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The Role of the Capital Markets as Leading Indicators: Evidence from the United States since 1869

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Abstract

Recent empirical research, based on post-war data, finds that variation in the slope of the term structure is a more reliable indicator of U.S. economic growth and consumption than past stock returns. We throw doubt on the generality of these conclusions by studying pre-war macroeconomic data that reach back to 1869. We also examine changes in industrial production after 1953. In theory, prices in financial markets reflect investors' efforts to smooth consumption, expected changes in inflation, as well as the outlook for corporate profits. Our analysis suggests that the last factor accounts for most of the markets' predictive power. However, for 1983-1987, survey forecasts of changes in industrial production clearly outperform the out-of-sample econometric forecasts developed here.

I. INTRODUCTION: CAPITAL MARKETS AND THE BUSINESS CYCLE

RECENT research in finance concludes that both stock and bond market data contain valuable information about future economic activity but that conditions in the bond market are most important. In particular, Harvey (1989) finds that, for the 1953-1989 period, forecasts based on the nominal yield curve are superior in terms of regression R-square. Past movements in interest rates explain about 30 percent of the annual variation in GNP. In contrast, past stock returns explain less than 5 percent. In earlier work (1988), Harvey observes that the lagged real yield curve has modest predictive power for per capita growth in real consumption. The R^2's are small (they vary between .01 and .12) and much hinges on the results of just one sub-period, 1972-1987. Nevertheless, the real yield spread greatly outperforms one-quarter lagged real stock returns or one-quarter lagged consumption growth. Also, its explanatory power seems "nontrivial" compared to commercial econometric models (1988, p. 331).[1]

The empirical link between the yield spread and the business cycle is consistent with intertemporal valuation theories such as the consumption-based capital asset pricing model (CCAPM). The CCAPM implies a linear relation between expected real returns and expected consumption growth. Its foundations reach back to Irving Fisher (1907). In theory, consumption depends on wealth and the representative agent prefers a smooth consumption stream through time. When current income is high (low) in relation to wealth, investors

[1]Based on 1953-1986 data, Campbell and Mankiw find that the predictable variation in consumption "cannot be explained as a rational response to movements in real interest rates" (1989, p. 186). But, as with Harvey, the difficulty of measuring consumption may be responsible for the weakness of the evidence. See Breeden et al. (1989) for a discussion of these issues.

want to save more (less) and required rates of return (r_t) on financial assets adjust so that, in equilibrium, they reflect the marginal utility of expected future consumption relative to the marginal utility of present consumption. If the supply of investment opportunities is not unusually large (small), higher savings pull expected real returns down and lower savings push returns up. Investors' hedging behavior further twists the real yield curve up (or down) as good economic times (bad times) lie ahead. Elegant modern interpretations of Fisher's theory appear in many places, including Merton (1973), Rubinstein (1976), Lucas (1978), and Breeden (1979).

Following Shiller's (1984) terminology, the CCAPM is a "demand-side" theory of asset prices, to be contrasted with more familiar "supply-side" discount models (see, e.g., Fama and Miller, 1972). In supply-side models, asset prices vary with the magnitude of the cash flows (coupons, dividends, or earnings) which investors expect to receive in the future. For stocks, this means that prices now (P_t) reflect anticipated dividends (D_{t+j}) so that, if r_t remains constant through time and γ is defined as $1/(1+r)$, $P_t = \sum \gamma^j D_{t+j}$, where j runs between 1 and ∞. Since corporate profits move with GNP over the business cycle, dividend discount models predict that stock prices fall if investors come to believe that an economic downturn is imminent. Similarly, prices should rise if the market foresees an upturn.[2] But, as mentioned, Harvey finds only minimal support for this hypothesis.[3]

The weak forecast power of past stock returns as well as

[2]Besides an improved outlook for corporate profits, there are at least two more channels which link stock returns and real activity. First, stock prices and production may both respond to a third set of variables, for example, a fall in interest rates which stimulates investment. Second, stock prices change investor wealth which affects the demand for consumption and investment goods. See Bosworth (1975) and Barro (1990).

the role of the term structure are likely to surprise many financial economists. Surely, Harvey's results for 1953-1989 invite a second look at the data. In this paper, we pose several questions. First, do the post-war findings stand the test of time, i.e., do they apply to the pre-war period? Second, is the evidence "robust" to slight changes in design and in data definitions? Third, do market-based forecasts of real activity still impress us if they are compared to the predictions of professional economists? Our contribution is to introduce new U.S. data and new variables into the analysis.

The results of our "robustness" tests warn against an uncritical acceptance of Harvey's findings. Section II begins with a look at history. Specifically, we predict annual and quarterly growth rates in real GNP (RGNP) and real consumption (RCONS) using stock and bond market data which go back to 1869. While few papers are based on pre-war data --Schwert (1990) is an exception-- the early data strongly confirm economists' intuition, that the stock market is an important leading indicator (Fama, 1981, 1990; Kaul, 1987). Near-term stock price changes have most predictive power. However, price movements as distant as four years before the start of the period for which GNP is forecast appear relevant. There is much less evidence, if any, that interest rates are helpful in predicting GNP or consumption.

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[3]The evidence recalls the joke that Wall Street predicted nine of the last four recessions. For instance, the 1987 crash was not immediately followed by an economic slowdown. A weak link between asset prices and GNP is consistent with the claims of social psychologists and others (e.g., Shiller, 1990) that prices are "excessively" volatile and bear little relation to economic fundamentals. Alternatively, (1), market prices may be less informative because they vary as investors rationally weigh scenarios which, ex post, never materialize. A second possibility, (2), is that prices rationally change with the arrival of news about the more distant future, i.e., beyond the period over which economic activity is measured. This is the "data alignment problem" discussed in Shiller (1990, Chapter 6). Finally, (3), note that stock prices may obscure the market's true forecast power because of variation in expected returns.

In Section III, our attention turns to the post-war period (1953-1987) and forecasts of semi-annual growth rates in industrial production (IP). We uncover more evidence that the stock market leads real activity but we agree with Harvey on the moderate importance of past variation in the real term structure. Eight months before the start of the period for which IP is forecast, we decompose the nominal yield curve into expected changes in real interest rates and expected changes in inflation. Interestingly, the forecast power of the nominal slope derives more from inflationary expectations than from real interest rates.

To gain further perspective on the quality of the econometric forecasts, we compare them to those of professional economists. The forecasts are taken from the well-known Livingston surveys. The survey predictions are clearly superior. It does not seem that they would benefit from additional emphasis on the capital market indicators which we study.

The results in this paper bear upon the central issues of investor and market rationality. On the one hand, we do not find the stable relationship between interest rates and economic fluctuations suggested by CCAPM. On the other hand, stock prices do appear forward-looking. Throughout, it is important to remember, however, that the market-based financial variables which successfully predict RGNP, RCONS, and IP are chosen on the basis of goodness-of-fit as well as theory. Like much other research in this area, our work may be characterized as "exploratory data analysis." Only broad hypotheses are formulated and some findings --e.g., the role of expected inflation -- are puzzling from the perspective of financial theory. In truth, therefore, the challenge to explain <u>why</u> the capital markets predict economic activity has merely begun.

II. REAL GNP, CONSUMPTION, AND THE CAPITAL MARKETS: 1869-1983

The empirical analysis follows a straightforward regression framework: $Y(T)=\alpha + \beta X(T) + \epsilon(T)$ where α is the intercept, β is a vector of coefficients, and X(T) is a common set of independent variables known at the start of period T or earlier. All X's are financial statistics. The dependent variable Y(T) is either the growth rate in real GNP (RGNP) or the growth rate in real consumption (RCON). The regressions are meant to judge how useful the financial indicators are for the prediction of real activity.

A. Data

All the historical data used in this Section are found in the appendices to Shiller (1990) and Balke and Gordon (1986). These publications provide references with exact details on the series' compilation. In most cases, the data are gathered from various sources. A brief summary discussion follows.

We use three types of data: Macroeconomic series, stock market statistics, and interest rates. The data are either quarterly or annual. Names of variables which are measured each quarter end with the letter "Q."

Our concern is with the prediction of RGNP and RCON. The GNP data are from Friedman and Schwartz (1982), Kuznets (1961), the Commerce Department, and the National Income and Product Accounts (NIPA). RGNP equals 100 times the logarithm of the ratio of real GNP for year T to the equivalent number for year T-1. RCON is defined in a similar way. Consumption is for nondurables and services and it is measured per capita. Quarterly real consumption growth rates (RCONQ) are based on NIPA. RDURQ measures the quarterly growth rate for consumption of durable goods. The quarterly growth rates are not annualized.

M2G represents the annual growth rate in the M2 money stock and MBG is the growth rate in the monetary base. The early data are from Friedman and Schwartz (1963; 1982). Later numbers are from various issues of the Federal Reserve Bulletin.

Stock market returns for the last year (RET) or for the three years prior to last (HISR) are computed from the January values of the Standard and Poor's Composite Stock Price Index. The returns are not corrected for dividends. Figure I plots RET as well as RGNP. The (annual) market-wide price-to-earnings ratio (PE) is calculated by dividing the value of the stock index by annual nominal earnings (adjusted to index). The original data are either from Cowles (1939) or Standard & Poor's Security Price Index Record.

With quarterly observations, RETQ and HISRQ are defined somewhat differently. RETQ is the return for the last quarter. HISRQ is the return for the three years prior to the last quarter. Again, no adjustments are made for dividends.

We also make use of representative short- and long term interest rates. SHORT is the rate on 4-6 month prime commercial paper. The early data are from Friedman and Schwartz (1982); recent data from Banking and Monetary Statistics and Citibase. LONG represents the yield on Moody's Baa-rated corporate bonds. Data prior to 1919 are yields on railroad bonds reported by Macaulay (1938). Both SHORT and LONG are plotted in Figure II. The gap between these rates, TERM=LONG-SHORT, defines the yield spread (also called "the slope" of the term structure). ΔSHORT,

ΔLONG, and ΔTERM are found by first differencing the underlying series with the same name.

Finally, we compute the GNP deflator -- nominal GNP divided by real GNP -- and, each quarter, we estimate (annualized) six-month inflation (INFQ). Quarterly observations of the six-month ex post real rate on commercial paper (RRQ) equal SHORTQ-INFQ.

B. Summary Statistics: 1875-1983

Summary statistics are provided in Table I. Since 1875, real GNP in the United States has grown at an annual rate of 3.28 percent, with a standard deviation of 5.97 percent. As one would expect, the average growth rate in real consumption per capita is considerably lower (1.71 percent) and less variable (3.47 percent). With annual observations, RGNP does not show any obvious time-series pattern. However, quarterly growth rates in real GNP display strong positive first-order serial correlation. Below, regressions that explain RGNPQ exploit the persistence with an autoregressive term on the right-hand side.

The average price/earnings ratio for the S&P-Index (PE) is about 14. PE changes gradually through time. The average annual capital gain on stocks (RET) is a mere 3.15 percent; however, the standard deviation is 18.08 percent! There is weak evidence of positive first-order autocorrelation in quarterly stock returns (RETQ). Since adjacent observations share an overlap of two years or more, HISR and HISRQ are highly autocorrelated by design.

The average yield spread (TERM) is 1.55 percent. Yields on commercial paper and corporate bonds show a great deal of persistence. Except for ΔLONG, first differencing removes this predictability. By construction, quarterly observations of six-month inflation (INFQ) are positively auto-correlated at lag one. However, also for higher lags, there is permanence in INFQ which reflects itself in the behavior of ex post real rates (RRQ). Perhaps, the predictability of inflation is itself a consequence of the apparent time-series patterns in the growth of the monetary base and M2.

C. The Regression Evidence With Annual Data: 1875-1983

Tables II and III summarize our findings. The tests in Table II (top panel) are run with annual observations. In general, the regression equations may be written as:

$$RGNP(T)=\alpha_0 + \beta_1\ RET(T-1) + \beta_2\ HISR(T-4,T-2) + \beta_3\ Z + \epsilon(T)$$

Z represents any of three bond market variables: TERM(T-1), SHORT(T-1), or ΔLONG(T-1)=LONG(T-1)-LONG(T-2). Note that the values of all predictor variables are known at the start of period T. The equations in the bottom panel of Table II have RCON(T) as the dependent variable but are otherwise similar. All the regressions are estimated using ordinary least squares.

For the period starting in 1875, between 20 and 25 percent of the annual variation in RGNP is explained by price movements in the stock and bond markets.[4] Innovations in stock prices (RET) are the single most important factor and past market run-ups or run-downs (HISR) also play some role.

[4]The R-squares in Table II seem low compared to previous work, e.g., Fisher and Merton (1984) where last year's real return on the S&P-Index by itself explains 54 percent of the variation in real GNP growth rates. However, the Fisher and Merton results are very much a function of the period (1950-1982) which these authors study. We closely replicated some of their findings (1984, Table 2, p. 68). Also, for the 1950-1982 period, a regression like ours with RGNP as the dependent variable and with RET, HISR, and ΔLONG on the right-hand side has an R-square of .67, more than double the .28 (1926-1983) or .25 (1875-1983) reported in Table II.

Interestingly, HISR shows the "wrong" sign. After a big bull market, it becomes more likely that the economy turns towards recession. Conversely, expansions are more likely after bear markets. As far as we know, to predict RGNP, previous researchers have not systematically looked back at stock returns beyond one year. Nevertheless, HISR is a logical choice in view of the recently discovered long-term mean-reversion in stock returns.[5]

Bond market conditions add little if anything to the regressions' explanatory power. In the top panel of Table II, only ΔLONG is significant and then only after 1926. When long-term rates rise --and the prices of corporate bonds fall-- future growth in GNP slows, perhaps because of declines in business investment or new housing starts.[6] Other bond market statistics do not display any consistent forecasting power.

For nearly a century, there is no hint that bond market indicators are any more useful in predicting RCON. Still, the bottom panel of Table II confirms the forecasting role of the stock market. Obviously, these findings seem totally at odds with Harvey who examines the last 35 years. However, when we repeat our RCON regressions starting in 1953, the coefficient for RET is .03 (t-statistic: 2.7) and it is .30 for TERM (t-statistic: 2.0). The R-square

[5]For a survey of the literature, see De Bondt and Thaler (1989). Note that the observation that HISR predicts RGNP with the wrong sign --relative to dividend discount models with a constant cost of capital-- is consistent with the "overreaction" interpretation of the price reversals. Perhaps, in bear markets, investors are excessively pessimistic about the distant outlook for corporate profits. Conversely, in bull markets, they may be too optimistic. Clearly, this scenario does not preclude that prices maintain some predictive power for IP in the immediate future.

[6]In other words, rising long-term rates may be a causal factor in the business cycle (rather than an early predictor). Of course, alternative explanations are possible. For example, when a recession is on the horizon, the prices of corporate bonds and stocks may fall together because of increased default risk. However, as it turns out, RET(T-1) and ΔLONG are nearly uncorrelated for the 1875-1983 period.

reaches as high as .47![7] It thus appears that Harvey's bond market results are specific to the post-war period.

D. The Regression Evidence With Quarterly Data: 1875-1983

Most regressions in Table III can be written as:

$$RGNPQ(T)=\alpha_1 + \gamma_1 RETQ(T-1) + \gamma_2 RETQ(T-2) + \gamma_3 ZQ + \eta(T)$$

ZQ represents either HISRQ(T-14,T-2) or one of four bond market indicators: TERMQ(T-2)=LONGQ(T-2)-SHORTQ(T-2), SHORTQ(T-2), RRQ(T-2), or ΔLONGQ(T-2)=LONG(T-2)-LONG(T-3). We have no quarterly values of the S&P-Index reaching back into the 19th century. Consequently, some regressions in Table III drop stock return data. The equations in the bottom panel attempt to explain quarterly growth rates in real consumption (RCONQ).

From Table III, there can be little doubt that stocks returns for the last six months are useful predictors of RGNPQ and RCONQ. When the 1905-1983 sample is split in 1953, the beta-estimates for RETQ(T-1) and RETQ(T-2) -- though smaller for 1954-1983 -- are significantly different from zero for both sub-periods.[8]

The value of the bond market indicators is more in doubt. For the whole sample (1876-1983), it appears that SHORTQ, RRQ, and ΔLONGQ play a role. However, these findings are driven by the post-war data. Here, even TERMQ is strongly significant. One way to evaluate the importance of the

[7] As with the regressions in the bottom panel of Table II, this includes a significant AR(1)-term. Note that, for 1953-1983, the first-order autocorrelation of RCON is .24 and that the correlation between RET(T-1) and TERM(T-1) is .46. A regression of RCON on TERM(T-1) and an AR(1) has an adjusted R-square equal to .35.

[8] In contrast to the regressions with annual data, HISRQ never added any explanatory power.

bond market indicators is to consider how much they add in R-square. For 1905-1953, a naive time-series model of RGNPQ which merely exploits its first-order autocorrelation has an adjusted R^2 of .17. Adding RETQ(T-1) and RETQ(T-2) as explanatory variables raises the R^2 to .34 but adding further bond market statistics has no effect. The picture is quite different for 1954-1983. The AR(1)-model has an R^2 of .15 and the introduction of stock returns brings it up to .25. As seen in Table III, the bond market indicators now add as much as .09 in R^2.[9]

In sum, the regressions with quarterly data confirm the results with annual data: The link to changes in real activity and real consumption is relatively convincing for stock market indices but it is much more tenuous for interest rates.

III. INDUSTRIAL PRODUCTION AND THE CAPITAL MARKETS: 1953-1987

We now turn to the post-war period and we look into the determinants of changes in industrial production (IP). Such changes are of special interest for several reasons. First, IP is a more volatile series than real GNP- or consumption. For example, for the last seven recessions in the United States, the average fall in real GNP was 2.6 percent. The average decline in IP amounted to 9.7 percent. Second, stock prices stand a better chance of predicting changes in IP because conditions in the stock market primarily reflect what happens to the corporate sector (rather than, say, the farm economy). Third, we have access to survey expectations of IP.

[9]The estimates for the post-war period may be tainted by multicollinearity. The correlations between TERMQ and RETQ(T-1) and RETQ(T-2) are .17 and .38 for 1954-1987; they are .03 and .05 for 1905-1953. See footnote 7 for similar results with annual data.

A. Data

The post-war data fall into four categories: Macroeconomic series, stock returns, bond yields, and economists' forecasts. The consumer price index (CPI) and industrial production statistics are made available by Citibase. Both series are transformed into percentage growth rates per annum. IP is seasonally adjusted but the CPI is not.

Stock returns are computed from the S&P-Index of 425 Industrial Companies, published in Standard & Poor's Corp. 1988 Security Price Index Record. The index is not adjusted for dividends.

The interest rate data were first collected by J. Huston McCulloch and are published in Shiller and McCulloch (1987). They are zero coupon yield curve series computed on an annual percentage continuously compounded basis.[10] The yields are available for maturities from zero months through twenty-five years but we only use the six-month, nine-month, one-year and two-year rates. Below, the yields on eight- and fourteen-month instruments are estimated by linear interpolation.

The sources of the economists' forecasts are the Livingston surveys. In early June and December of each year since the 1940's, Joseph Livingston of the Philadelphia Enquirer and, later, the Federal Reserve Bank of Philadelphia have collected various macroeconomic forecasts.[11] Here, we con-

[10] McCulloch's data set includes most marketable U.S. Government treasury bills, notes, and bonds. For the last trading day of each month, closing bid and ask quotations reported in dealer quote sheets or the next day's Wall Street Journal are averaged. If they sell above par, callable bonds are treated as if they mature on their call dates. No callables are used after August 1985.

[11] We thank Henry Min from the Federal Reserve Bank of Philadelphia for providing the survey data.

sider predictions of the levels of the CPI and IP at the end of the following June and December. The last CPI and IP statistics known to the survey participants are those for April or October so that the forecasts cover either eight or fourteen months. Even though we have the individual forecast data, we work with "consensus" forecasts which are the means of, on average, 52 respondents' predictions. For comparability with our earlier Citibase data, both series are in percentage expected growth rates per annum.

B. Testing Methods

To examine the relationship between asset returns, yields, and future real activity, we again estimate various multiple regression equations. In every case, the dependent variable (IP) is the annualized actual growth rate in industrial production for the six-month periods which start in each January or July between 1954 and 1987. Figure III plots this variable. There are 68 consecutive six-month time spans (T=1,..,68).[12]

Three measures of stock returns are used: [1] the historical three-year cumulative return on the S&P (excluding dividends) for the period ending seven months prior to the start of period T (RET3Y); [2] the seven-month S&P return between end May and December (or between November and June of the following year) immediately prior to the start of period T (RET7M); [3] the price-to-earnings ratio for the S&P end May (November)(PE). The slope of the term structure (TERM) is computed as the difference between the nominal yield on a 14-month instrument (LONG) and the yield on an 8-month bill (SHORT). Both yields are annualized and

[12]Since the dependent variable is defined for nonoverlapping periods, we again use OLS.The timing of the independent variables is linked to the timing of the Livingston forecasts. The rationale for this procedure becomes clear later.

they are observed on the last trading day of each April (October) eight months before the start of period T.

One often thinks of the nominal interest rate on a bill (bond) as the sum of the expected real rate and the rate of inflation expected to occur over the life of the instrument. However, it is almost impossible to know what the market's ex ante real rate and expected inflation rate are since neither is directly observed. A common approach is to predict inflation over the instrument's maturity and to subtract an annualized forecast from the nominal rate. For example, Harvey (1988) produces naive time-series forecasts of inflation based on an IMA(1,1) process. A different method, followed here, starts by assuming that the 8- and 14-month Livingston consensus forecasts of inflation (denoted EINF8 and EINF14) are adequate proxies for market expectations. Then, by subtraction, we find the real interest rates REAL8=SHORT-EINF8 and REAL14=LONG-EINF14. The slope of the real term structure is defined as RTERM=REAL14-REAL8. The (scaled) expected inflation change, ECINF, equals EINF14-EINF8. By construction, TERM=RTERM+ECINF.

The Livingston survey dates matter for our timing conventions because, at the start of period T, the forecasts of inflation that we use are eight months old. This, in fact, motivates our use of a TERM spread which is also eight months old. From the perspective of the Livingston forecast date (t), T runs between t+8 and t+14. Accordingly, INFL(t+8,t+14) is the actual annualized six-month inflation rate for T and IP(t+8,t+14) is the industrial production growth rate for that period. The equivalent Livingston consensus forecast is represented by AIP(t+8,t+14). AIP is found by comparing the 8- and 14-month IP-forecasts. For the econometric work later, this procedure avoids any ambiguity about which was the <u>last known level</u>

of IP just prior to the survey. Like IP, AIP is plotted in Figure III. Actual IP-growth is the sum of anticipated IP-growth (AIP) and unanticipated growth (UIP). Similarly, INFL is the sum of anticipated (AINF) and unanticipated inflation (UINF).

C. Summary Statistics: 1953-1987

Tables IV and V provide means, standard deviations, auto-correlations and cross-correlations for the economic variables of interest. There are 68 observations for each variable, one for each six-month period. To repeat, the different periods start approximately seven months after each Livingston forecast date (early June 1953, December 1953, .., December 1986). For the 34 years between January 1954 and December 1987, the average (annualized) six-month growth rate in U.S. industrial production is 3.46 percent, with a standard deviation of 7.34 percent.

IP is positively correlated with RET7M, TERM, and the expected change in inflation (ECINF), and negatively correlated with RET3Y and the anticipated --as well as later realized-- level of inflation. There is only a weak link between anticipated and realized industrial production. Much of the uncertainty about IP is resolved during the months prior to the start of the period that is forecast (T) since the correlation between UIP and RET7M is .52. Interestingly, forecasts of inflation and IP move together. The Livingston economists associate greater economic growth with larger increases in consumer prices.

On average, the nominal term structure is upward sloping and the real term structure is flat. Changes in expected inflation are negatively related to changes in real interest rates (the correlation is -.56). Since we compute differences in nominal yields between 8- and 14-month instruments, TERM is relatively small compared to the numbers reported in other studies (e.g., Fama and French, 1989). Nevertheless, from previous work (De Bondt and Bange, 1990), we know that the variation in TERM is representative of more general movements in the yield curve.

Table IV shows means for the years 1953-1987. We report separately for recessionary periods. The dates of business cycle peaks and troughs are taken from the National Bureau for Economic Research.[13] The 2nd, 3rd, and 4th columns in Table IV show means for observations corresponding to Livingston forecast dates which are closest to business cycle peaks, closest to troughs, or in between.

It appears that, about 7 months after a business cycle peak, actual IP is typically negative (-2.64 percent) even though anticipated IP at the peak is still positive (2.09 percent). At troughs, IP beats expectations notwithstanding the fact that AIP already exceeds the 1953-1987 average. The increased growth expectations are accompanied by expectations of higher inflation (in Table V, the correlation between AIP and AINF is .45).

The slope of the term structure turns with the business cycle. At peaks, short term interest are above long rates and the slope of the yield curve is negative. In contrast, at troughs, the slope is more steeply upward than usual. Most of this movement is associated with changes in expected inflation (ECINF). For the whole 1953-1987 period, inflation is on average higher than anticipated but this is not the case during recessions, especially at the trough.

[13] For peaks, the dates are July 1953, August 1957, April 1960, December 1969, November 1973, January 1980, and July 1981. For troughs, they are May 1954, April 1958, February 1961, November 1970, March 1975, July 1980, and November 1982.

D. <u>The Regression Evidence</u>: <u>1953-1987</u>

Equations (1) through (4) in Table VI study the role of bond market indicators, equation (5) considers stock market returns, and equations (6) and (7) combine both data sets. Generally, the R^2's of the regressions are substantial. The bond market variables explain roughly 15 percent of the variation in IP(t+8,t+14) and the stock market variables explain another 30 percent. Clearly, the two sets of predictors are related since their combined explanatory amounts to about 35 percent.

Equation (1) shows that an upward-sloping nominal yield curve is associated with larger growth in IP. Obviously, we would want more detail on the sources of this predictive power. By construction, TERM equals SHORT-LONG but equation (1) forces the same coefficient on both sets of interest rates (with opposite signs). Equation (2) relaxes this constraint. Besides the difference between long and short rates, the general <u>level of interest rates</u> may have an independent influence on IP. A simple test is to run IP on SHORT as well as TERM, variables which are weakly related ($\rho_{SHORT,TERM}$=-.20). The R^2 is .16. For TERM, the coefficient remains roughly the same as in equation (1) but, for SHORT, it equals -.46 (t-statistic: -1.8).

Equations (3) and (4) form the basis for yet another interesting contrast, between RTERM and ECINF. A bivariate regression of IP on ECINF would indicate a positive relationship (β=7.53; t-statistic=2.1) but the R^2 is only .05. Equation (3) shows even less of a link between IP and RTERM. Since RTERM and ECINF are highly collinear ($\rho_{RTERM,ECINF}$=-.56), there is some question whether their t-statistics in (4) can be trusted. On balance, the forecast power of TERM seems to be more a function of expected inflation than of expected real rates. For example, the 8- and 14-month Livingston consensus forecasts of inflation (EINF8 and EINF14) have forecast power for IP but the corresponding real rates (REAL8 and REAL14) do not.

Much of the predictive power of stock returns is short-term. When we regress IP on RET3Y (not reported in Table VI), the estimated slope equals -.07 (t-statistic: -2.0) and the R^2 is .04. Adding RET7M on the right-hand side improves the R^2 of equation (5) substantially.[14] As mentioned earlier, the result that past stock returns lead IP is not new. It is interesting, however, that the coefficient on RET3Y remains <u>negative</u> in both regressions! This is similar to our findings in Section II.

Equations (6) and (7) use both stock and bond market predictors to forecast industrial production. Table VII repeats equation (7) for three subperiods. We split the 1954-1987 period in half. In addition, the period starting in June 1980 is of some interest because of the much-investigated U.S. monetary regime change at the end of 1979. The term structure variables, RTERM and ECINF, gain most of their forecast power during the 1970s. In contrast, RET7M is important throughout. RET3Y is particularly significant during the 1980s.

E. Survey Forecast Error Analysis

Harvey finds that predictions based on capital market data beat those sold by commercial forecasting services or generated by leading econometric models. Below, we check the

[14] On the other hand, adding the S&P price-to-earnings ratio (PE) adds no R-square and a regression of IP on PE completely lacks in explanatory power. Note that the R-square of regressions similar to (5) is always much higher than in Harvey (1989). However, Harvey uses past one- and four-quarter stock returns to predict growth in GNP (rather than industrial production).

robustness of this result by comparing the performance of the regression models with the Livingston survey forecasts.

Rationality Tests

Our study of the surveys starts with standard rationality tests. A familiar restriction implied by rational expectations is unbiasedness, i.e., in a regression of outcomes on forecasts, $IP(T)=\alpha + \beta\ AIP(T) + \epsilon(T)$, the intercept and the slope should be statistically indistinguishable from, respectively, zero and one. As it turns out, we cannot reject unbiasedness for the 1954-1987 period. The intercept, α, equals 1.15 (t-statistic: .82) and β is .63 (t-statistic: -1.23). It is interesting to note that the regression R^2 is barely .05. Thus, eight months before the start of period T, little is known about future industrial production growth.

A second approach to test for rationality is to check whether public information, available at the time of the forecast, is correlated with IP-forecast errors. Could the survey participants improve their forecasts by giving proper weight to capital market indicators? We study regressions similar to those in Tables VI and VII but now UIP, the unanticipated growth component, is the dependent variable. Under rationality, neither the intercept nor the slope coefficients should be statistically different from zero. As seen in Table VIII, there is mild evidence of systematic error. Perhaps, the typical economist does not pay enough attention to conditions in the bond market. The higher the level of short-term interest rates, and the more short rates exceed long rates, the more actual IP-growth remains below expectations.[15]

[15] Of course, from the perspective of Section II, this lack of attention may be completely justified. The apparent post-war link between real growth and interest rates could well be "spurious."

The relationship between survey forecast errors and interest rates derives more from expected inflation than from real rates. For example, if SHORT is decomposed into REAL8 and EINF8, a regression of UIP on REAL8 (not shown in Table VIII) has an adjusted R^2 of -.01. In contrast, with EINF8 on the right-hand side, the R^2 is .15. Notice further that, in Table VIII, the R^2 for equation (3) is zero. A comparison of equations (1) and (4) shows that R^2 falls if we split TERM into RTERM and ECINF. On the other hand, the t-statistic for RTERM in equation (4) is large. That statistic is suspect, however, because RTERM and ECINF are highly correlated.

Out-of-Sample Forecasts of Industrial Production

A third way to judge the relative quality of the industrial production forecasts is to compare the average (AVE) and mean absolute errors (MABE) of the surveys with the prediction errors generated by regressions studied earlier. It may well be, however, that those estimates leave a false illusion of predictability since goodness-of-fit is an important consideration in the choice of the explanatory variables. The solution is to make forecasts out-of-sample. We focus on the five-year period starting in January 1983 and we use the following regression equation,

$$IP(t+8,t+14) = \alpha + \beta_1 \, RET3Y(t-36,t) + \beta_2 \, RTERM(t) + \beta_3 \, ECINF(t) + \upsilon(T)$$

The procedure starts by estimating $\hat{\alpha}$, $\hat{\beta}_1$, $\hat{\beta}_2$ and $\hat{\beta}_3$ for the 56 semi-annual periods with complete data (January 1954-December 1981) prior to 1982. Based on these estimates as well as the values of RET3Y, RTERM, and ECINF available in early June 1982, we predict IP for the period between January and June 1983.[16] The regression equation gets updated (57, 58, .., 65 observations) as we predict IP for later periods.

The annualized AVE is 1.36 percent for the Livingston consensus forecasts and -1.37 percent for the regression forecasts. MABE is 3.16 and 5.17 percent, respectively. Thus, the survey forecasts easily beat the regressions. The regressions do worse than even a naive forecast strategy which always predicts the average (annualized) IP-growth rate between January 1954 and December 1981: 3.10 percent. For this naive forecast method, MABE is 4.28 percent (AVE is 2.44 percent).

IV. COMMENTARY AND CONCLUSION

For the period after 1953, Harvey finds [1] strong (but unexplained) forecast power of the slope of the nominal term structure for real GNP-growth; [2] weak forecast power of the slope of the real term structure for consumption-growth; [3] weak forecast power of past stock returns for GNP- and consumption-growth.

This paper employs simple statistical techniques and a long data set to reexamine the cyclical relationships between U.S. economic fluctuations and financial markets. Our search is guided by modern consumption-based asset

[16] An extended example clarifies our methods. Consider the first period for which IP is forecast, January-June 1983. The Livingston survey is gathered late in the Spring of 1982 and our capital market forecast should be based on a comparable data set. In the Spring of 1982, data on actual IP were available through the end of 1981. Consequently, we can run a regression equation with 56 observations for IP, between January 1954 and December 1981. We find that $\hat{\alpha}=3.33$, $\hat{\beta}_1=-.07$, $\hat{\beta}_2=15.50$, and $\hat{\beta}_3=14.94$. For the 36 months prior to (and including) the last trading day of May 1982, RET3Y equals 9.47 percent. By construction, RTERM equals TERM on the last trading day of October minus ECINF. The annualized inflation forecasts are 5.70 percent (14 months) and 5.32 percent (8 months), so that ECINF=.38. The yields on 8- and 14-month instruments are 13.25 and 13.49 percent. Thus, TERM equals .24 percent and RTERM is (.24-.38)=-.14. In the end, after appropriate substitution, our econometric forecast for annualized IP-growth equals 6.26 percent. This is 7.68 percent less than actual later growth (13.94 percent) but comparable to the June 1982 Livingston forecast (6.06 percent).

pricing theories as well as standard dividend discount models. This approach is ultimately based on assumptions about investor rationality, risk-aversion, and perfect markets. The main findings are as follows:

1. Over a century of data, starting in 1875, indicates that past stock returns are a better predictor of real GNP and real consumption growth than other financial statistics.

2. In particular, the forecast power of the term structure is confined to the period after 1953.

3. For the period after 1953, growth rates in industrial production are better predicted by expected inflation movements than by changes in the real term structure. The forecast power of both variables is strongest during the 1970s.

4. Between 1983 and 1987, out-of-sample econometric forecasts based on stock and bond market data perform worse than survey forecasts.

Obviously, the above results throw some doubt on the generality of Harvey's conclusions and we would question his interpretation favorable towards CCAPM. Given the link between the post-war business cycle and interest rates but no clear finding of such relationship with pre-war data, caution suggests that the more recent results are not necessarily the most relevant, either as a test of financial theory or for practical forecasting purposes. Indeed, the experience after 1953 --and, especially, the inflation of the 1970s which weighs so heavily in the tests--may well be unique. In a broader context, Benjamin Friedman also makes this point when, after a review of the changing financial structure of the U.S. economy, he warns against accepting "the appearance of simple and eternal verities in much of the literature of monetary and financial aspects of business fluctuations" (1986, p. 437).

What then distinguishes the post-war period from previous times? This is an interesting topic for further research. Surely a major difference is the larger role of government with the Federal Reserve and monetary policy at central stage. In our present analysis, we have chosen to ignore the fundamental links between money and business activity. But monetary shocks affect interest rates through inflation and, possibly, they have lasting real effects. In future work, we plan to investigate whether the reaction of GNP, aggregate consumption, and corporate profits to interest rates mirrors the asymmetric response of economic activity to monetary disturbances (De Long and Summers, 1988). Such tests distinguish most modern macroeconomic theories from non-natural rate (old Keynesian) theories. A related and intriguing interpretation of recent financial history --in some respects consistent with our findings after 1953-- is Wojnilower's (1980) emphasis on "credit crunches" at upper cyclical turning points. In Wojnilower's view, the public's propensity to spend is inelastic with respect to interest rates and only credit interruptions slow GNP growth. Ironically, because high nominal interest rates are thought to foretell recession, at such times monetary policy becomes more expansionary. Market participants associate increased future growth with expectations of more inflation, and vice versa. But these policies and the efforts to avoid the next crunch --e.g., through financial deregulation-- may have introduced a long-run inflationary bias in the U.S. economy.

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Table I: Summary Statistics: 1875-1988

	No. Obs.	Time Span	Means	St. Dev.	Autocorrelations ρ_1	ρ_2	ρ_3	ρ_4	ρ_5	ρ_6
ANNUAL DATA										
RGNP	109	1875-1983	3.28	5.97	.13	.08	-.15	-.17	-.13	.04
RCON	94	1890-1983	1.71	3.47	-.14	.17	-.05	-.05	-.07	.07
HISR	109	1875-1983	8.87	30.07	.66	.14	-.24	-.30	-.21	-.07
RET	109	1875-1983	3.15	18.08	.06	-.24	.04	-.12	-.18	.03
PE	113	1876-1988	13.97	4.12	.57	.42	.34	.20	.15	.19
M2G	109	1875-1983	6.20	6.14	.62	.24	.04	-.05	-.06	-.01
MBG	109	1875-1983	5.15	5.51	.63	.32	.18	.07	-.01	-.03
TERM	109	1875-1983	1.55	1.62	.75	.54	.49	.49	.51	.49
SHORT	109	1875-1983	4.87	2.65	.89	.76	.68	.62	.58	.56
LONG	109	1875-1983	6.45	2.31	.91	.75	.61	.52	.48	.46
ΔTERM	109	1875-1983	0.07	1.17	-.00	-.30	-.09	-.05	.01	-.01
ΔSHORT	109	1875-1983	0.00	1.21	-.02	-.26	.01	-.02	-.00	.01
ΔLONG	109	1875-1983	0.07	0.65	.41	-.02	-.04	-.12	.04	.20
QUARTERLY DATA										
RGNPQ	432	1876-1983	.83	2.46	.40	.11	.14	-.04	-.09	.01
RCONQ	120	1954-1983	.83	.50	.21	.04	.20	.10	-.11	.01
RDURQ	120	1954-1983	1.14	3.56	.03	.17	-.09	-.04	-.08	.02
HISRQ	316	1905-1983	10.76	32.19	.94	.85	.74	.62	.49	.37
RETQ	316	1905-1983	.96	7.75	.28	.17	.06	-.01	-.13	-.04
M2GQ	432	1876-1983	1.58	1.89	.74	.58	.46	.33	.30	.27
TERMQ	432	1876-1983	1.57	1.74	.90	.79	.74	.68	.60	.53
SHORTQ	432	1876-1983	4.85	2.72	.96	.90	.88	.85	.81	.77
LONGQ	432	1876-1983	6.44	2.33	.98	.95	.93	.89	.86	.82
ΔTERMQ	432	1876-1983	0.01	.77	.03	-.32	.08	.12	-.09	-.12
ΔSHORTQ	432	1876-1983	0.01	.78	.09	-.31	.03	.16	-.07	-.17
ΔLONGQ	432	1876-1983	0.01	.36	.03	.09	.30	-.07	-.07	.10
INFQ	432	1876-1983	2.22	7.19	.75	.39	.27	.22	.18	.14
RRQ	432	1876-1983	2.63	7.81	.77	.45	.33	.27	.22	.18

Table II: Regression Results with Annual Data: 1875-1983

Eq. No.	Time Span	Constant Terms	RET	HISR	TERM	SHORT	ΔLONG	AR(1)	Adj. R-square	D.W.
				Dependent Variable: GROWTH IN REAL GNP						
(1.1)	1875-1983	3.35	.12	-.05	--	--	--	--	.21	1.76
		(6.1)	(4.4)	(-2.9)						
(1.2)		2.98	.12	-.05	.21	--	--	--	.20	1.76
		(3.8)	(4.3)	(-2.5)	(.6)					
(1.3)		4.61	.12	-.05	--	-.26	--	--	.21	1.77
		(4.2)	(4.2)	(-3.0)		(-1.3)				
(1.4)		3.53	.10	-.05	--	--	-2.07	--	.25	1.86
		(6.6)	(3.6)	(-3.0)			(-2.6)			
(1.5)	1875-1925	3.40	.12	-.03	--	--	-3.77	--	.17	2.35
		(4.6)	(2.3)	(-.8)			(-1.4)			
(1.6)	1926-1983	3.63	.09	-.06	--	--	-1.91	--	.28	1.52
		(4.6)	(2.6)	(-2.8)			(-2.2)			
				Dependent Variable: GROWTH IN REAL CONSUMPTION PER CAPITA						
(2.1)	1890-1983	1.36	.10	--	--	--	--	--	.26	2.53
		(4.3)	(5.8)							
(2.2)		1.38	.10	--	--	--	--	-.28	.32	1.85
		(5.8)	(6.6)					(-2.8)		
(2.3)		1.48	.10	-.01	--	--	--	-.29	.32	1.86
		(5.9)	(6.7)	(-1.1)				(-2.9)		
(2.4)		1.44	.10	--	-.03	--	--	-.28	.31	1.85
		(4.1)	(6.6)		(-.2)			(-2.8)		
(2.5)		1.26	.10	--	--	.03	--	-.28	.31	1.85
		(2.7)	(6.6)			(.3)		(-2.8)		
(2.6)		1.47	.10	--	--	--	-.60	-.31	.33	1.85
		(6.2)	(6.0)				(-1.5)	(-3.31)		
(2.7)	1890-1925	1.73	.13	--	--	--	--	-.60	.37	1.95
		(4.6)	(3.6)					(-3.7)		
(2.8)	1926-1983	1.18	.08	--	--	--	--	.40	.54	1.83
		(2.9)	(6.9)					(3.2)		

Note: T-statistics are in parentheses below the coefficient estimates.

Table III: Regression Results with Quarterly Data: 1875-1983

Eq. No.	Time Span	Constant Terms	RETQ(T-1)	RETQ(T-2)	TERMQ	SHORTQ	RRQ	ΔLONGQ	AR(1)	Adj. R-square	D.W.
				Dependent Variable: GROWTH IN REAL GNP							
(1.1)	1876-1983	.62 (2.7)	--	--	.13 (1.4)	--	--	--	.39 (8.7)	.16	1.94
(1.2)		1.42 (4.0)	--	--	--	-.12 (-1.9)	--	--	.39 (8.7)	.16	1.94
(1.3)		.97 (5.3)	--	--	--	--	-.05 (-2.8)	--	.40 (8.8)	.17	1.95
(1.4)		.82 (4.8)	--	--	--	--	--	-1.03 (-3.6)	.38 (8.5)	.18	2.22
(1.5)	1905-1983	.56 (3.0)	.12 (7.6)	.07 (4.6)	--	--	--	--	.39 (7.5)	.32	1.96
(1.6)	1905-1953	.43 (.9)	.14 (6.7)	.08 (3.9)	.07 (.4)	--	--	--	.39 (5.9)	.34	1.97
(1.7)		1.18 (2.2)	.14 (6.6)	.08 (3.9)	--	-.18 (-1.3)	--	--	.39 (5.9)	.34	1.97
(1.8)		.60 (2.0)	.14 (6.6)	.08 (3.7)	--	--	-.01 (-.5)	--	.40 (5.9)	.34	1.97
(1.9)		.58 (2.0)	.13 (5.5)	.10 (4.4)	--	--	--	-.98 (-2.1)	.40 (6.0)	.35	1.95
(1.10)	1954-1983	.26 (1.8)	.03 (2.0)	.03 (2.2)	.26 (4.1)	--	--	--	.26 (2.8)	.34	2.09
(1.11)		1.34 (5.9)	.03 (2.0)	.05 (3.1)	--	-.11 (-3.5)	--	--	.26 (2.8)	.32	2.07
(1.12)		.85 (6.3)	.04 (2.4)	.05 (3.5)	--	--	-.13 (-2.9)	--	.25 (2.8)	.29	2.05
(1.13)		.69 (6.2)	.03 (2.1)	.05 (3.6)	--	--	--	-.56 (-3.0)	.23 (2.5)	.30	2.04

Table III: (Continued)

Eq. No.	Time Span	Constant Terms	RETQ(T-1)	RETQ(T-2)	TERMQ	SHORTQ	RRQ	ΔLONGQ	AR(1)	Adj. R-square	D.W.
Dependent Variable: GROWTH IN REAL CONSUMPTION											
(2.1)	1954-1983	.76	.02	.02	--	--	--	--	--	.13	1.70
		(17.0)	(2.5)	(2.5)							
(2.2)		.67	.02	.01	.07	--	--	--	--	.17	1.78
		(11.2)	(2.5)	(1.5)	(2.4)						
(2.3)		1.03	.02	.01	--	-.04	--	--	--	.21	1.86
		(11.6)	(2.6)	(1.9)		(-3.4)					
(2.4)		.83	.02	.02	--	--	-.04	--	--	.16	1.77
		(15.4)	(2.8)	(2.3)			(-2.0)				
(2.5)		.78	.02	.02	--	--	--	-.17	--	.15	1.77
		(17.1)	(2.6)	(2.2)				(-1.7)			

Note: T-statistics are in parartheses below the coefficient estimates.

Table IV: Summary Statistics: 1953-1987

	Mean 1953-1987	At PEAKS	During RECESSIONS	At TROUGHS	St. Dev. 1953-1987	Autocorrelations ρ_1	ρ_2	ρ_3	ρ_4
IP(t+8,t+14)	3.46	-2.64	5.45	7.69	7.34	.31	-.21	-.25	-.17
AIP(t+8,t+14)	3.67	2.09	4.05	6.54	2.91	.51	.21	.07	.07
UIP(t+8,t+14)	-.21	-4.73	1.40	1.14	7.20	.27	-.08	-.05	.02
RET3Y(t-36,t)	24.23	35.12	11.97	21.87	25.96	.71	.42	.21	.14
RET7M(t,t+7)	8.95	-12.16	15.95	20.33	21.70	.11	-.07	-.14	-.17
PE(t)	14.27	12.97	11.94	13.27	4.02	.85	.66	.58	.55
TERM(t)	.14	-.09	.07	.23	.22	.63	.45	.05	-.07
RTERM(t)	.00	.00	-.07	.04	.21	.16	-.04	-.09	-.05
ECINF(t)	.14	-.09	.14	.19	.25	.47	.24	.11	-.06
INFL(t+8,t+14)	4.43	5.43	3.75	3.04	3.67	.79	.72	.52	.43
AINF(t+8,t+14)	3.67	3.70	4.14	4.00	2.78	.94	.90	.86	.81
UINF(t+8,t+14)	.76	1.74	-.38	-.96	2.62	.61	.48	.11	.00

Table V: Correlation Matrix: 1953-1987

	IP	AIP	UIP	RET3Y	RET7M	TERM	RTERM	ECINF	INFL	AINF
IP	1.00									
AIP	.25	1.00								
UIP	.92	-.15	1.00							
RET3Y	-.24	-.35	-.11	1.00						
RET7M	.53	.04	.52	-.14	1.00					
TERM	.38	.22	.30	.07	.24	1.00				
RTERM	.10	-.09	.13	.09	.10	.32	1.00			
ECINF	.25	.26	.15	-.02	.12	.61	-.56	1.00		
INFL	-.32	.17	-.39	-.28	-.19	-.31	-.18	-.13	1.00	
AINF	-.20	.45	-.38	-.36	-.08	-.12	-.08	-.03	.70	1.00
UINF	-.24	-.24	-.15	-.01	-.18	-.32	-.16	-.14	.66	-.08

Table VI: Industrial Production and the Capital Markets: 1953-1987

Independent Variables	Regression Equation # (1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	1.62	4.54	3.46	1.57	3.14	2.15	2.09
	(1.6)	(2.4)	(3.9)	(1.5)	(2.8)	(1.9)	(1.8)
TERM	12.84	--	--	--	--	9.86	--
	(3.3)					(2.9)	
SHORT	--	-11.88	--	--	--	--	--
		(-3.1)					
LONG	--	11.42	--	--	--	--	--
		(2.9)					
RTERM	--	--	3.37	12.09	--	--	9.19
			(.8)	(2.5)			(2.1)
ECINF	--	--	--	13.19	--	--	10.14
				(3.2)			(2.8)
RET3Y	--	--	--	--	-.05	-.06	-.06
					(-1.7)	(-2.1)	(-2.0)
RET7M	--	--	--	--	.17	.15	.15
					(4.8)	(4.2)	(4.2)
D.W.	1.6	1.7	1.4	1.6	1.7	1.8	1.8
Adj. R-sq.	.13	.16	-.00	.12	.29	.36	.35

Note: T-statistics are in parentheses below the coefficient estimates.

Table VII: Industrial Production and the Capital Markets: Four Periods

Independent Variables	Regression Equation #			
	12/53-12/87	12/53-12/70	1/71-12/87	6/80-12/87
Intercept	2.09	4.31	.49	6.32
	(1.8)	(1.8)	(.4)	(2.2)
RTERM	9.19	-3.26	16.07	-6.83
	(2.1)	(-.3)	(3.6)	(-.78)
ECINF	10.14	5.43	9.90	5.48
	(2.8)	(.4)	(2.8)	(1.3)
RET3Y	-.06	-.07	-.04	-.20
	(-2.0)	(-1.4)	(-1.1)	(-2.6)
RET7M	.15	.17	.14	.16
	(4.2)	(3.0)	(3.4)	(2.7)
D. W.	1.8	1.8	2.2	1.5
Adj. R-sq.	.35	.29	.51	.57

Note: T-statistics are in parentheses below the coefficient estimates.

Table VIII: Determinants of Survey Forecast Errors: 1953-1987

Independent Variables	Regression Equation # (1)	(2)	(3)	(4)	(5)	(6)	(7)
Intercept	-1.63	4.79	-.21	-1.57	.51	-.82	-.72
	(-1.6)	(2.9)	(-.2)	(-1.5)	(.4)	(-.6)	(-.6)
TERM	9.95	--	--	--	--	10.24	--
	(2.6)					(2.6)	
SHORT	--	-.85	--	--	--	--	--
		(-3.4)					
RTERM	--	--	4.60	10.90	--	--	11.43
			(1.1)	(2.2)			(2.3)
ECINF	--	--	--	9.53	--	--	9.71
				(2.3)			(2.3)
RET3Y	--	--	--	--	-.03	-.04	-.04
					(-.9)	(-1.1)	(-1.1)
D. W.	1.6	1.7	1.5	1.6	1.4	1.6	1.6
Adj. R-sq.	.08	.14	.00	.06	-.00	.08	.07

Note: T-statistics are in parentheses below the coefficient estimates.

Fig. I: Real GNP and the Stock Market: 1872-1983

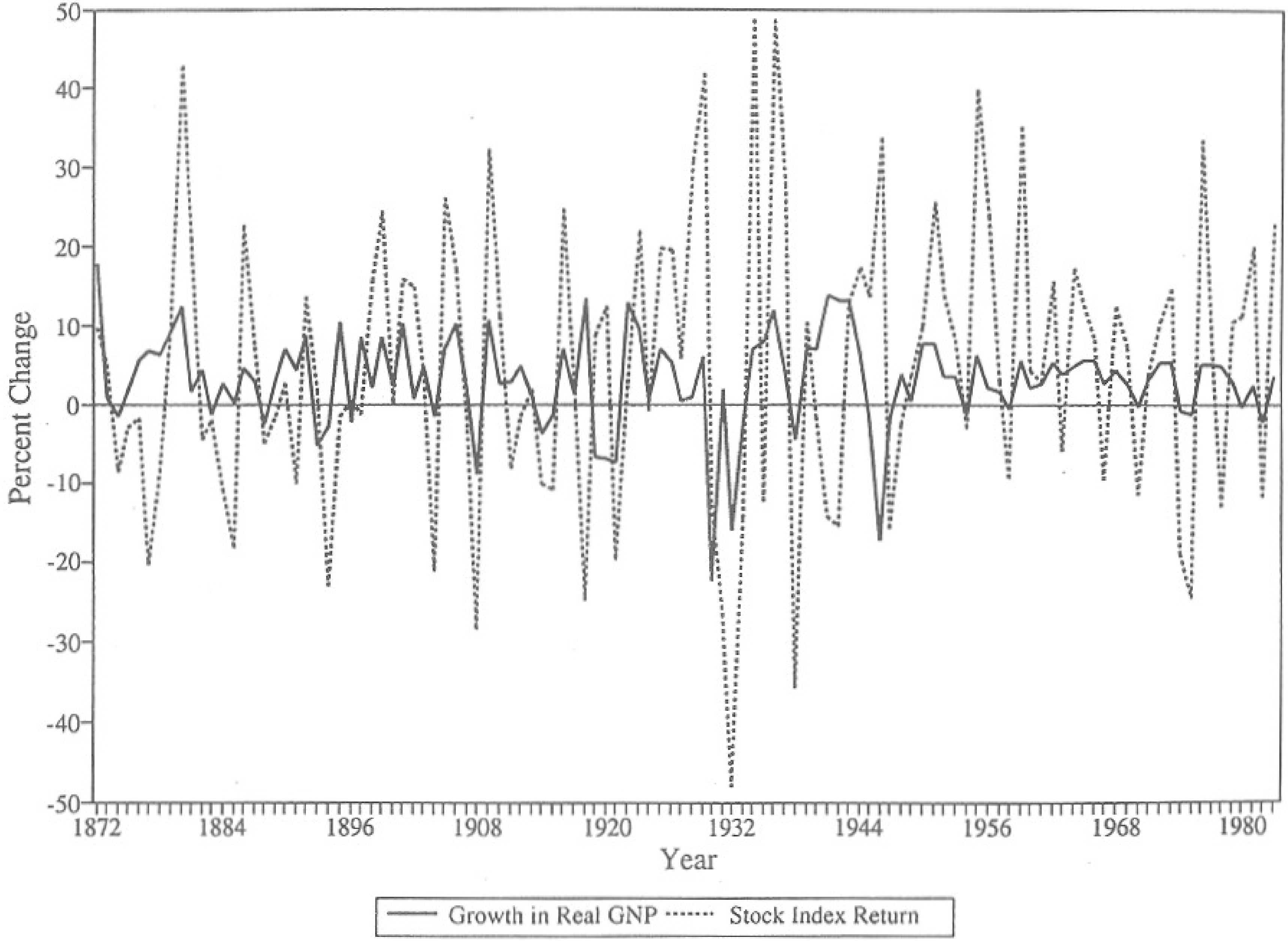


Fig. II: Corporate Interest Rates:
1869-1983

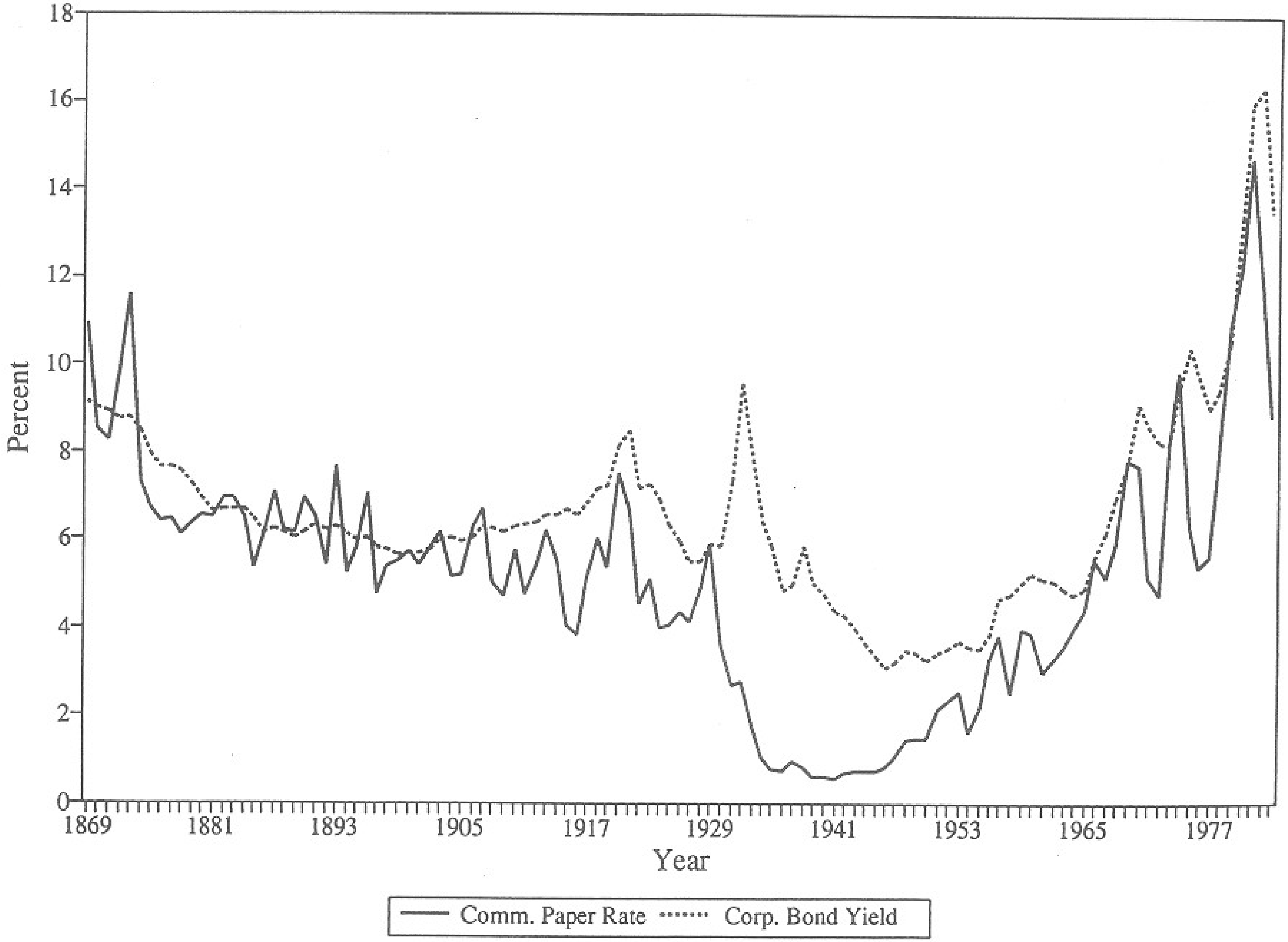
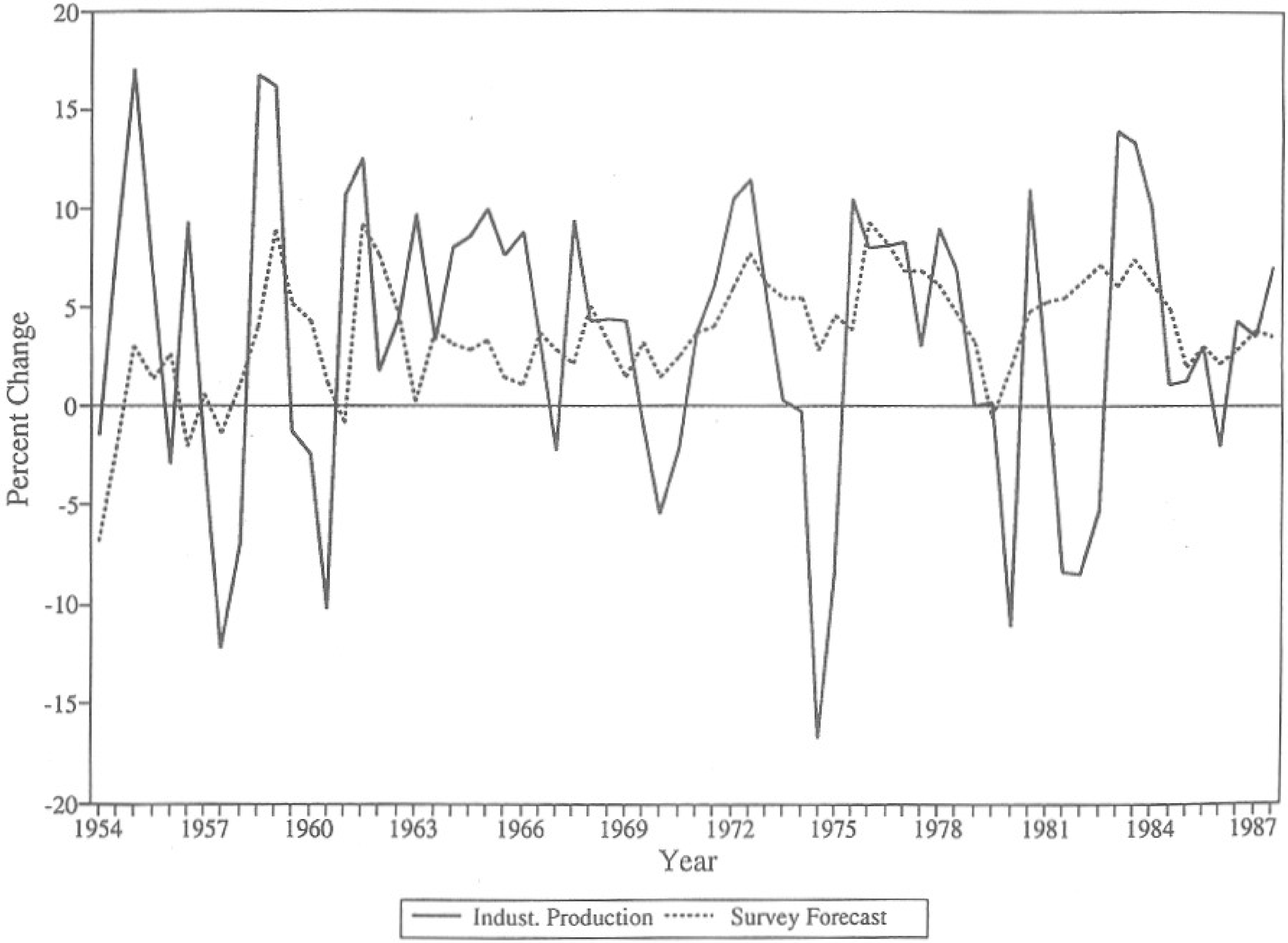


Fig. III: Industrial Production Growth:
Actual and Survey Forecasts, 1954-1987



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