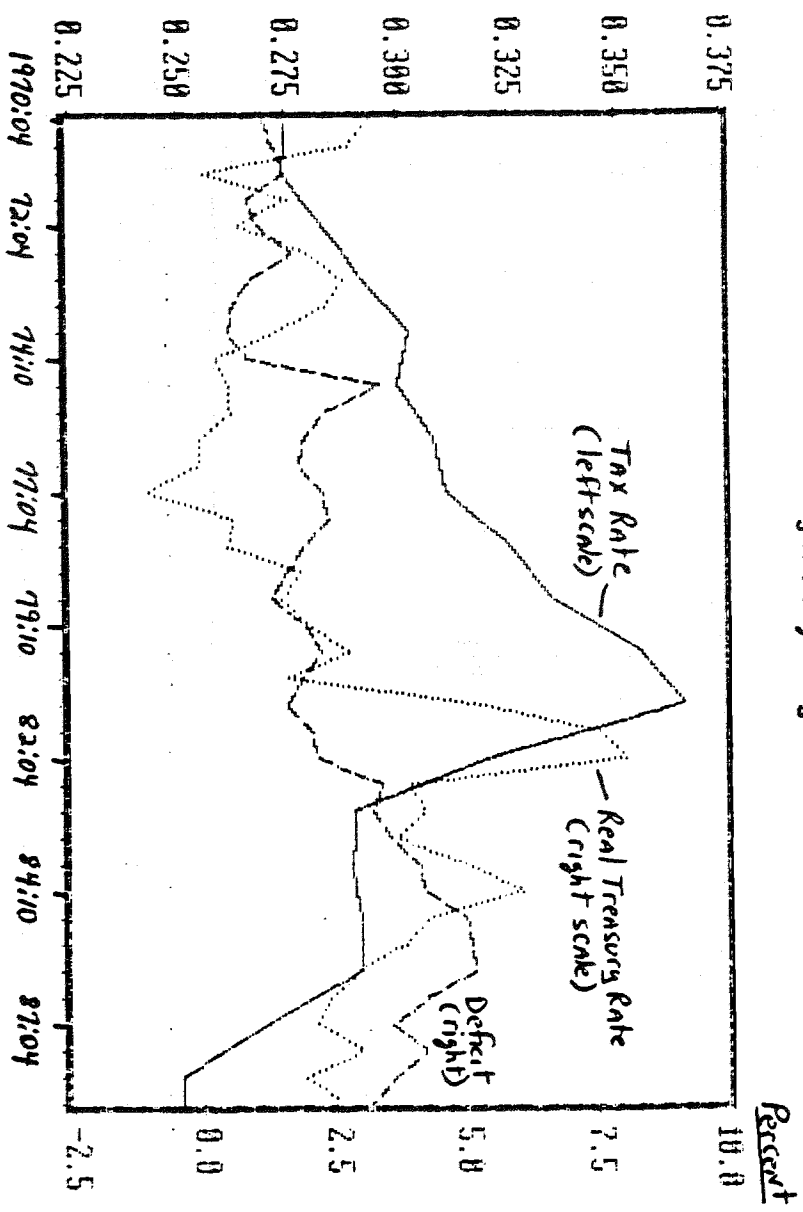
Figure 4
Pretax Real Six-month Treasury Bill Rate
And Monetary Policy Impact

— Real Bill Rate

— monetary Policy
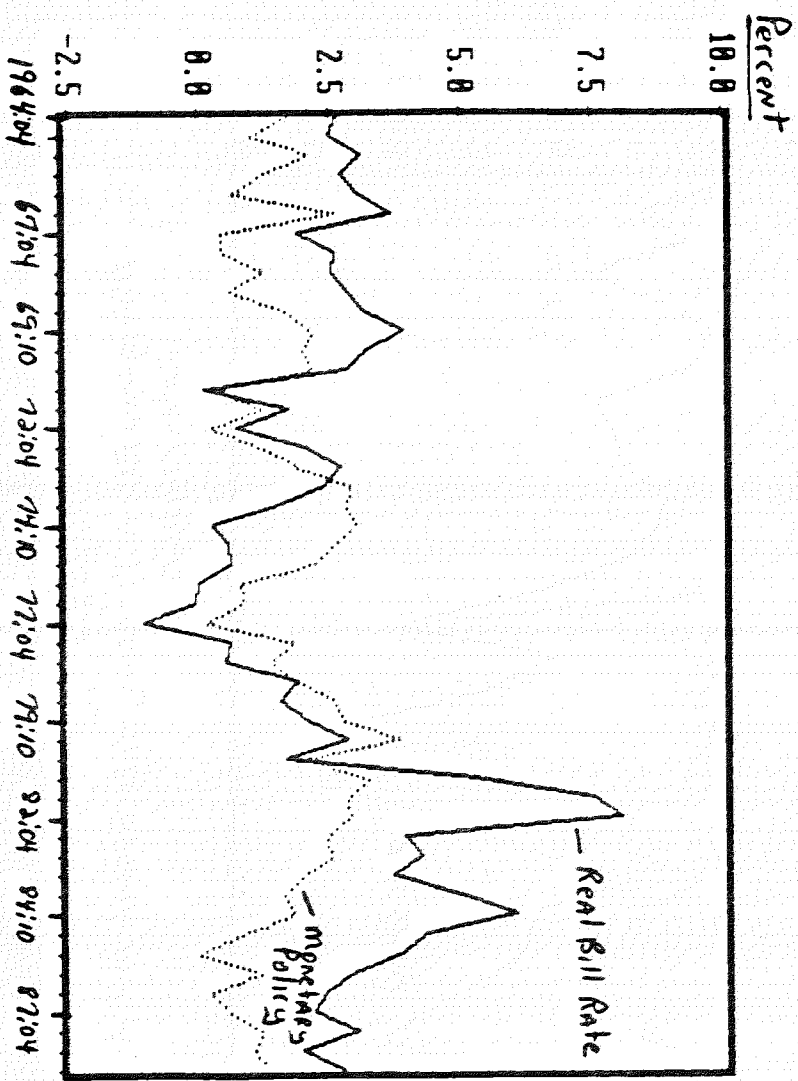
Figure 5
Mortgage Rate — Treasury Rate Spread And Interest
Rate Volatility
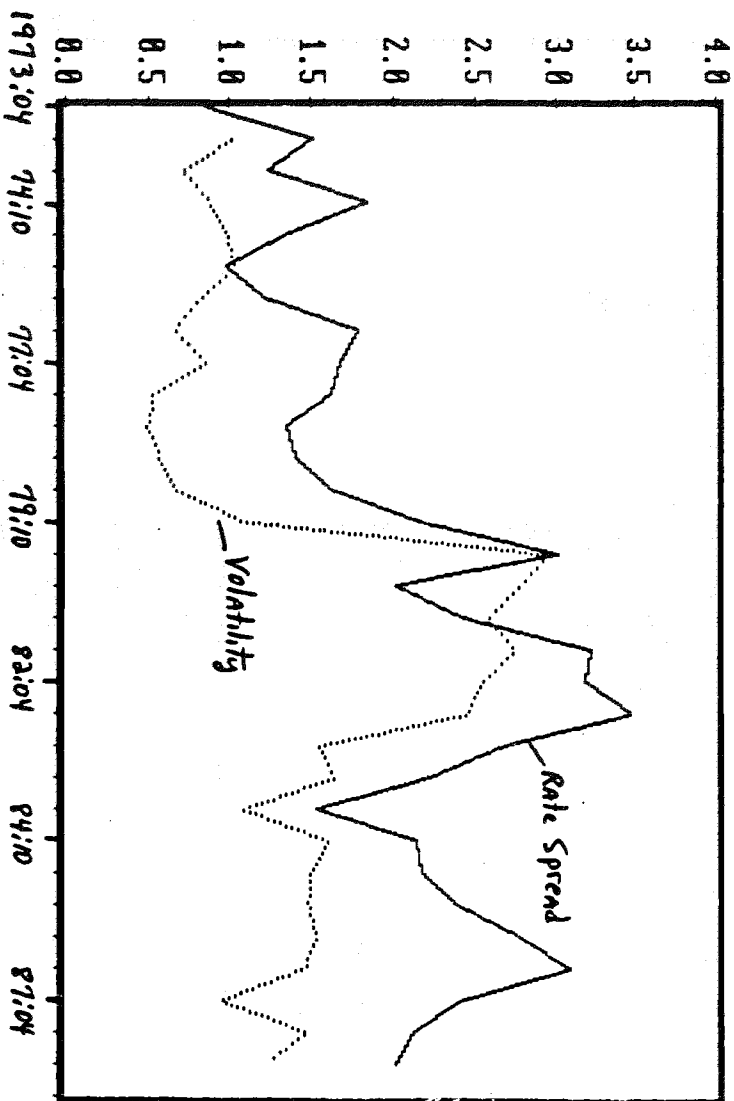
Figure 6

Effective Commitment Rate

Actual & Perfect Market

□ Actual   + Perfect Market

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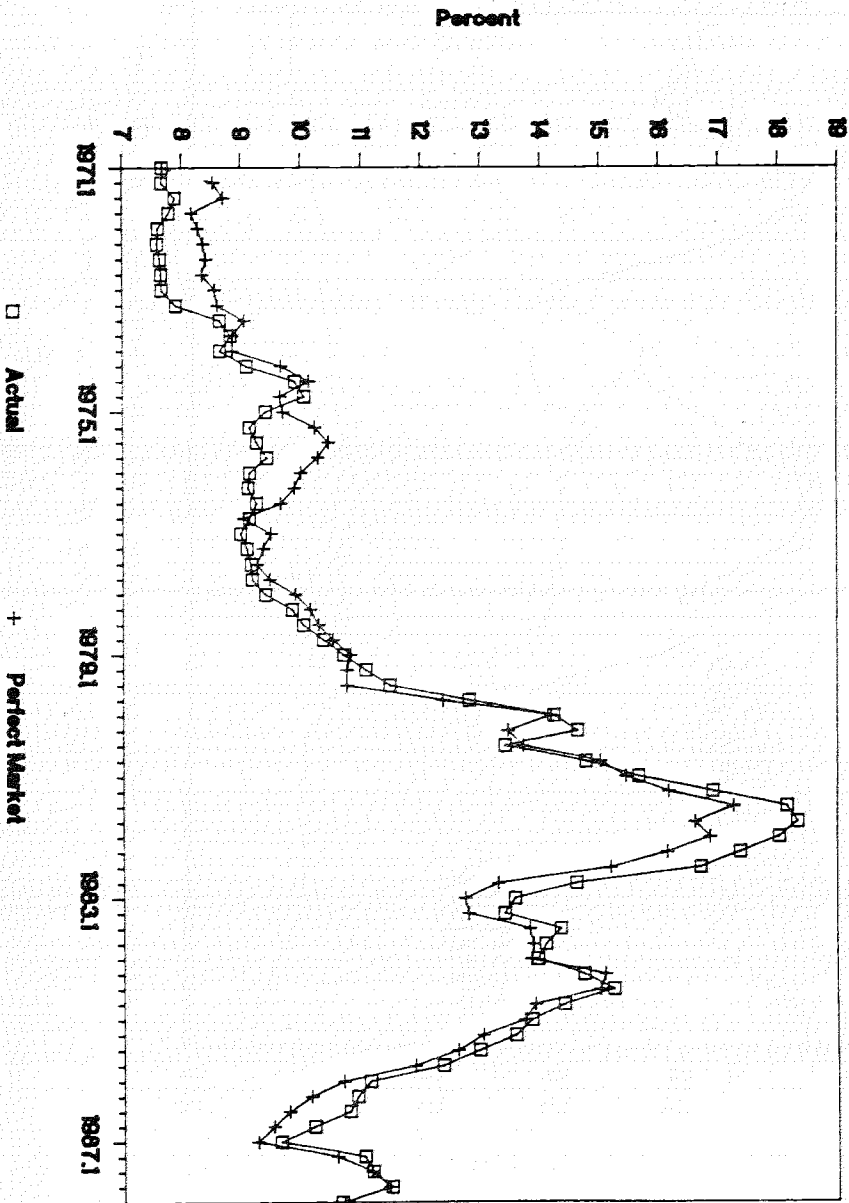
Figure 7

Ratio of One-year Exempt to One-year Taxable Yields,
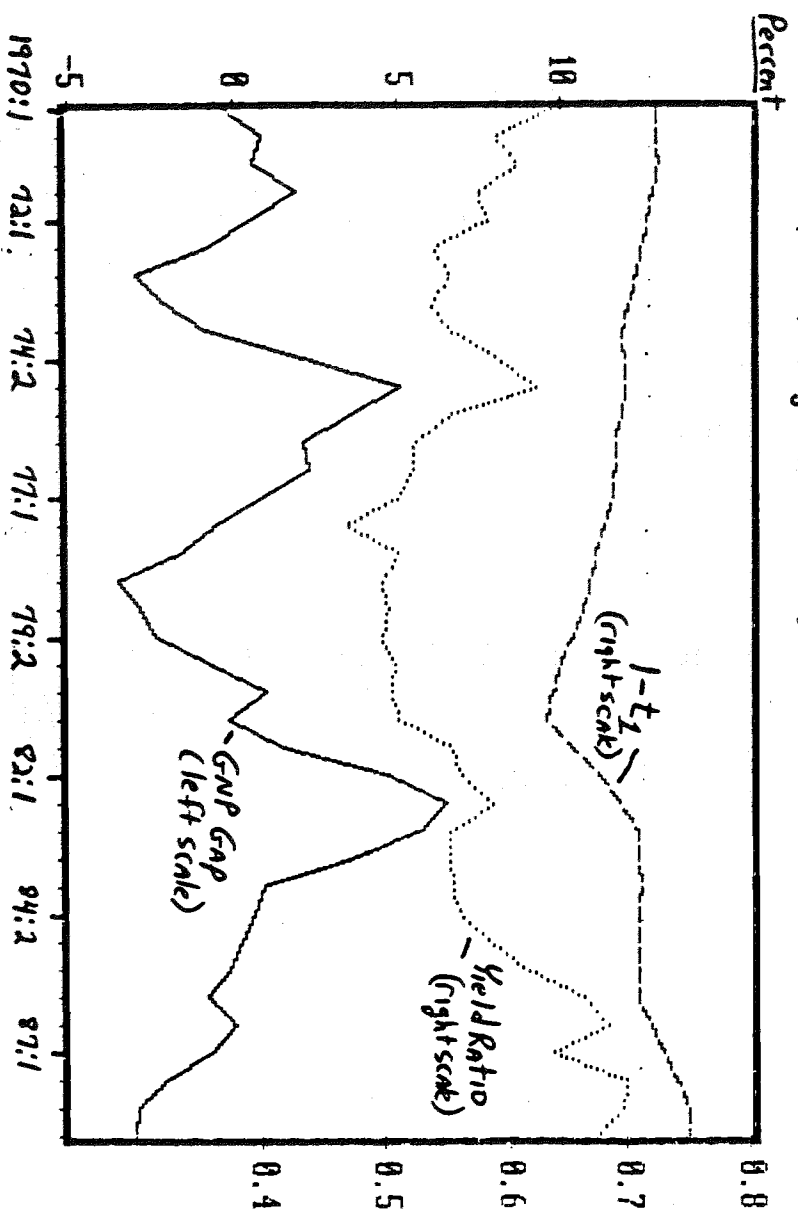One Minus Marginal Tax Rate, And Percentage GNP Gap

Figure 8
Ratio of Five-year Exempt to Five-year Taxable Yields,
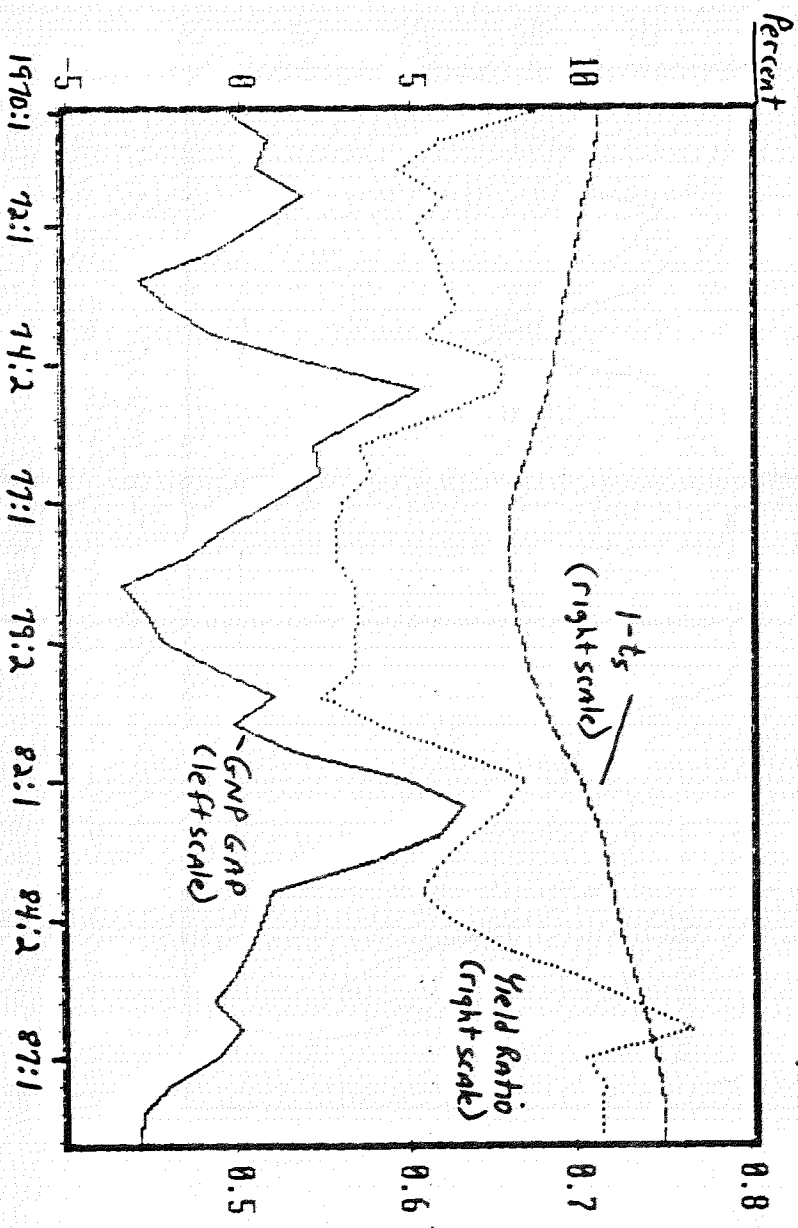One Minus Marginal Tax Rate, And Percentage GNP GAP

Figure 9

Ratio of One-year Exempt to One-year Taxable Yields: Actual and Fitted/Forecasted
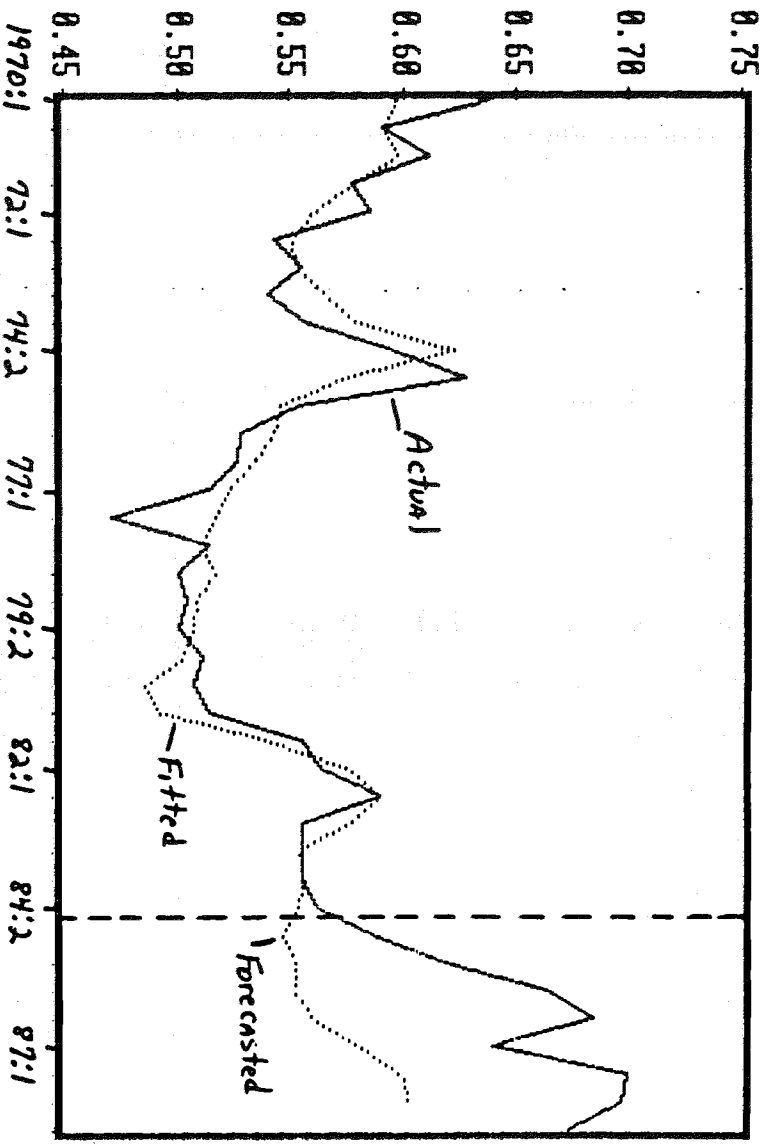
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Figure 10

Ratio of Five-Year Exempt to Five-year Taxable Yields:
Actual And Fitted/Forecasted