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The Role of the Capital Markets as Leading Indicators: Evidence from Twelve OECD Countries

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THE ROLE OF THE CAPITAL MARKETS AS LEADING INDICATORS: EVIDENCE FROM TWELVE OECD COUNTRIES

Abstract

Past long- and short-term interest rates and stock returns are major leading indicators of U.S. industrial production. We examine whether domestic financial variables are as relevant in other industrialized countries. We also study the importance of capital market developments world-wide. The analysis is based on monthly data for twelve OECD countries between 1964 and 1988. Our aim is to forecast quarterly growth rates in industrial production. In general, the predictive power of nominal interest rates and stock returns (international as well as domestic) is quite modest. Consumption-based asset pricing models (CCAPM) suggest that the term structure of real interest rates is most pertinent. Also, the forecast power of the term structure for inflation and for economic growth may be linked. According to the Fisher expectations hypothesis (FEH), movements in the nominal yield curve reflect changes in anticipated inflation. Perhaps, investors expect inflation to slow down in recessions and to pick up in recoveries. However, the data provide little support for either FEH or CCAPM.

IT IS A WELL-KNOWN FACT that asset returns contain substantial information about the future path of U.S. macro-economic activity and consumer prices. Possibly the most prominent financial predictor of business conditions is the stock market. In their original (1937) development of the index of leading indicators for the National Bureau of Economic Research (NBER), Wesley Mitchell and Arthur Burns used stock returns. More recently, Stanley Fischer and Robert Merton (1984), Eugene Fama (1990), and others confirm that the stock exchange usually, but not always, leads industrial activity.

It is "easy" to understand this predictive power. Consider dividend discount models. The price of any stock (at time t), P_t, reflects the future dividends D_{t+j} that shareholders expect to receive ($1 \leq j \leq \infty$). Assuming a constant discount rate r and with $\gamma=1/(1+r)$, we have $P_t = \Sigma\, \gamma^j\, E(D_{t+j}|\phi_t)$. Prices change with the available information (ϕ_t). If the news suggests that business conditions are likely to deteriorate, dividends will probably also fall below expectations. A reduction in expected dividends causes an immediate fall in stock prices. Thus, a bear market today reflects expectations of reduced economic growth. Conversely, a bull market registers true or false hopes of economic expansion.[1]

In a series of influential papers based on post-war data, Campbell Harvey shows that, in addition tc stock returns, the term structure of interest rates for U.S. Government Bonds and Treasury Bills (the TBO-TB spread) is helpful in forecasting economic growth. On the face of it, the evidence looks very impressive. Forecasts that start from the nominal yield curve explain about 30 percent of the variance in U.S. GNP growth (Harvey, 1989; Chen, 1991; Estrella and Hardouvelis, 1991). (In contrast, for the period since the early 1950s, past stock returns explain less than 5 percent.) In prior work (1988), Harvey finds that the real yield spread outperforms both one-quarter lagged real stock returns and one-quarter lagged consumption growth as a predictor of per capita growth in real consumption. Harvey (1991) further analyzes the relation between the nominal slope and real output growth for the G-7 countries.[2] Once again, the term structure variables

[1] The assumption of a constant discount rate is essential to this argument. However, in reality, required returns systematically vary over the business cycle because of the changing supply of "good" investment projects, changes in default risk, the efforts of economic agents to smooth consumption, and changes in risk-aversion.

account for part of the variation in real economic growth across countries.

More evidence that some interest rate spreads have predictive power for GNP appears in Stock and Watson (1989) and Friedman and Kuttner (1992). Besides the yield spread between U.S. Government instruments mentioned earlier, Stock and Watson choose the spread between the commercial paper rate and the yield on 6-month Treasury Bills (CP-TB spread) as one of the variables comprising a new index of leading indicators. Friedman and Kuttner independently confirm that this spread predicts real income.[3]

In contrast to stock returns, it is not obvious what to make of the predictive power of interest rate spreads. Bernanke (1990) and Friedman and Kuttner (1992) suggest several possible explanations. As far as the CP-TB spread goes, there are manifest distinctions between these instruments in terms of default risk, taxation, and liquidity. Therefore, they are imperfect substitutes in investors' portfolios. The weight of these factors likely depends in a systematic way on the phase of the business cycle. For example, Bernanke reports that the CP-TB spread is more correlated with monthly changes in the federal funds rate --a good proxy for current monetary policy actions-- than with economy-wide measures of default risk. He concludes that the spread is an indicator of the tightness of monetary policy (see also Bernanke and Blinder, 1992). Monetary policy may also play a role, inter alia, in the predictive power of the TBO-TB spread. But, when Estrella and Hardouvelis (1991) add the federal funds rate to a regression of future changes in GNP on the slope, the forecast power of the slope "remains almost intact" (p. 566).

Harvey (1988, 1989, 1991) emphasizes that the results for the TBO-TB spread agree with modern asset pricing theory. He repeatedly refers to the consumption-based capital asset pricing model (CCAPM) as the motivating force behind his research. The CCAPM implies a link between expected real returns

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[2]The G-7 countries are Canada, Japan, France, Germany, Italy, the United Kingdom, and the United States.

[3]However, the empirical link between the CP-TB spread and economic activity has weakened during the 1980s. See Bernanke (1990) and Friedman and Kuttner (1992). There is also reason to doubt whether, in the future, either the CP-TB or the TBO-TB spread will continue to predict real output if the Federal Reserve adopts it as a policy variable (see, e.g., Estrella and Hardouvelis, 1991).

and expected consumption growth (Breeden, 1986). Consider a simple example (Harvey, 1991). Most people prefer to smooth consumption over time, i.e., they do not want to reduce their standard-of-living too much in "bad times." This means that, as the economic outlook changes, the public is likely to adjust its investment portfolio. If a recession is expected, say, in three years, then a desire to hedge may lead consumers to purchase financial instruments that guarantee a certain payoff in the slowdown. Such an instrument is a three-year duration government bond. If many people buy three-year bonds, bond prices increase and the yield-to-maturity decreases. To the degree that consumers finance their bond purchases by selling short-term assets (say, one-year treasury bills), the yield on bills rises. So, if a recession is near, we expect long rates to come down and short rates to go up. As a result, the term structure becomes flat or inverted. In conclusion, the shape of the yield curve today provides a forecast of future economic growth.[4]

While supportive of modern asset pricing theory, the surprising strength of Harvey's empirical findings remains somewhat of a mystery. In earlier research, our own skepticism motivated a number of robustness questions, e.g., do the results apply prior to the 1950s? De Bondt and Bange (1990) employ U.S. data that go back to the end of the Civil War. As it happens, past stock returns are a better predictor of real GNP and real consumption growth than are interest rates. In fact, the forecast power of the nominal term structure slope is confined to the period after 1953. Even then, for the post-1953 years, industrial production growth is better predicted by survey forecasts of inflation than by changes in the real term structure.

In this article, we address a different and perhaps more critical issue. What are the true sources of the predictive power of the TBO-TB yield

[4]Real business cycle models that allow for productivity shocks share this intuition with CCAPM. Of course, both views disregard the empirical connection between current income and current consumption, an old –but, in this context, puzzling– macroeconomic fact. In their time-series analysis of consumption and interest rates for the G-7 countries, Campbell and Mankiw (1989) exploit this observation to set aside the permanent income approach of intertemporal choice –where aggregate consumption is the outcome of the rationally optimizing efforts of a forward-looking representative agent. (Campbell and Mankiw argue in favor of a model with rule-of-thumb consumers.) Another disturbing fact emphasized by Campbell and Mankiw is that, in their data set, changes in consumption are not associated with changes in real interest rates. More broadly, the frequent empirical rejection of CCAPM and the equity premium puzzle also question the appropriateness of Euler equation methods.

spread during the post-war period? This paper formulates new tests of CCAPM and explores a second view, the "Fisher expectations hypothesis" (FEH). The starting point is the familiar Fisher equation. The nominal term structure (SL) can be decomposed into the expected real term structure (RSL_e) and the expected change in inflation ($\Delta\pi_e$): $R^L - R^S = (r_e^{\,L} - r_e^{\,S}) + (\pi_e^{\,L} - \pi_e^{\,S})$. In this formula, R^L denotes the long-maturity nominal interest rate, $r_e^{\,L}$ is the long-term expected real rate, and $\pi_e^{\,L}$ is expected inflation for maturity L. R^S, $r_e^{\,S}$, and $\pi_e^{\,S}$ denote the corresponding nominal short rate, real short rate, and expected inflation rate. Hereafter, we often use the ex post "short-hand" form of the equation, $SL = RSL + \Delta\pi$. Under rational expectations, $\Delta\pi$ differs from $\Delta\pi_e$ by a random error term v (with mean zero and standard deviation σ_v).[5]

The Fisher equation reminds us that movements in SL are partly due to variation in $\Delta\pi_e$. In light of the post-war experience, it is natural for investors (at least in the U.S.) to expect inflation to slow down in recessions and to pick up in recoveries.[6] Therefore, <u>the Fisher expectations hypothesis is that SL will successfully forecast changes in economic activity</u> (i) <u>so long as these changes are positively correlated with $\Delta\pi$</u> (i.e., $\rho(IPY,\Delta\pi) > 0$) <u>and</u> (ii) <u>so long as SL has predictive power for $\Delta\pi$</u>.[7] Clearly, the forecast power of the yield curve for inflation depends itself on the variation in RSL_e, the predictability of $\Delta\pi$ (i.e., σ_v), and the correlation between RSL_e and $\Delta\pi$.

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[5] We adopt rational expectations as a working assumption in this paper. However, for the 1953-1987 period, movements in the slope are systematically related to past survey inflation forecast errors. For instance, if recent past inflation numbers are higher than expected, the survey expected change in inflation, the slope, and term premia all predictably decline. This finding may well explain the term structure anomaly that the nominal spread predicts subsequent changes of long rates in the "wrong" direction. See De Bondt and Bange (1992) and Hardouvelis (1993) for more discussion.

[6] This intuition appears to hold for most industrialized countries in the post-war period. See Backus and Kehoe (1992). It is interesting that the correlations between output growth and inflation are typically much different for the interwar and pre-World War I periods. Maybe this is explained by the source of the shocks to economic activity. Supply and demand shocks have different inflationary impacts vis-a-vis GNP.

[7] Both conditions hold for the United States. The longer-maturity term structure contains considerable information about future inflation (Fama, 1990; Mishkin, 1990). This is also true overseas (Jorion and Mishkin, 1991). However, at the short end of the maturity spectrum (up to six months), the U.S. nominal term structure has little predictive power for inflation (Mishkin, 1990a). Mishkin (1991) confirms these results for seven of ten OECD countries. (The exceptions are France, the U.K., and Germany.)

The FEH rests on the comovement of output and prices. Some of its implications differ from the CCAPM. However, the two hypotheses are not mutually exclusive, e.g., both agree with market rationality. Rational agents will certainly take account of the fact that changes in inflation and real output are related. Thus, when a recession is near, not only is RSL_e predicted to fall but so is $\Delta\pi_e$. Ceteris paribus, we may well find that the nominal slope behaves as the CCAPM says --even if the CCAPM is false.

We use monthly data to study twelve OECD countries for the quarter century between 1964 and 1988. The initial tests mimic previous research for the United States. Do domestic nominal stock returns and nominal interest rates predict quarterly growth in industrial production (IP)? The evidence is mixed and it does not offer a uniform picture. Of course, in an increasingly integrated world economy, domestic financial indicators may not carry as much weight as they did in previous times. For this reason, we construct regional and world indices of stock prices and interest rates and we study their forecast power for the business conditions of individual countries.

Again, the fact that the nominal slope predicts IP cannot help us to determine why it happens. Our tests rely on the Fisher decomposition. Below, we first check whether RSL_e forecasts IP, as suggested by CCAPM. Second, we check whether $\Delta\pi_e$ forecasts IP, as suggested by FEH. Third, the multi-country data base allows us to determine whether in the cross-section the forecast power of SL for IP rises as $\rho(IPY,\Delta\pi)$ is closer to +1.0 and as SL contains more information about $\Delta\pi$.

Neither RSL_e nor $\Delta\pi_e$ are directly observable. RSL_e is estimated as (SL - $\Delta\pi$) where, for every month t, $\Delta\pi$ is annualized inflation for the next year minus annualized inflation for the next quarter. $\Delta\pi$ serves as a proxy-variable for $\Delta\pi_e$. Under rationality, they differ by the forecast error v (and so do RSL and RSL_e).

The results of our analysis are engaging in at least three ways. First, we learn that, with the exception of Japan, outside the U.S. domestic stock returns and nominal yield spreads contain only modest information about next-quarter IP-growth. However, the financial indicators usually do have the correct sign. Interestingly, this cannot be said for real yield spreads. Second, the inclusion of world stock prices and bond yields usually does not add much to the regressions for individual countries. Overall, the behavior of world output and inflation mirrors the behavior of the corresponding U.S. variables. The third result is that --except for France, Japan, and the U.S-- the nominal slope has little forecast power for inflation. Perhaps the volatility of real rates obscures the information in nominal rates about subsequent changes in prices (and output). It is left to future research to explain these puzzling cross-country differences.

The remainder of the paper is organized as follows. Section I describes the data. Section II presents summary statistics. Section III discusses the empirical methods and results. Section IV concludes.

I. DATA SOURCES AND DEFINITION OF VARIABLES

All the data are collected from (i) the OECD's monthly publication Main Economic Indicators and (ii) from Citibase (for details, see the appendix). We use two types of data: macroeconomic and financial series. The data are computed monthly, quarterly, or yearly. Names of variables that are measured for quarterly (yearly) horizons end with the letter "Q" ("Y").

Our concern is with forecasts of changes in industrial production (IP) and inflation (π). The monthly (quarterly) growth rate in seasonally-adjusted industrial production is measured as 100 times the natural logarithm of the ratio of IP for month t to the equivalent number for month t-1 (t-3). Inflation (i.e., the change in consumer prices) is defined in a similar way.[8]

Stock returns (SP) are computed from changes in stock market indices. In general, the returns measure price appreciation or depreciation, i.e. they are not corrected for dividends. We also employ short- and long-term interest rates paid on government-guaranteed instruments, both nominal and ex

[8]We do not have complete macroeconomic data for every country. The industrial production index for Switzerland is missing. In the case of Australia, we use the producer price index to compute inflation. Similarly, for Japan, we use the wholesale price index prior to February 1970.

post real.[9] The gap between these rates defines, respectively, the nominal yield spread ($SL = R^L - R^S$) and the ex post real yield spread ($RSL = SL - \Delta\pi$). $\Delta\pi$ is annualized inflation for the next year minus annualized inflation for the next quarter.[10]

Finally, we work with "world" and "regional" growth rates. The world values are calculated using weights based on Real Gross Domestic Product at 1985 purchasing power parity U.S. relative prices. The weights are as follows: Australia .020, Belgium .012, Canada .041, France .073, Germany .082, Italy .069, Japan .166, Netherlands .018, Sweden .012, Switzerland .009, the United Kingdom .070, and the United States .421. For further comparison, we also compute a North American index (AMER) (Canada and United States) and a European index (EUR) (Belgium, France, Germany, Italy, Netherlands, Sweden, Switzerland and United Kingdom). The world and regional indices do not reflect currency movements. Thus, the indices are computed from the perspective of a world investor who fully hedges his foreign exchange exposure.[11]

II. SUMMARY STATISTICS

A. Macro-Variables

Summary statistics for industrial production are shown in table 1 (panel A). Between 1964 and 1988, real IP in the twelve OECD countries grew at an annual rate of 3.6 percent. Figure 1 graphs annual growth rates for world industrial production.[12] Even though the growth rates are usually positive, there are temporary setbacks that correspond to recessions, i.e., periods between an economic trough and peak. The troughs in the world economy

[9] The short-term rate is usually a 3-month rate for an instrument guaranteed by the central government. There are exceptions. For Italy, the short rate is a 6-month rate. For France, the short-term interest rate is a call money rate. For Japan, the short-rate is measured by the call money rate prior to February 1977 and by the Gensaki rate thereafter. See the appendix for more details.

[10] We did not experiment with inflation numbers computed for periods longer than one year even though the maturity of the bonds in the sample is typically in the range of four to ten years. (See the appendix.) This may add random error to the estimates of $\Delta\pi_e$.

[11] Admittedly, a fully hedged position in world financial markets is not easily achieved. Also, one may ask whether the concepts of a "world stock market" and "world interest rate" (borrowed from Barro and Sala-i-Martin, 1990) are meaningful. We do not take a position in this debate. Definitely, at this time, the data show some segmentation in world bond markets (Alesina et al., 1991; Tanzi and Lutz, 1991). See also Driffill et al. (1993).

roughly correspond to those for the United States. For the U.S., recessionary periods are determined by the NBER. The NBER Business Cycle Dating Committee decided that the following cycles occurred during our sample period: (i) peak: December 1969, trough: November 1970, (ii) peak: November 1973, trough: March 1975, (iii) peak: January 1980, trough: July 1980, (iv) peak: July 1981, trough: November 1982.

If we consider the full 25-year period, growth in the U.S. has been about average. At more than 6 percent per year, Japan's economic growth has outpaced the American and European regions. Table 1 (panel A) reports the correlations for individual countries between monthly growth in IP and the IP-growth for the U.S. and the "rest-of-the-world". (The country that is analyzed is excluded from the world index.) Not surprisingly, the highest correlation (.28) is between the U.S. and Canada. This reflects the geographic closeness and the integration of the two economies. The other countries' correlations with the U.S. range from .02 (Sweden) to .19 (United Kingdom). The U.S. has .26 correlation with the world index. The smallest correlations with the world index are for Australia (.04) and Belgium (.07).

Table 1 also lists the time-series standard deviations of IP growth rates. There is considerable dispersion in the amplitude of economic fluctuations. E.g., the standard deviations for Belgium, France, and Italy are approximately three times greater than for the U.S.[13] Because business conditions differ between nations, world IP has lower volatility than any single country.

Table 1 (panel B) details monthly inflation. For the whole period, π is lowest in Germany (3.5 percent per year) and Switzerland (3.8 percent) and highest in Italy (9.4 percent). Inflation demonstrates strong persistence through time. For every country, the first-order serial correlation is positive. Between countries, there is more comovement for inflation than there is for industrial production.

[12]For illustration purposes, figure 1 also shows a world index of (real currency) retail sales. In future work, we hope to learn whether financial variables have forecast power for measures of economic activity other than industrial production.

[13]France's variabilility is greatly influenced by two months. The minimum value of -39.03% occurs in May 1968 when there was a nation-wide strike against President Charles de Gaulle. The maximum value of 24.20% is for June 1968, the month after the strike.

B. Financial Variables

Figure 2 plots an index of nominal and real currency world stock prices. Three remarkable features of the graph are (i) the real-currency depreciation between the mid-1960s and the early 1980s, (ii) the bull market of the 1980s, and (iii) the 1987 drop in stock prices.[14]

Table 2 contains multi-country summary statistics for stock returns and interest rates. Japan's extraordinary GNP-growth is reflected in nominal stock returns which average 12.6 percent a year (panel A). On the other hand, unadjusted for inflation, the stock market that shows the least long-term appreciation is Germany. Consistent with the concept of diversification, the world portfolio has the lowest standard deviation of returns. An interesting characteristic of the world portfolio is the first-order autocorrelation of .38. This finding may reflect lead-lag relationships between markets. The correlations with the U.S. and the world index are higher for stock returns than for industrial production. Maybe financial markets are more integrated than product markets. Alternatively, it could also be that industrial production is measured with less precision.

Table 2 (panels B and C) summarizes the interest rate statistics. As with inflation, short-term rates are on average low in central Europe (Germany and Switzerland) and high in Italy. Both short- and long-term interest rates show a high degree of autocorrelation. Interest rates also appear to move together across countries. Japan is an outlier in this regard. For short-term rates, the correlation with the world is .17. For long-term rates, the correlation is higher (.31) but still far below that of other nations.

As shown by table 2 (panels D and E), our estimates of real yield spreads are much more variable than the analogous nominal yield spreads, almost

[14]Note that the stock market returns are in local currency and ignore exchange rate fluctuations. Thus, table 2 and figure 2 do not reflect what an unhedged investor would have earned.

Eight of the twelve stock markets saw their biggest drop for the sample period in October or November 1987. This includes Australia, Belgium, Canada, Germany, the Netherlands, Switzerland, the U.K., and the U.S. (October and November combined). There is not a corresponding calendar concentration of biggest positive stock returns. However, four countries (Germany, Netherlands, Switzerland and the UK) do experience their largest upswings in January and February 1975.

surely because they include an inflation forecast error. However, the averages are quite similar for every country. The nominal slope of the world term structure is on average upward-sloping with R^L about 1.0 percent higher than R^S. Australia is the only economy with a yield curve that is on average inverted. This statistic is "distorted" by the data for the mid-1970s when short rates were in the 18 to 21 percent range but long rates only varied between 9 and 11 percent.

Figure 3 plots monthly values of the world nominal and real yield spreads. Earlier research for the U.S. (e.g., Harvey, 1988) suggests that SL is negative prior to recessions and positive prior to expansions. The vertical lines on figure 3 correspond to NBER designated business peaks and valleys for the United States. In fact, the world nominal yield spread is negative at business cycle peaks, i.e., short rates exceed long rates. The reader can discern from figure 3 that, while the nominal and real slopes display some comovement, these series are ordinarily far apart at the onset of recessions but converge as the recovery comes near.

C. Correlations Between Macro- and Financial Variables

Contemporaneous monthly correlations for the major variables are presented in tables 3 and 4. Many of the variables in table 4 (including all with "Y" at the end) are measured for yearly horizons. Nonetheless, the correlations are calculated each month. There is no easy alternative to this procedure for variables that involve $\Delta\pi$, e.g., the real yield spreads (RSL). The tables present Spearman rank as well as Pearson correlations. This way, it is possible to evaluate the impact of extreme observations.

Several correlations stand out. In most countries, industrial production and the level of inflation are negatively correlated, particularly over yearly horizons. Similarly, for most economies, IPY is positively related to the change in inflation ($\Delta\pi$). As suggested by prior research, IPY and the nominal slope are usually positively correlated. However, IPY is either positively or negatively related to the real yield spread. At the level of the world index, there is no link between IPY and RSL.

For a majority of nations, the nominal slope (SL) is positively related to

$\Delta\pi$. Typically for the same economies, SL is negatively related to π (inflation measured for monthly horizons) and πY (yearly horizons). For every single country, RSL moves with SL.

The contemporaneous monthly correlations between, on the one hand, stock returns (SP) and, on the other, IP and π draw our attention because they are so small. Chances are that much current news about economic activity is already discounted into stock prices. An interesting finding, however, is that SP and SL are positively linked in all twelve countries. (The Pearson correlation for the world index is statistically significant.) Thus, equity values tend to rise when the term structure slopes upward.

III. LINKS BETWEEN THE REAL SECTOR AND THE FINANCIAL SECTOR

What do the descriptive statistics, figures, and correlations of section II teach us about the links between world financial variables and industrial production? It is tempting to tell a story that agrees with the Fisher expectations hypothesis. The story goes as follows: "In many countries, the conditions for economic expansion are favorable when the level of inflation is low. As the economy picks up, inflation rises. The nominal term structure anticipates this acceleration in inflation. As a result, it has the ability to predict industrial production. Even though real interest rate spreads are correlated with nominal spreads, they have little predictive power for economy activity. Much the same is true for stock returns."

In terms of table 4, the previous summary depends on ρ(IPY,πY), ρ(IPY,$\Delta\pi$), ρ(SL,$\Delta\pi$), ρ(SL,IPY), ρ(SL,RSL), and ρ(RSL,IPY). Evidently, the account (told as a series of simple bi-variate correlations) is neither tight nor complete. (At a minimum, we ought to rely upon a multiple regression framework.) Two critical points are whether nominal interest rates contain information about future inflation and whether the ability to forecast inflation implies some knowledge about future economic activity.

An advantage of the multi-country approach followed here is that a wide range of macro-economic circumstances can be studied. Referring again to table 4, we find for instance that the correlation between the annual growth rate in industrial production and inflation varies between -.02 (Australia) and .33 (U.S.). At least for Australia this weak correlation removes all chances that the forecast power of the slope for IP (the correlation is .50) directly follows from its forecast power for $\Delta\pi$.

On the other hand, a drawback of the multi-country approach is that, for smaller countries, it is dubious whether domestic economic conditions (captured by domestic financial indicators) are most relevant. For example, Barro (1990) discovers that the U.S. stock market has more predictive power than the Canadian market for Canadian business investment. Below, we initially focus on two polar cases: (i) only domestic conditions matter; (ii) only international conditions matter. Later, we also consider the intermediate case that both matter. In addition, for the European countries, we run separate tests with regional indices for stock returns and interest rates. It is intuitively reasonable to assume that, e.g., in the case of Belgium, economic developments in the surrounding nations (France, Germany, and Britain) matter a great deal more than either domestic conditions or what is happening in Japan and the United States. The analysis by Formby et al. (1992) confirms that there is indeed a higher synchronization of macroeconomic fluctuations within the European Union than outside the trading bloc.

A. <u>The Regression Framework for Industrial Production</u>

We use simple OLS-regression methods, $Y_t = \alpha + \beta X_{t-j} + \epsilon_t$, where α is the regression intercept, β is a vector of coefficients, and X_{t-j} is a common vector of independent variables known at the start of period t or earlier ($j>0$). The X-variables are financial statistics: SPQ and SLQ. The dependent variable Y is the growth rate in industrial production (IPQ). The variables are measured quarterly. In order to sidestep some well-known econometric problems, we use non-overlapping observations for the quarters that end in March, June, September, and December of each year.[15]

SPQ and SLQ are measured in several ways: (i) in nominal terms and in real terms; (ii) domestically, internationally, or at the European level. SPQ is lagged for the previous two quarters. SLQ is the average slope for the previous quarter. We sometimes combine domestic and world predictors within the same regression. The extra information in world indicators is measured by the excess of the world index over-and-above the domestic index. For instance, let $WSLQ_{t-1}$ represent the world nominal slope for the previous quarter. Then, the excess ($WSLQ_{t-1}$ - SLQ_{t-1}) is represented by $XSLQ_{t-1}$.

The results are summarized in tables 5, 6, and 7. Table 5 shows the proportion of IP growth in OECD countries that is accounted for by local, European, and international capital market indicators. The regressions contain the dependent variable (one quarter lagged) on the right-hand side because, as we already know, IP is autocorrelated.[16] The t-statistics are corrected for heteroskedasticity using the methods of White (1980). In table 5 (panel A), the nominal slope shows some ability to forecast industrial production. For every country, the sign is positive; in six cases, the coefficient is significant. The predictive power of local stock returns (SP) is more questionable. Only for the U.S. do all three financial variables have significant predictive power. The most precise within-sample forecasts are for Japan (R-square: .40) and the United States (.39). Little or no explanatory power is found for France, Italy, the Netherlands, and the United Kingdom.

From panels B and C of table 5, we learn that, in selected cases, European or world financial variables add explanatory power. E.g., for the Netherlands, the adjusted R-square jumps from .01 to .08. For the U.K., from .01 to .13. On the other hand, it is surprising that for a small country like Belgium the regression R-squares actually fall as we move from domestic to European and world financial markets (.17 versus .14 versus .06). World industrial production, however, is clearly predictable from world stock markets and world interest rates. The R-square is higher than for any individual country, including the United States.

[15] In the tables below, the regressions are based on slightly less than 100 quarterly observations for two reasons: (i) they require information for prior quarters; (ii) missing data (e.g., Australia). Also, without data for 1963, we cannot compute growth rates for the first quarter of 1964. (An alternative method is to use 300 monthly observations of quarterly data and to rely on the Hansen-Hodrick (1980) method-of-moments adjustment for the standard errors.)

Please note that the variables are not annualized. However, the interest rates and yield spreads are annualized yields.

[16] Thus, the OLS-estimates are biased. However, if the error terms are normally distributed, the estimates remain asymptotically consistent and efficient.

The country-by-country regressions in table 6 combine international with domestic data. Panel A uses nominal predictors; panel B uses real predictors.[17] In only a few cases does the presence of international data add predictive power. For example, the excess of the world nominal slope over-and-above the U.S. slope ($XSLQ_{t-1}$) is significant. Also, for the United Kingdom, world nominal stock returns are relevant. More startling than the international evidence is the observation that in our sample the domestic real term structure slope never contributes explanatory power. (The world real term structure only helps for the United States. For the Netherlands, it has the wrong sign.) Taken as a whole, these results argue against CCAPM.[18]

Compared to table 6, the regressions in table 7 substitute $\Delta\pi Q$ for the slope of the term structure.[19] (The stock returns are nominal.) The domestic change in inflation is statistically significant for seven countries. It is positive in every case. The equivalent world variable is significant for France, the Netherlands, and Sweden. Overall, the results in table 7 provide weak support for the Fisher expectations hypothesis. They hold out hope for a view that links the forecast power of the term structure for economic activity with its forecast power for inflation.

B. The Regression Framework for Inflation

To predict changes in price levels, we again rely upon the familiar Fisher equation. This equation expresses the nominal rate of interest as the sum of the expected real rate of interest plus the expected rate of price change over the life of the instrument. In the spirit of Fama (1975), the regression is: $\pi Q_t = \alpha_* + \beta_* X_{*t-j} + \epsilon_{*t}$. Actual quarterly inflation πQ_t is

[17] For every country, real stock returns (RSP) are computed from domestic nominal stock returns (SP) and domestic inflation (π). The domestic real slope is as defined in the text, RSL = SL - $\Delta\pi$. Based on the equivalent world indices (WRSP and WRSL), we define two more predictor variables as follows: XRSP = WRSP - RSP and XRSL = WRSL - RSL. Each variable is measured quarterly.

[18] The poor performance of the real slope in table 6 may also be due to a classic errors-in-variables problem. It is possible that the variance of the observation error for RSL is quite large relative to the variance of the true RSL. In that case, the coefficients are severely underestimated. In table 7 (below) the exact same problem reoccurs with a different predictor variable: the change in inflation ($\Delta\pi$). However, the coefficients for $\Delta\pi$ are much larger and often significant.

[19] Thus, two new regressors appear: $\Delta\pi$ and $X\Delta\pi$. The last variable captures whether worldwide inflation is increasing (decreasing) at a faster rate than it is domestically. Again, both measures are computed quarterly.

regressed on either the short-term interest rate at the end of the previous quarter (SRQ_{t-1}), or lagged inflation (πQ_{t-1}), or both. Similarly, we also run a second set of regressions that explain changes in inflation ($\Delta\pi Q$) by the nominal yield spread. These procedures follow earlier research by Mishkin (1990a,b) and Jorion and Mishkin (1991). The regressions with $\Delta\pi Q$ use quarterly observations even though this causes some overlap in the dependent variable. Both sets of regressions are run with domestic, European, and world interest rates.

Table 8 (panel A) examines the link between inflation and short-term interest rates. The coefficient estimates listed in the table are for regressions with domestic interest rates as the predictor variable. While the t-statistics associated with SRQ are often reliably positive, there is little explanatory power in for at least five countries. In those cases (i.e., when domestic short rates capture only a small part of the variation in inflation, e.g., in the Netherlands, Japan, or Switzerland), European and world interest rates tend to be unproductive also. Sweden is an exception.

Of course, inflation shows considerable serial correlation. In other words, past inflation contains information about future inflation. Table 8 (panel B) reports the results when lagged three-month inflation is included as a regressor. From the viewpoint of market rationality, it is disturbing that lagged πQ subsumes the short rate in the regressions. Only for Germany and the U.K. do short rates show additional information content. The results contradict Fama's (1975) results for the U.S. that nominal short rates reflect much news about expected inflation <u>beyond</u> what is obvious from time-series data.

The results in table 9 are also less than satisfying. In panel A, the R-squares are minimal. With the exception of France, Japan, and the United States, the nominal slope does not provide additional information about changes in inflation <u>beyond</u> what is known from the time-series process of $\Delta\pi Q$ (panel B). However, at the level of the world index, SLQ perhaps deserves our attention.

What explains the apparent poor forecast performance of the nominal slope?

One explanation is that our measure of $\Delta\pi Q$ is poor (see footnote 10). A second possibility --much discussed by Mishkin (1991)-- is that the variation in the real slope obscures the information implicit in $\Delta\pi_e$. Definitely, the results in tables 8 and 9 suggest that the Fisher equation holds up better for the United States than most other countries. If this is the case, and the experience of the U.S. is somewhat unique, then we are left once again without an adequate explanation for the relationship between the nominal term structure and economic growth.

IV. CONCLUSIONS

Previous empirical research, pioneered by Campbell Harvey, finds that the nominal slope of the term structure of interest rates is surprisingly helpful in forecasting economic activity. For example, this interest rate spread outweighs past stock market returns. Harvey's work is motivated by the consumption-based capital asset pricing model. CCAPM argues for a systematic link between the real term structure and subsequent economic growth.

In order to better understand the evidence, we use data for twelve OECD countries and we study a competing theory: the Fisher expectations hypothesis. The forecast power of the nominal slope for output may be linked to its forecast power for inflation. This is plausible since the yield curve can be decomposed into a real yield curve and an expected change in inflation. The FEH possibly explains the forecast power of the nominal slope if (i) changes in output are positively correlated with changes in inflation and (ii) the nominal slope predicts changes in inflation.

We offer three main findings. First, for a majority of countries, financial market variables (stock returns and interest rates) contain only modest information about quarterly changes in industrial production and much less than we may have guessed ex ante, based on the data for the United States. In many cases, domestic financial indicators are more relevant than are world financial indicators. Second, our estimates of the real term structure slope do not have forecast power for industrial production. This argues against the CCAPM. Third, nominal yield spreads outside the U.S. are often poor predictors of actual changes in inflation. Ceteris paribus, this argues against the FEH.

The results in this paper represent only a first step towards understanding the predictive power of the term structure for economic growth. They are not immune to criticism. Throughout, we have judged the merits of different capital market predictors on the basis of goodness-of-fit as well as theory. But ideally the success of a theory should be tested out-of-sample.[20] Of course, to a degree, the multi-country data achieve the same purpose. Unfortunately, our theories do not perform well outside the United States. A second possible line of criticism lists all the hypotheses that we did not explore. The most obvious one is whether differences in monetary policy between nations can explain the differential forecast power of the term structure. Monetary policy affects the slope of the term structure (and economic activity) through changes in real interest rates and inflation. We leave this topic to future research.

[20] Since 1988 (the end of our sample period), the United States has experienced a complete business cycle. According to the NBER, a recession began in July 1990 (peak) and ended in March 1991 (trough). Harvey (1993) suggests that the nominal term structure slope gave a five-quarter advance signal of the 1990 downturn in GNP as well as of the upturn three quarters later.

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Table 1: SUMMARY STATISTICS: MACRO-VARIABLES

	No. Obs.	Mean	Std. Dev.	Min.	Max.	Autocorrelation 1	2	3	6	12	Correlation USA	World
					A: One-Month Changes in Industrial Production							
AUS	299	.25	2.16	-8.47	6.92	-.33	-.05	.12	-.10	-.01	.07	.04
BEL	299	.19	3.07	-15.05	8.98	-.49	-.06	.23	.20	.05	.07	.07
CAN	299	.25	1.15	-3.26	4.30	-.13	.01	.17	.06	-.14	.28	.29
FRA	299	.22	3.39	-39.03	24.20	-.25	-.23	.02	.02	-.05	.03	.08
GER	299	.21	1.86	-9.95	12.04	-.35	.01	.10	.00	.00	.14	.21
ITA	299	.27	3.05	-12.74	11.50	-.37	.10	-.05	.01	.19	.12	.15
JPN	299	.52	1.36	-3.74	3.67	-.11	.16	.38	.25	.04	.17	.16
NED	299	.29	2.74	-10.96	13.88	-.50	.15	-.03	-.14	-.10	.04	.14
SWE	299	.21	2.42	-8.37	12.01	-.34	-.13	.04	-.06	.12	.02	.08
UK	299	.15	1.65	-8.19	9.29	-.15	-.08	.00	-.05	-.08	.19	.18
USA	299	.29	.88	-4.31	3.14	.38	.27	.21	.03	-.02	1.00	.26
AMER	299	.28	.84	-3.94	2.98	.36	.28	.24	.04	-.04	.28	.28
EUR	299	.21	1.26	-7.37	6.14	-.22	.00	.05	-.05	.00	.19	.25
WORLD	299	.30	.72	-2.79	2.09	.16	.34	.27	.05	.01	.26	1.00
					B: One-Month Changes in Prices							
AUS	245	.60	1.76	-8.92	7.79	.35	.07	.01	.06	.06	.30	.28
BEL	299	.44	.38	-0.97	1.57	.43	.35	.30	.37	.38	.34	.51
CAN	299	.50	.38	-.51	1.72	.40	.26	.38	.27	.46	.50	.44
FRA	299	.58	.40	-.98	1.86	.51	.51	.55	.52	.53	.53	.64
GER	299	.29	.34	-.65	2.75	.38	.26	.10	.04	.47	.28	.38
ITA	299	.78	.66	-.78	3.38	.61	.51	.52	.55	.49	.46	.57
JPN	299	.38	.74	-1.18	4.12	.30	.08	.21	.31	.50	.29	.42
NED	299	.41	.57	-2.90	4.21	.16	.02	-.10	.24	.40	.16	.33
SWE	299	.56	.52	-1.04	2.68	.28	.24	.14	.18	.29	.34	.41
SWI	299	.32	.45	-1.25	2.07	.15	.25	.07	.20	.44	.24	.19
UK	299	.69	.71	-.30	4.83	.38	.30	.36	.38	.44	.36	.49
USA	299	.46	.33	-.55	1.79	.64	.60	.52	.48	.38	1.00	.54
AMER	299	.46	.32	-.48	1.73	.67	.61	.54	.50	.41	.50	.70
EUR	299	.55	.35	-.16	1.86	.68	.62	.65	.67	.66	.56	.58
WORLD	299	.48	.32	-.39	1.68	.73	.63	.65	.61	.59	.54	1.00

Notes: The sample period runs between January 1964 and December 1988. The countries are Australia (AUS), Belgium (BEL), Canada (CAN), France (FRA), Germany (GER), Italy (ITA), Japan (JPN), the Netherlands (NED), Sweden (SWE), Switzerland (SWI), the United Kingdom (UK), and the United States (USA). The exact variable definitions are listed in the appendix.

For some countries, we do not have complete data. For Australia, we have a producer price index beginning in July 1968, short-term interest rates starting in January 1968, long-term interest rates

Table 1 (continued)

beginning in November 1968, and stock prices starting in January 1970. Japanese long-term interest rates start in October 1966. For Switzerland, the industrial production index is missing. Stock returns for Switzerland begin in January 1966.

Monthly growth rates are computed as ln(X(t)/X(t-1))*100. Inflation is measured using the consumer price index. However, there are two exceptions. Inflation for Australia is computed from the producer price index. Also, prior to February 1970, Japan's inflation is measured by the wholesale price index.

The "world" growth rates (WORLD) are computed with weights based on GDP at 1985 purchasing power parity U.S. relative prices. The weights are as follows: Australia .020, Belgium .012, Canada .041, France .073, Germany .082, Italy .069, Japan .166, Netherlands .018, Sweden .012, Switzerland .009, United Kingdom .070 and United States .421. In some cases, the country being analyzed is excluded from the world index. To arrive at the index, weights are scaled by 1.0/(sum of weights). The European index (EUR) consists of Belgium (weight is .035), France (.212), Germany (.238), Italy (.200), Netherlands (.052), Sweden (.035), Switzerland (.026) and the United Kingdom (.203). Canada (weight is .088) and the United States (.912) comprise the North American index (AMER).

Table 2: SUMMARY STATISTICS: FINANCIAL VARIABLES

	No. Obs.	Mean	Std. Dev.	Min.	Max.	Autocorrelation 1	2	3	6	12	Correlation USA	World
					A: One-Month Stock Returns							
AUS	227	.81	5.43	-36.26	11.33	.27	.07	.00	-.07	.04	.54	.61
BEL	299	.33	4.33	-16.75	15.42	.13	-.06	.00	.08	.17	.44	.55
CAN	299	.55	5.23	-26.03	23.56	-.02	-.08	.04	-.04	.06	.57	.55
FRA	299	.56	6.70	-28.77	24.85	-.01	-.12	.06	-.03	-.03	.35	.42
GER	299	.28	4.06	-24.69	12.78	.16	.05	.00	.05	.02	.38	.45
ITA	299	.45	6.36	-22.74	22.44	.24	-.04	.08	.12	.07	.26	.33
JPN	299	1.05	4.02	-11.78	11.78	.21	.04	.07	.00	.00	.32	.37
NED	299	.31	5.12	-26.77	16.03	.10	.02	.05	.00	.10	.41	.49
SWE	299	.95	5.70	-31.85	22.31	-.02	-.02	.09	.05	.00	.23	.31
SWI	275	.31	4.56	-27.85	19.00	.08	-.07	.00	.05	.01	.47	.53
UK	299	.71	5.79	-25.89	34.83	.20	-.02	.09	-.08	.00	.53	.57
USA	299	.43	3.62	-13.41	11.02	.27	-.02	.00	-.02	-.01	1.00	.63
AMER	299	.44	3.58	-14.05	10.04	.28	-.03	.00	-.02	-.01	.57	.43
EUR	299	.49	3.56	-18.16	11.98	.32	.02	.07	.03	.09	.59	.46
WORLD	299	.56	2.98	-14.22	9.83	.38	.03	.04	-.06	.04	.63	1.00
					B: Short-Term Interest Rates							
AUS	252	10.69	4.00	4.30	21.75	.94	.88	.83	.72	.61	.49	.55
BEL	300	8.09	3.38	3.45	17.50	.98	.95	.91	.82	.64	.88	.92
CAN	300	8.07	3.54	3.00	20.82	.98	.95	.92	.84	.72	.91	.84
FRA	300	8.67	3.27	3.75	19.93	.97	.95	.92	.82	.62	.81	.89
GER	300	6.33	2.68	3.32	14.57	.98	.94	.90	.75	.42	.59	.51
ITA	300	10.56	5.46	3.41	21.49	.99	.97	.95	.90	.83	.67	.71
JPN	300	7.02	2.22	3.71	13.48	.97	.94	.90	.74	.33	.14	.17
NED	300	6.59	2.51	.89	14.80	.93	.84	.75	.54	.26	.69	.70
SWE	300	7.78	3.02	2.00	16.25	.97	.93	.89	.75	.48	.54	.57
SWI	300	3.64	1.75	.13	9.75	.96	.91	.85	.66	.27	.26	.36
UK	300	9.07	2.92	3.76	16.28	.96	.91	.87	.75	.55	.73	.83
USA	300	6.87	2.74	3.20	16.30	.97	.93	.89	.80	.68	1.00	.82
AMER	300	6.98	2.79	3.22	16.49	.97	.93	.90	.81	.69	.91	.62
EUR	300	8.28	2.79	3.73	15.84	.99	.96	.95	.86	.69	.85	.63
WORLD	300	7.49	2.34	4.16	14.32	.99	.96	.94	.87	.70	.82	1.00
					C: Long-Term Interest Rates							
AUS	242	10.63	3.11	5.35	16.40	.99	.97	.96	.92	.84	.77	.70
BEL	300	8.81	2.21	6.34	14.25	.99	.98	.97	.94	.85	.94	.96
CAN	300	9.14	2.71	4.96	17.66	.98	.97	.95	.91	.82	.98	.96
FRA	300	10.12	3.00	4.60	17.58	.99	.98	.97	.93	.82	.84	.97
GER	300	7.57	1.36	5.20	11.20	.98	.95	.91	.80	.56	.36	.45
ITA	300	10.79	4.62	5.16	21.45	.99	.99	.98	.96	.89	.90	.89
JPN	267	7.15	1.44	3.38	10.30	.95	.91	.90	.82	.65	.19	.31

Table 2 (continued)

NED	300	7.82	1.58	4.82	12.30	.98	.95	.92	.85	.71	.72	.84
SWE	300	9.28	2.51	5.22	13.77	.99	.98	.97	.94	.87	.91	.87
SWI	300	4.73	.89	3.03	7.41	.98	.96	.94	.85	.61	.46	.25
UK	300	10.22	2.54	5.86	17.05	.98	.96	.94	.89	.78	.53	.64
USA	300	8.13	2.70	4.15	15.32	.99	.97	.95	.91	.81	1.00	.87
AMER	300	8.22	2.70	4.24	15.53	.99	.97	.96	.91	.81	.98	.29
EUR	300	9.33	2.27	5.54	15.16	.99	.98	.97	.93	.83	.85	.54
WORLD	300	8.42	2.18	4.84	14.30	.99	.98	.94	.87	.83	.87	1.00

D: Nominal Yield Spreads

AUS	242	-.29	2.03	-12.95	4.65	.83	.65	.51	.23	.08	.26	.39
BEL	300	.72	1.65	-5.05	3.57	.93	.84	.74	.50	.13	.28	.55
CAN	300	1.07	1.48	-4.34	4.35	.93	.84	.75	.57	.36	.53	.53
FRA	300	1.46	1.43	-3.54	5.37	.88	.79	.70	.42	.04	.39	.07
GER	300	1.24	1.71	-4.79	4.42	.95	.90	.84	.64	.25	.43	.53
ITA	300	.22	1.86	-5.77	4.20	.91	.83	.75	.57	.46	-.19	-.04
JPN	267	.22	1.43	-4.15	2.75	.93	.88	.83	.62	.13	.26	.37
NED	300	1.22	1.81	-5.51	6.34	.88	.77	.64	.39	.13	.53	.69
SWE	300	1.50	2.01	-3.44	6.10	.94	.87	.80	.57	.14	.12	.26
SWI	300	1.09	1.43	-3.76	4.27	.95	.90	.85	.68	.39	.34	.49
UK	300	1.15	2.22	-4.48	6.30	.95	.90	.84	.71	.48	.20	.26
USA	300	1.26	1.35	-2.65	4.42	.94	.85	.78	.61	.41	1.00	.40
AMER	300	1.24	1.30	-2.80	4.10	.94	.88	.81	.56	.14	.53	.29
EUR	300	1.05	1.04	-1.91	3.51	.94	.85	.77	.60	.40	.41	.54
WORLD	300	.99	.94	-1.68	2.65	.96	.90	.84	.66	.30	.40	1.00

E: Ex Post Real Yield Spreads

AUS	231	-.11	12.51	-63.37	32.85	.73	.31	-.05	-.10	-.01	.19	.27
BEL	288	.73	2.62	-9.58	6.93	.76	.47	.25	.16	.10	.19	.32
CAN	288	1.04	2.34	-4.91	8.18	.73	.39	.17	.02	.26	.34	.27
FRA	288	1.43	2.10	-5.55	7.17	.72	.44	.19	.08	.21	.23	.44
GER	288	1.21	2.82	-9.05	11.47	.79	.53	.21	-.07	.47	.16	.43
ITA	288	.26	3.80	-14.22	14.61	.77	.46	.17	.04	.13	.07	.28
JPN	256	.21	4.02	-11.67	18.67	.60	.04	-.27	.15	.37	.19	.64
NED	288	1.28	3.97	-11.33	19.61	.63	.19	-.14	.25	.39	.15	.38
SWE	288	1.49	3.65	-8.16	14.06	.75	.43	.12	-.06	.14	.00	.07
SWI	288	1.11	3.09	-10.67	12.53	.71	.43	.05	-.03	.38	.17	.15
UK	288	1.19	4.50	-8.72	26.53	.76	.47	.18	.09	.27	.17	.41
USA	288	1.17	1.97	-4.54	7.99	.83	.61	.41	.27	.16	1.00	.77
AMER	288	1.16	1.88	-4.04	7.70	.83	.61	.40	.26	.15	.34	.77
EUR	288	1.06	1.77	-6.29	6.61	.79	.49	.21	.16	.24	.27	.68
WORLD	288	.95	1.56	-4.40	5.47	.80	.50	.26	.16	.18	.77	1.00

Notes: The nominal yield spread is the difference between the long-term and the short-term rate. The real yield spread is the difference between the long-term real rate (with annualized actual inflation computed over twelve months) and the short-term real rate (with inflation computed over three months). For exact variable definitions, see the appendix.

Table 3: CORRELATIONS BETWEEN SELECTED VARIABLES: MONTHLY HORIZONS

	IP π	IP SP	IP SL	π SP	π SL	SP SL
			A: Pearson Correlations			
AUS	.04	.07	.06	.00	.05	.19*
BEL	-.01	-.06	.06	.04	-.20*	.11
CAN	-.16*	.07	.12	-.09	-.26*	.04
FRA	-.05	.07	.03	-.01	-.13	.08
GER	-.17*	.01	.08	-.03	-.20*	.13
ITA	.09	.01	.03	-.06	-.41*	.06
JPN	-.07	.01	.21*	-.04	-.20*	.06
NED	-.06	-.01	.00	.02	.08	.18*
SWE	.03	.05	.04	.03	.09	.08
SWI	na	na	na	-.11	-.06	.11
UK	-.04	.07	.04	.09	.15*	.04
USA	-.10	-.02	.10	-.19*	-.42*	.19*
WORLD	-.17*	-.01	.24*	-.13	-.40*	.19*
			B: Spearman Rank Correlations			
AUS	.04	.05	.09	.02	-.01	.12
BEL	-.01	.01	.07	.04	-.14*	.06
CAN	-.15*	.04	.12	-.07	-.19*	.04
FRA	-.07	.01	.04	.01	-.02	.06
GER	-.08	.03	.14	-.07	-.21*	.13
ITA	.11	.06	.03	-.02	-.41*	-.01
JPN	-.04	-.02	.14	.03	-.05	.02
NED	-.06	.01	.00	-.03	.04	.24*
SWE	.01	.03	.07	-.01	.10	.06
SWI	na	na	na	-.05	-.06	.12
UK	-.05	.12	.02	-.01	.18*	-.01
USA	-.08	-.04	.10	-.16*	-.36*	.14*
WORLD	-.12	-.02	.18*	-.08	-.22*	.13

Notes: For sample periods and country abbreviations, see table 1. The other abbreviations are: IP (industrial production), π (inflation), SP (stock returns) and SL (nominal slope). The correlations are for contemporaneous monthly data. * indicates significance at the one percent level.

Table 4: CORRELATIONS BETWEEN SELECTED VARIABLES: YEARLY HORIZONS

	No. Obs.	IPY SL	IPY Δπ	IPY RSL	IPY πY	SL πY	SL Δπ	SL RSL
				A: Pearson Correlations				
AUS	230	.50	-.02	.10	.19	.16	-.01	.17
BEL	287	.61	.16	.26	-.31	-.28	.03	.62
CAN	287	.58	.08	.31	-.44	-.35	.08	.57
FRA	287	.35	.22	.26	-.26	-.08	.18	.54
GER	287	.52	.14	.20	-.20	-.39	.06	.56
ITA	287	.26	.28	-.12	-.31	-.51	.04	.46
JPN	255	.39	.27	-.14	-.34	-.17	.26	.10
NED	287	.22	.06	.05	.04	.03	-.05	.51
SWE	287	.37	.11	.11	-.37	.33	.09	.48
UK	287	.26	.09	.04	-.40	.29	.08	.42
USA	287	.47	.33	.03	-.41	-.46	.19	.52
WORLD	287	.64	.37	.03	-.44	-.38	.27	.34
				B: Spearman Rank Correlations				
AUS	230	.47	.01	.08	.17	.17	.10	.07
BEL	287	.56	.16	.25	-.20	-.23	.08	.59
CAN	287	.52	.03	.30	-.26	-.21	.04	.53
FRA	287	.35	.26	.04	-.28	.03	.18	.55
GER	287	.62	.18	.20	-.18	-.31	.12	.46
ITA	287	.38	.23	-.02	-.31	-.57	.04	.39
JPN	255	.22	.20	-.12	-.13	.01	.18	.13
NED	287	.21	.10	.02	.06	.01	.09	.53
SWE	287	.37	.12	.11	-.35	.32	.07	.51
UK	287	.18	.09	.05	-.19	.37	.05	.40
USA	287	.46	.30	.07	-.36	.37	.13	.57
WORLD	287	.55	.33	.04	-.32	-.22	.21	.39

Notes: Variables ending with "Y" are measured each month for future overlapping yearly periods. $\Delta\pi$ is the annualized change in inflation for the next year relative to the next quarter. RSL is the ex post real term structure slope ($RSL=SL-\Delta\pi$). For sample periods and other abbreviations, see tables 1 and 3.

Table 5: INDUSTRIAL PRODUCTION AND THE CAPITAL MARKETS

	No. Obs.	Constant Term	IPQ_{t-1}	SPQ_{t-1}	SPQ_{t-2}	SLQ_{t-1}	Adj. R-Sq.
				A: Domestic Capital Market Predictors			
AUS	73	.43	-.07	.01	.07*	.44*	.17
BEL	97	.12	-.20	.03	-.03	.86*	.17
CAN	97	.16	-.06	.06*	.04	.41*	.19
FRA	97	.26	-.21	-.01	.03	.37	.05
GER	97	.13	-.17	.06	-.05	.47*	.10
ITA	97	.93*	-.19	-.01	.02	.34	.02
JPN	88	.38	.46*	.08*	.01	.26	.40
NED	97	.77	-.17	.02	.01	.19	.01
SWE	97	.24	-.29*	.03	-.04	.38*	.15
UK	97	.22	-.05	.02	.01	.14	.01
USA	97	.02	.36*	.08*	.05*	.27*	.39
				B: European Capital Market Predictors			
BEL	97	-.48	-.18	.06	-.04	1.10*	.14
FRA	97	.07	-.25	-.01	.04	.71*	.08
GER	97	-.19	-.20	.08*	-.02	.78*	.11
ITA	97	.26	-.19	.01	.03	.66	.03
NED	97	.26	-.19	.06	-.03	.70*	.08
SWE	97	.34	-.29*	.05	-.06	.46	.11
UK	97	-.35	-.12	.04	-.01	.74*	.12
				C: World Capital Market Predictors			
AUS	73	.18	-.02	.06	.07	.27	.06
BEL	97	-.19	-.16	.04	-.05	.91*	.07
CAN	97	.13	.02	.04*	.04	.46	.09
FRA	97	.31	-.24	.05	.08*	.33	.07
GER	97	-.03	-.20	.11*	.00	.58	.09
ITA	97	.52	-.18	.03	.03	.37	.01
JPN	88	.23	.55*	.09*	.03	.25	.41
NED	97	.58	-.18	.06	-.01	.39	.02
SWE	97	.56	-.27*	.09	-.09*	.25	.13
UK	97	-.37	-.10	.06	-.03	.77*	.13
USA	97	-.23	.26*	.08*	.06*	.62*	.41
WORLD	97	-.07	.42*	.07*	.02	.43*	.49
t-stat.		(-.34)	(4.67)	(2.51)	(1.17)	(2.79)	

Notes: The dependent variable is the quarterly growth rate in industrial production (IPQ). SPQ_{t-1} is the return on the stock index for the prior quarter. SPQ_{t-2} is the stock return for the second-to-last quarter. SLQ_{t-1} is the average nominal term structure slope for the prior quarter. The regressions are OLS with t-statistics corrected for heteroskedasticity using the methods of White (1980). * indicates a t-statistic larger (smaller) than 1.96 (-1.96). For sample periods and country abbreviations, see table 1.

Table 6: INDUSTRIAL PRODUCTION: REAL VS. NOMINAL PREDICTORS

	No. Obs.	Constant Term	IPQ_{t-1}	SPQ_{t-1}	SPQ_{t-2}	SLQ_{t-1}	$XSPQ_{t-1}$	$XSPQ_{t-2}$	$XSLQ_{t-1}$	Adj. R-Sq.
					A: Nominal Currency Predictors					
AUS	73	.44	-.06	.07	.08*	.40	.11	.03	-.08	.17
BEL	97	.09	-.20	.04	-.06	.93*	.02	-.06	.09	.15
CAN	97	.04	-.08	.04*	.04	.58*	-.04	.01	.24	.18
FRA	97	.27	-.25	.05	.07*	.37	-.11	.08*	.31	.07
GER	97	-.12	-.21	.11*	-.03	.56	.10	.05	.18	.12
ITA	97	.46	-.17	.03	.03	.70	.06	.01	.38	.01
JPN	88	.27	.47*	.11*	.02	.32	.07	.04	.12	.42
NED	97	.59	-.18	.05	-.01	.36	.08	-.03	.29	.00
SWE	97	.24	-.31*	.10*	-.09*	.38	.10	-.09	.00	.18
UK	97	-.45	-.12	.07*	-.01	.84*	.12*	-.01	.78*	.14
USA	97	-.15	.21	.07*	.06*	.75*	-.01	.01	1.13*	.42
					B: Real Currency Predictors					
AUS	70	.65	-.01	.08*	.07	-.21	.09	.03	-.26	.10
BEL	94	.69	-.17	.07	-.01	.06	.02	-.03	-.12	.00
CAN	94	.70	-.01	.06*	.06	.02	-.03	.05	-.09	.11
FRA	94	.98	-.26	.06	.10*	-.22	.11	.11*	-.25	.09
GER	94	.88	-.21	.14*	.00	-.25	.10	.07	-.36	.09
ITA	94	1.29	-.19	.04	.07	-.41	.08	.06	-.38	.00
JPN	85	.53	.55*	.13*	-.01	-.15	.08*	.00	-.01	.47
NED	94	1.31	-.20	.05	.04	-.35	.08	-.02	-.46*	.03
SWE	94	1.06	-.31*	.11*	-.07	-.26	.09	-.08	-.30	.10
UK	94	.27	-.03	.09*	.00	.15	.13*	-.02	.18	.03
USA	94	.65	.33*	.08*	.08*	-.05	.00	.05	.18	.38

Notes: The dependent variable is the quarterly growth rate in industrial production. The predictors are either (i) past nominal stock returns and the nominal slope (panel A) or (ii) past real stock returns and the real slope (panel B). In each panel, variables are measured (i) domestically and (ii) as differences from the corresponding world index (variables denoted $XSPQ_{t-1}$, $XSPQ_{t-2}$, and $XSLQ_{t-1}$). * indicates a t-statistic larger (smaller) than 1.96 (-1.96).

Table 7: INDUSTRIAL PRODUCTION, STOCK RETURNS, AND CHANGES IN INFLATION

	Constant Term	IPQ_{t-1}	SPQ_{t-1}	SPQ_{t-2}	$\Delta\pi Q_{t-1}$	$XSPQ_{t-1}$	$XSPQ_{t-2}$	$X\Delta\pi Q_{t-1}$	Adj. R-Sq.
AUS	.14	-.05	.07	.06	.36	.07	.00	.41	.11
BEL	.57	-.13	.08	-.02	.64*	.06	-.01	.15	.04
CAN	.56*	-.02	.05*	.06	.35*	-.01	.04	.23	.12
FRA	.60	-.27	.05	.08*	.42	.12	.10*	.42*	.10
GER	.51	-.21	.13	-.01	.67	.08	.04	-.50	.13
ITA	.85	-.20	.03	.03	.59*	.07	.03	.46	.03
JPN	.41	.58*	.12*	-.02	.21*	.08	-.02	.04	.47
NED	.96*	-.21	.04	.01	.49*	.05	-.04	.59*	.04
SWE	.86*	-.34*	.09*	-.11*	.62*	.06	-.13*	.47*	.16
UK	.30	-.04	.10*	-.02	.17	.13*	-.04	.10	.04
USA	.33	.36*	.07*	.06*	.35*	-.01	.03	-.02	.41

Notes: The dependent variable is the quarterly growth rate in industrial production. The predictors are past nominal stock returns and changes in actual inflation. The variables are measured (i) domestically and (ii) as differences from the corresponding world index (variables denoted $XSPQ_{t-1}$, $XSPQ_{t-2}$, and $X\Delta\pi Q_{t-1}$). The number of observations for each country is the same as in table 6 (panel B). * indicates a t-statistic larger (smaller) than 1.96 (-1.96).

Table 8: INFLATION AND SHORT-TERM INTEREST RATES

	No. Obs.	Constant Term	t-stat.	πQ_{t-1}	t-stat.	SRQ_{t-1}	t-stat.	Adj. R-Sq. (1)	(2)	(3)
				A: $\pi Q_t = \alpha_* + \beta_* SRQ_{t-1} + \epsilon_{*t}$						
AUS	74	4.13	3.29	--	--	-.21	-1.82	.04	na	.02
BEL	98	.64	3.48	--	--	.09	3.90	.09	.18	.17
CAN	98	.73	3.97	--	--	.10	4.75	.16	na	.28
FRA	98	.27	1.14	--	--	.17	6.26	.30	.37	.38
GER	98	.09	.51	--	--	.12	4.62	.17	.02	.03
ITA	98	.43	1.93	--	--	.18	10.13	.35	.45	.41
JPN	88	-.07	-.13	--	--	.13	1.31	.00	na	.00
NED	98	.79	3.04	--	--	.06	1.94	.02	.00	.00
SWE	98	1.52	4.61	--	--	.02	.57	.01	.20	.17
SUI	98	.49	2.48	--	--	.13	2.52	.05	.00	.01
UK	98	-.05	-.14	--	--	.23	4.92	.16	.11	.10
USA	98	.43	2.20	--	--	.14	4.25	.18	na	.18
WORLD	98	.19	.88	--	--	.17	5.28	na	na	.20
				B: $\pi Q_t = \alpha_* + \beta_{*1} \pi Q_{t-1} + \beta_{*2} SRQ_{t-1} + \epsilon_{*t}$						
AUS	74	3.74	2.94	.13	1.00	-.19	-1.70	.04	na	.03
BEL	98	.33	1.74	.51	4.65	.04	1.33	.31	.35	.34
CAN	98	.38	2.30	.63	7.27	.02	1.10	.46	na	.48
FRA	98	.22	.95	.62	6.71	.05	1.43	.53	.54	.54
GER	98	.08	.41	.13	1.62	.11	3.67	.18	.07	.08
ITA	98	.28	1.33	.69	6.84	.04	1.46	.62	.64	.63
JPN	88	.01	.03	.13	1.44	.11	1.06	.01	na	.00
NED	98	.50	1.98	.32	3.15	.05	1.55	.11	.09	.09
SWE	98	1.06	3.50	.37	3.40	.01	.02	.12	.22	.20
SWI	98	.39	2.10	.23	1.92	.10	1.92	.09	.06	.07
UK	98	-.04	-.10	.46	2.82	.13	2.42	.33	.31	.32
USA	98	.32	1.71	.70	8.09	.01	.42	.53	na	.52
WORLD	98	.25	1.60	.83	11.16	.00	-.02	na	na	.68

Notes: The dependent variable is the three-month inflation rate. SRQ_{t-1} is the average short-term interest rate for the previous quarter. πQ_{t-1} is three-month inflation for prior quarter. The R-squares in column (1) are for regressions with the domestic short-term rate as the predictor variable. Columns (2) and (3) list the R-squares for regressions with, respectively, the European and world short-term rates as predictors.

Table 9: CHANGES IN INFLATION AND THE NOMINAL TERM STRUCTURE

	No. Obs.	Constant Term	t-stat.	$\Delta\pi Q_{t-1}$	t-stat.	SLQ_{t-1}	t-stat.	Adj. R-Sq. (1)	(2)	(3)
					A: $\Delta\pi Q_t = \alpha + \beta\ SLQ_{t-1} + \epsilon_t$					
AUS	76	-.58	-.52	--	--	-1.20	-1.49	.04	na	.00
BEL	94	-.06	-.36	--	--	.06	.67	.01	.00	.00
CAN	94	-.07	-.36	--	--	.11	1.11	.00	na	.00
FRA	94	-.47	-2.42	--	--	.33	3.91	.09	.06	.01
GER	94	-.11	-.42	--	--	.08	.62	.01	.01	.00
ITA	94	.00	.01	--	--	.02	.10	.01	.01	.00
JPN	84	-.05	-.15	--	--	.54	1.91	.04	na	.07
NED	94	-.04	-.12	--	--	.01	.11	.01	.00	.00
SWE	94	-.14	-.41	--	--	.11	.81	.00	.02	.01
SWI	94	.01	.05	--	--	-.03	-.20	.01	.00	.00
UK	94	-.23	-.60	--	--	.22	1.07	.01	.04	.01
USA	94	-.22	-1.01	--	--	.22	1.83	.03	na	.13
WORLD	94	-.47	-2.60	--	--	.51	3.88	na	na	.12
					B: $\Delta\pi Q_t = \alpha + \beta_1\ \Delta\pi Q_{t-1} + \beta_2\ SLQ_{t-1} + \epsilon_t$					
AUS	76	-.62	-.57	.17	1.77	-1.32	-1.66	.05	na	.00
BEL	94	-.02	-.15	.33	2.89	.04	.49	.10	.09	.09
CAN	94	-.06	-.34	.04	.38	.10	1.06	.00	na	.00
FRA	94	-.41	-2.08	.23	2.09	.29	3.22	.13	.11	.07
GER	94	-.11	-.42	-.02	-.13	.08	.62	.00	.00	.00
ITA	94	.03	.09	.29	2.21	-.06	-.31	.06	.07	.06
JPN	84	-.09	-.26	-.26	-1.97	.71	2.59	.09	na	.10
NED	94	.02	.07	-.35	-2.91	-.05	-.38	.10	.11	.10
SWE	94	-.11	-.32	.21	2.52	.09	.68	.03	.05	.04
SWI	94	.02	.06	.05	.43	-.02	-.23	.00	.00	.00
UK	94	-.18	-.46	.30	2.33	.19	.89	.09	.11	.09
USA	94	-.18	-.87	.26	2.49	.23	1.72	.10	na	.15
WORLD	94	-.39	-2.18	.24	2.57	.43	3.18	na	na	.17

Notes: The dependent variable is the annualized change in inflation between the next three and twelve months. SLQ_{t-1} is the nominal slope of the term structure at the end of the month prior to period for which the dependent variable is measured. The regressions are OLS with the t-statistics corrected for heteroskedasticity (White (1980)). The adjusted R-squares in column (1) are for regressions with the domestic nominal term structure slope as the predictor variable. In columns (2) and (3) the R-squares are for regressions with the European and world slopes, respectively.

Fig. 1: World Economic Activity

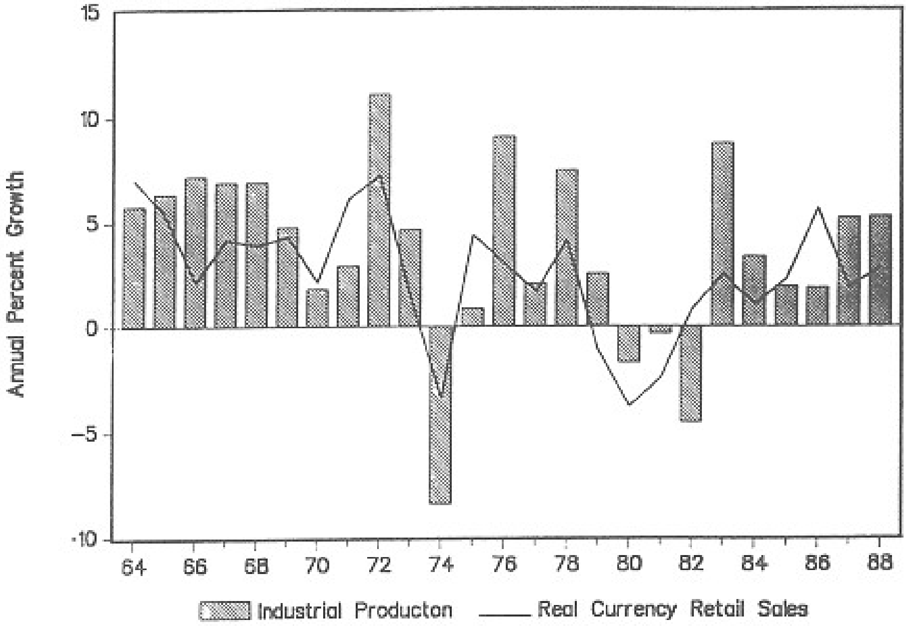


Fig. 2: World Stock Prices

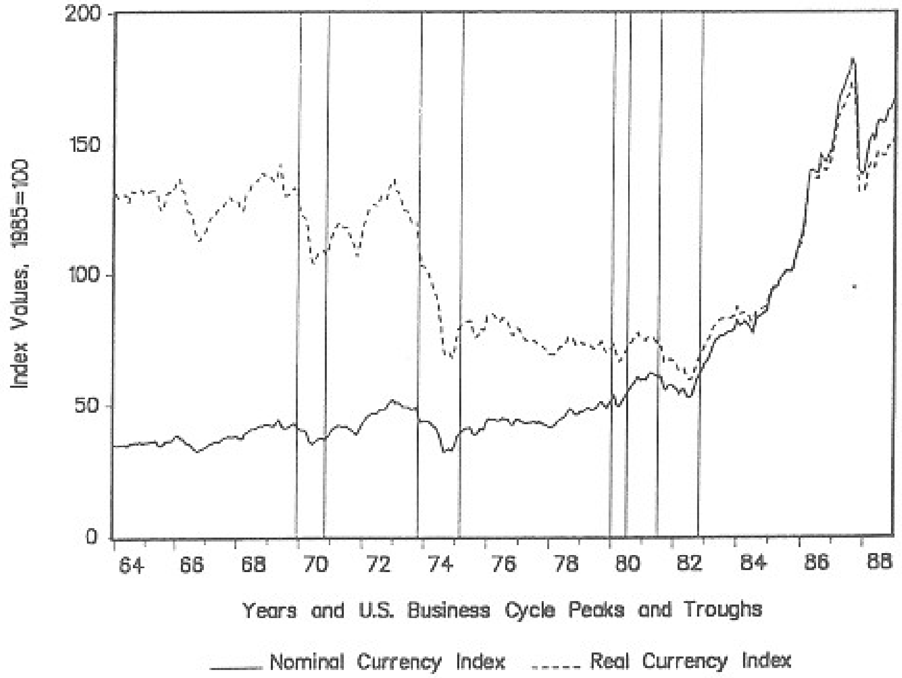
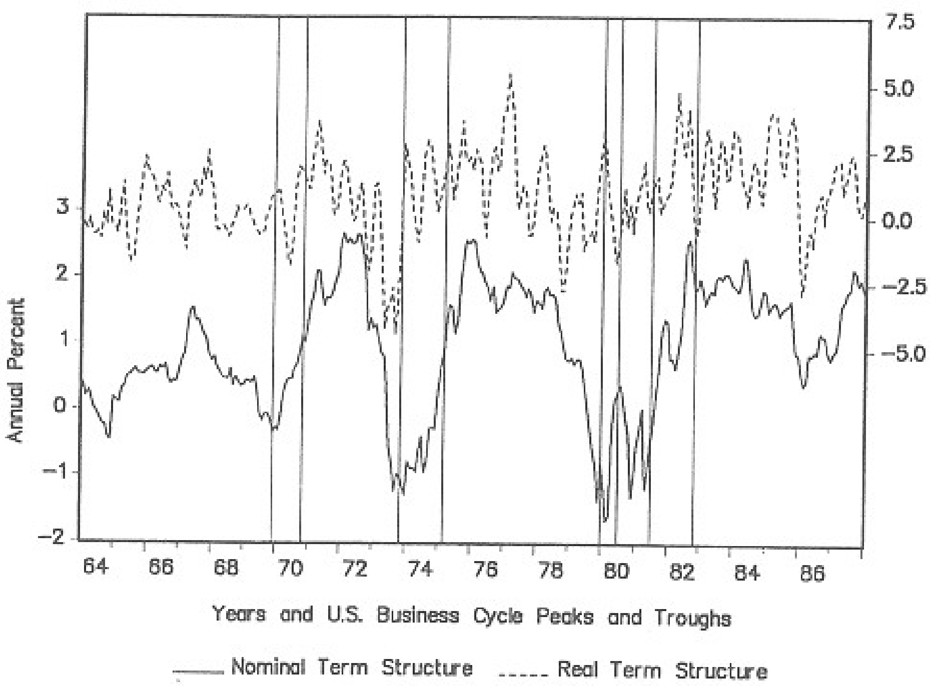


Fig. 3: World Term Structure



APPENDIX

The data for countries other than the United States can be found in OECD's monthly publication, Main Economic Indicators. The U.S. data is taken from Citibase. Below, we offer a brief description of each time series and we list likely "breaking points." We also provide the main data source.

1. AUSTRALIA

Industrial Production Total (manufacturing, electricity, and gas), adjusted by the OECD, 1985=100. The base of the index changed in 1976. Source: Australia and New Zealand Banking Group Limited, Quarterly Survey.

Consumer Prices All items, 1985=100. Source: Australian Bureau of Statistics, Monthly Summary of Statistics.

Producer Prices Total, manufacturing input, 1985=100. Prior to 1985, wholesale prices. Source: Australian Bureau of Statistics, Monthly Summary of Statistics.

Commercial Bills 90 days, percent per annum. Average of daily yields for the week with the last Wednesday of the month. Source: Reserve Bank of Australia, Statistical Bulletin.

Yield of Long-Term Government Bonds Percent per annum, end of month. From June 1981, 15-year treasury bonds; previously, 20-year government bonds. Source: Reserve Bank of Australia, Statistical Bulletin.

Share Prices Industrials, 1985=100. Average of daily index numbers. Source: Reserve Bank of Australia, Statistical Bulletin.

2. BELGIUM

Industrial Production Total, adjusted by the OECD, 1985=100. Adjusted for the unequal number of working days in each month. Source: Institut National de Statistique, Bulletin de Statistique.

Consumer Prices All items, 1985=100. The index leaves out rent before June 1976. Source: Institut National de Statistique, Bulletin de Statistique.

Treasury Bills 3 months, percent per annum. The yields are for the last Friday of the month. Source: Banque Nationale de Belgique, Bulletin.

Yield of Long-Term Government Bonds Per cent per annum, beginning of the next month. Source: Banque Nationale de Belgique, Bulletin.

Share Prices Industrials, Brussels and Antwerp Stock Exchanges, 1985=100. Figures refer to the 25th day of the month. Source: Institut National de Statistique, Bulletin de Statistique.

3. CANADA

Real Domestic Product Non-durable manufactures, index of industrial production, adjusted by the OECD, 1985=100. Calculated from gross domestic product at factor cost and 1981 prices. The base of the index changed in 1984. Source: Statistics Canada, Gross Domestic Product by Industry.

Consumer Prices All items, 1985=100. Source: Statistics Canada, Consumer Prices and Price Indices.

Treasury Bills 3 months, percent per annum. Average yield of the last weekly issue in the month. Source: Bank of Canada, Bank of Canada Review.

Yield on Long-Term Government Bonds Percent per annum. The yield is based on the average of the buying and selling closing prices on the last Wednesday of the month. Source: Bank of Canada, Bank of Canada Review.

Share Prices Toronto Stock Exchange, 1985=100. The index is based on closing prices on the last trading day of the month. Source: Bank of Canada, Bank of Canada Review.

4. FRANCE

Industrial Production Total, adjusted by the OECD, 1985=100. The base of the index changed in 1980. Source: Institut National de la Statistique et des Etudes Economiques, Bulletin Mensuel de Statistique.

Consumer Prices All items, 1985=100. Weighting pattern revised each January from 1970. Earlier weights based on 1962. Source: Institut National de la Statistique et des Etudes Economiques, Bulletin Mensuel de Statistique.

Call Money Percent per annum. On collateral of private bills. Averages of daily opening quotation. Source: Banque de France, Bulletin Trimestriel.

Bond Yield Issues guaranteed by the government. Percent per annum, end of month. Source: Banque de France, Bulletin Trimestriel.

Share Prices Industrials, 1985=100. Last Friday of the month. The weighting pattern of the index changed in January 1973, January 1982, and each January from 1985 onwards. Source: Institut National de la Statistique et des Etudes Economiques, Bulletin Mensuel de Statistique.

5. GERMANY

Industrial Production Total, adjusted by the OECD, 1985=100. The base of the index changed in 1970, 1980, and 1984. Source: Deutsche Bundesbank, Statistische Beihefte zu den Monatsberichten der Deutschen Bundesbank.

Consumer Prices All items, excluding seasonal items, 1985=100. The weighting pattern changed in 1968, 1976, and 1980. Source: Statistisches Bundesamt, Wirtschaft und Statistik.

Rate on 3-Month Loans Percent per annum, Frankfurt. Monthly data are daily averages. Source: Deutsche Bundesbank, Monatsberichte.

Yield on Long-Term Government Bonds Percent per annum. From 1971 onwards, only bonds with a maximum maturity of four years are included. Source: Deutsche Bundesbank, Monatsberichte.

Share Prices Industrials, average of daily values. The base of the index changed in 1966 and 1984. Source: Statistisches Bundesamt, Wirtschaft und Statistik.

6. ITALY

Industrial Production Total, adjusted by the OECD. The base of the index changed in 1966, 1971, 1984, and 1985. Source: Istituto Centrale di Statistica, Bolletino Mensile di Statistica.

Consumer Prices All items, all households, 1985=100. The weighting pattern changed in 1967, 1971, 1977, 1981, and 1985. Source: Istituto Centrale di Statistica, Bolletino Mensile di Statistica.

Treasury Bills 6 months, percent per annum. Auction rate on new issues. Prior to September 1973, 12-month bills. Source: Banca d'Italia, Bolletino.

Yield on Long-Term Government Bonds Percent per annum. The estimation procedure and coverage changed in 1976. Source: Banca d'Italia, Bolletino.

Share Prices Milan Stock Exchange, 1985=100. Monthly data are daily averages. Source: Banca d'Italia, Bolletino.

7. JAPAN

Industrial Production Total, adjusted by the OECD, 1985=100. The indices were linked in 1968, 1973, 1978, and 1984. The series is not adjusted for the unequal number of working days in the month. Source: Ministry of International Trade and Industry, Industrial Statistics Monthly.

Consumer Prices All items, including imputed rent, 1985=100. Weighting pattern changed in 1975, 1980, and 1985. Source: Office of the Prime Minister Bureau of Statistics, Monthly Statistics of Japan.

Wholesale Prices Total, 1985=100. Weighting pattern changed in 1965, 1970, 1975, 1980, and 1985. Source: Bank of Japan, Economic Statistics Monthly.

Call Money Percent per annum, Tokyo. Averages of daily rates from May 1972 onwards and the mode of daily rates previously. Source: Bank of Japan, Economic Statistics Monthly.

Gensaki Rate 3 months, percent per annum. Short-term money market rate where the instrument is a repurchase agreement in securities. Source: Bank of Japan, Economic Statistics Monthly.

Yield on Central Government Bonds Percent per annum. Source: Bank of Japan, Economic Statistics Monthly.

Share Prices Tokyo Stock Exchange, 1985=100. Averages of daily index values. The index changed in January 1968. Source: Bank of Japan, Economic Statistics Monthly.

8. THE NETHERLANDS

Each of the series below is provided by the Centraal Bureau voor de Statistiek.

Industrial Production Total, adjusted by the OECD, 1985=100. The base of the index changed in 1970, 1975, and 1979. Source: Maandschrift.

Consumer Prices All items, 1985=100. Source: Sociale Maandstatistiek.

Rate on 3-Month Loans to Local Authorities Percent per annum. Monthly data are daily averages. Source: Maandstatistiek van het Financiewezen.

Yield of Long-Term Government Bonds Five- to eight year bonds, percent per annum. Prior to 1981, averages of Friday quotations. From 1981, averages of daily rates. Source: Maandstatistiek van het Financiewezen.

Share Prices Amsterdam Stock Exchange, 1985=100. Prior to 1984, industrial and commercial shares. From 1984, all share index. Monthly data refer to end of period. Source: Maandstatistiek van het Financiewezen.

9. SWEDEN

Industrial Production Mining and manufacturing, adjusted by the OECD, 1985=100. Source: Statistiska Centralbyran, Allman Manadsstatistik.

Consumer Prices All items, excluding indirect taxes, 1985=100. The base of the index changed in 1981. The weighting pattern is revised each January. Source: Statistiska Centralbyran, Statistiska Meddelanden.

Treasury Bills 3 month yields, percent per annum, at the end of the month. Starting in January 1984, the annual rate is for 3-month Treasury discount notes. Source: Statistiska Centralbyran, Allman Manadsstatistik.

Yield on Long-Term Government Bonds Percent per annum. Yields are measured in mid-month. Source: Statistiska Centralbyran, Allman Manadsstatistik.

Share Prices Stockholm Stock Exchange, 1985=100, at the end of the month. Source: Statistiska Centralbyran, Allman Manadsstatistik.

10. SWITZERLAND

Consumer Prices All items, 1985=100. Weighting pattern changed in October 1966, October 1977, and January 1983. Source: Departement Federal de L'Economie Publique, La Vie Economique.

3-Month Deposit Rate Major banks, Zurich. Averages of daily rates. Source: Banque Nationale Suisse, Bulletin Mensuel.

Yield on Confederation Bonds Percent per annum. Monthly figures refer to last Monday of the month. Weighting pattern changed in 1970 and 1979. Source: Banque Nationale Suisse, Bulletin Mensuel.

Share Prices Excluding dividends. Prior to 1984, monthly figures refer to the last Friday of the month; starting in 1984, they refer to the last business day of the month. Source: Departement Federal de L'Economie Publique, La Vie Economique.

11. UNITED KINGDOM

Industrial Production Total, adjusted by the OECD, 1985=100. The base of the index changed in 1968 and 1984. Source: Central Statistical Office, Monthly Digest of Statistics.

Consumer Prices All items, 1985=100. The index excludes seasonal items prior to 1984. The weighting pattern is revised annually. Source: Department of Employment, Employment Gazette.

Treasury Bills 91 days, percent per annum. Average rate on the last issue of the month. Source: Central Statistical Office, Financial Statistics.

Yield on Government Bonds 2.5% consols, percent per annum. The yield is measured on the last Friday of the month. Source: Central Statistical Office, Financial Statistics.

Share Prices F.T. Actuaries (500 shares). Monthly figures are daily averages. Source: Central Statistical Office, Monthly Digest of Statistics.

12. UNITED STATES

Industrial Production Total, seasonally adjusted, 1987=100. Source: Board of Governors of the Federal Reserve System, Industrial Production, Statistical Release G17.

Consumer Prices All items, seasonally adjusted, 1982-84=100. Source: U.S. Department of Labor, Bureau of Labor Statistics, The Consumer Price Index.

Treasury Bills 3 months, percent per annum. Monthly average of daily figures in the secondary market. Source: Citibase.

Treasury Notes 10 years, percent per annum. Monthly average of daily figures in the secondary market. Source: Citibase.

Share Prices S&P-500 Composite, monthly average of daily prices, 1941-1943=10. Source: Standard & Poor's Corporation, The Outlook.

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