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# BUSINESS CONDITIONS AND EXPECTED RETURNS ON STOCKS AND BONDS*

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Expected returns on common stocks and long-term bonds contain a term or maturity premium that has a clear business-cycle pattern (low near peaks, high near troughs). Expected returns also contain a risk premium that is related to longer-term aspects of business conditions. The variation through time in this premium is stronger for low-grade bonds than for high-grade bonds and stronger for stocks than for bonds. The general message is that expected returns are lower when economic conditions are strong and higher when conditions are weak.

## 1. Introduction

There is mounting evidence that stock and bond returns are predictable. Some argue that predictability implies market inefficiency. Others contend that it is a result of rational variation in expected returns. We offer evidence on this issue. The evidence centers on whether there is a coherent story that relates the variation through time of expected returns on bonds and stocks to business conditions. The specific questions we address include:

(1) Do the expected returns on bonds and stocks move together? In particular, do the same variables forecast bond and stock returns?

(2) Is the variation in expected bond and stock returns related to business conditions? Are the relations consistent with intuition, theory, and existing evidence on the exposure of different assets to changes in business conditions?

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Our tests indicate that expected excess returns (returns net of the one-month Treasury bill rate) on corporate bonds and stocks move together. Dividend yields, commonly used to forecast stock returns, also forecast bond returns. Predictable variation in stock returns is, in turn, tracked by variables commonly used to measure default and term (or maturity) premiums in bond returns. The default-premium variable (the default spread) is the difference between the yield on a market portfolio of corporate bonds and the yield on Aaa bonds. The term- or maturity-premium variable (the term spread) is the difference between the Aaa yield and the one-month bill rate.

The dividend yield and the default spread capture similar variation in expected bond and stock returns. The major movements in these variables, and in the expected return components they track, seem to be related to long-term business episodes that span several measured business cycles. The dividend yield and the default spread forecast high returns when business conditions are persistently weak and low returns when conditions are strong.

The term spread is more closely related to the shorter-term business cycles identified by the National Bureau of Economic Research (NBER). In particular, the term spread – and the component of expected returns it tracks – are low around measured business-cycle peaks and high near troughs.

There are clear patterns across assets in the slopes from regressions of returns on the forecasting variables. The slopes for the term spread are positive and similar in magnitude for all the stock portfolios and (long-term) bond portfolios we examine. This suggests that the spread tracks a term or maturity premium in expected returns that is similar for all long-term assets. A reasonable and old hypothesis is that the premium compensates for exposure to discount-rate shocks that affect all long-term securities (stocks and bonds) in roughly the same way.

In contrast to the slopes for the term spread, the slopes for the default spread and the dividend yield increase from high-grade to low-grade bonds and from bonds to stocks. This pattern corresponds to intuition about the business risks of the assets, that is, the sensitivity of their returns to unexpected changes in business conditions. The slopes suggest that the default spread and the dividend yield track components of expected returns that vary with the level or price of some business-conditions risk.

Does the expected-return variation we document reflect rational pricing in an efficient market? On the plus side, it is comforting that three forecasting variables, all related to business conditions, track common variation in the expected returns on bonds and stocks. It is appealing that the term spread, known to track a maturity premium in bond returns, identifies a similar premium in stock returns. It is also appealing that a measure of business conditions like the default spread captures expected-return variation that increases from high-grade bonds to stocks in a way that corresponds to intuition about the business-conditions risks of assets. Finally, it is comforting that variation in the dividend yield, which might otherwise be interpreted as the result of 'bubbles' in stock prices, forecasts bond returns as well as stock returns, and captures much the same variation in expected bond and stock returns as the default spread.

What one takes as comforting evidence for market rationality is, however, somewhat a matter of predilection. As always, the ultimate judgment must be left to the reader.

## 2. Data

### *2.1. Common stocks*

We use the value- and equal-weighted portfolios of New York Stock Exchange (NYSE) stocks, from the Center for Research in Security Prices (CRSP), to represent the behavior of stock returns. The value-weighted portfolio is weighted toward large stocks; equal-weighted returns are affected more by small stocks. The two portfolios thus provide a convenient way to examine the behavior of stock returns as a function of firm size, a dimension known to be important in describing the cross-section of expected stock returns [Banz (1981)] and the variation through time of expected returns [Keim and Stambaugh (1986), Fama and French (1988a)].

### *2.2. Corporate bonds*

To study corporate bond returns, we use a sample maintained by Ibbotson Associates (obtained for us by Dimensional Fund Advisors). This database has monthly returns and yields for 1926–1987. The sample includes 100 bonds, chosen to approximate a value-weighted market portfolio of corporate bonds with maturities longer than one year. The sample starts in 1926 with 100 randomly chosen bonds, with probability of selection proportional to face value outstanding. Random selection based on face value is used at the start of each following year to add and delete bonds to maintain a 100-bond sample that approximates a value-weighted market portfolio. We use the portfolio of all 100 bonds (called All), and portfolios of bonds rated Aaa, Aa, A, Baa, and below Baa (LG, low-grade). Portfolio returns and yields are price-weighted averages of individual bond returns and yields. The average maturity of bonds in these portfolios is almost always more than ten years.

### *2.3. Explanatory variables for excess returns*

The tests attempt to measure and interpret variation in expected excess returns for return horizons $T$ of one month, one quarter, and one to four years. A one-month excess return is the difference between the continuously compounded one-month return on a bond or stock portfolio and the continuously compounded one-month Treasury bill return (from Ibbotson Associates). Excess returns for quarterly and one- to four-year holding periods are obtained by cumulating monthly excess returns. The monthly, quarterly, and annual excess returns are nonoverlapping. The two- to four-year returns are overlapping annual (end-of-year) observations. Henceforth, the word return, used alone, implies excess return.

The tests center on regressions of future stock and bond returns, $r(t, t+T)$, on a common set of variables, $X(t)$, known at $t$,

$$r(t, t+T) = \alpha(T) + \beta(T)X(t) + \varepsilon(t, t+T). \tag{1}$$

One of the explanatory variables is the dividend yield, $D(t)/P(t)$, on the value-weighted NYSE portfolio, computed by summing monthly dividends on the portfolio for the year preceding time $t$ and dividing by the value of the portfolio at $t$. [See Fama and French (1988b).] We use yields based on annual dividends to avoid seasonals in dividends. These annual yields are used to forecast the returns, $r(t, t+T)$, for all horizons.

The hypothesis that dividend yields forecast stock returns is old [see, for example, Dow (1920) and Ball (1978)]. The intuition of the efficient-markets version of the hypothesis is that stock prices are low in relation to dividends when discount rates and expected returns are high (and vice versa), so $D/P$ varies with expected returns. There is a similar prediction, however, if variation in dividend yields is due to irrational bubbles in stock prices. In this case, dividend yields and expected returns are high when prices are temporarily irrationally low (and vice versa). Evidence that dividend yields forecast stock returns is in Rozeff (1984), Shiller (1984), Flood, Hodrick, and Kaplan (1986), Campbell and Shiller (1988), and Fama and French (1988b). The novel result here is that $D/P$ also forecasts bond returns.

Expected returns on long-term corporate bonds can vary through time for at least two reasons: (a) variation in default premiums (differences between the expected returns on low- and high-grade bonds with similar maturities) and (b) variation in term or maturity premiums (differences between the expected returns on long- and short-term bonds).

To identify variation in term or maturity premiums, we use the term spread, $TERM(t)$, the difference between the time $t$ yield on the Aaa bond portfolio and the one-month bill rate. This choice is consistent with evidence that spreads of long- over short-term interest rates forecast differences between long- and short-term bond returns [see, for example, Fama (1976, 1984, 1986, 1988), Shiller, Campbell, and Schoenholtz (1983), Keim and Stambaugh (1986), and Fama and Bliss (1987)]. Our novel result is that $TERM$ tracks a time-varying term premium in stock returns similar to that in long-term bond returns.

To track default premiums, we use the default spread, *DEF*($t$), the difference between the time $t$ yield on the portfolio of (All) 100 corporate bonds and the Aaa yield. This choice is in line with evidence in Fama (1986) and Keim and Stambaugh (1986) that spreads of low- over high-grade interest rates forecast spreads of low- over high-grade bond returns.

The regression results are robust to changes in the definitions of the variables used to forecast returns. The dividend yield on the equal-weighted NYSE portfolio forecasts returns about as well as the yield on the value-weighted portfolio. Substituting a low-grade (Baa or below) bond yield for the market-portfolio bond yield in the default spread has little effect on the results. We use a market-portfolio bond yield because it is less subject to changes through time in the meaning of bond ratings. Substituting a long-term Treasury bond yield for the Aaa yield in the default and term spreads also has little effect on the results. We choose the Aaa yield to avoid potential problems caused by the change in the tax status of Treasury bonds (from nontaxable to taxable) in the early 1940s.

## 3. Business conditions and the behavior of the forecasting variables

### 3.1. Autocorrelations

The autocorrelations of the variables used to forecast returns are information about the behavior of expected returns. For the 1927–1987 and 1941–1987 periods used in the regressions, the autocorrelations of the dividend yield, the default spread, and the term spread (table 1) are large at the first-order (annual) lag, but tend to decay for longer lags. This suggests that *D/P*, *DEF*, and *TERM* track components of expected returns that are autocorrelated but show some tendency toward mean reversion.

The autocorrelations of *TERM* for 1941–1987 are smaller than those of *D/P* and *DEF*. Beyond the first (one-year) lag, the autocorrelations of *TERM* for 1941–1987 are close to 0. Thus for the last 47 years of the sample, the component of expected returns tracked by *TERM* is much less persistent than those tracked by *D/P* and *DEF*. This result is in line with our story that *TERM* tracks variation in expected returns in response to short-term variation in business conditions, whereas *DEF* and *D/P* track expected-return variation that relates to more persistent aspects of business conditions. The business-conditions part of this story comes next.

### 3.2. Plots of the forecasting variables

Since we measure the variation of expected returns with linear regressions of returns on the forecasting variables, plots of the forecasting variables picture the components of expected returns they capture.

Table 1

Summary statistics for annual observations on one-year excess returns on the bond and stock portfolios, and the dividend yield (*D/P*), default spread (*DEF*), and term spread (*TERM*).[a]

| | | | Autocorrelations | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | S.D. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | | | | | 1927–1987 | | | | | |
| Aaa | 0.74 | 6.69 | 0.21 | 0.05 | −0.06 | −0.10 | −0.16 | 0.05 | −0.03 | −0.04 |
| Aa | 0.67 | 6.82 | 0.20 | −0.05 | −0.13 | −0.15 | −0.13 | 0.03 | −0.02 | −0.10 |
| A | 0.87 | 8.38 | 0.25 | −0.15 | −0.24 | −0.13 | −0.02 | 0.12 | −0.05 | −0.13 |
| Baa | 1.45 | 8.65 | 0.24 | −0.13 | −0.24 | −0.14 | −0.01 | 0.15 | −0.01 | −0.07 |
| LG | 2.25 | 12.36 | 0.32 | −0.03 | −0.21 | −0.21 | −0.05 | 0.13 | 0.05 | 0.11 |
| VW | 5.70 | 20.81 | 0.10 | −0.19 | −0.06 | −0.13 | −0.01 | −0.02 | 0.15 | 0.07 |
| EW | 8.80 | 28.26 | 0.13 | −0.18 | −0.12 | −0.22 | −0.10 | −0.11 | 0.11 | 0.05 |
| *D/P* | 4.49 | 1.36 | 0.62 | 0.29 | 0.20 | 0.20 | 0.28 | 0.32 | 0.24 | 0.17 |
| *DEF* | 0.96 | 0.68 | 0.83 | 0.70 | 0.57 | 0.51 | 0.49 | 0.54 | 0.52 | 0.51 |
| *TERM* | 1.99 | 1.25 | 0.54 | 0.36 | 0.21 | 0.22 | 0.26 | 0.14 | 0.18 | 0.05 |
| | | | | | 1941–1987 | | | | | |
| Aaa | −0.01 | 7.05 | 0.21 | −0.03 | −0.13 | −0.16 | −0.25 | −0.03 | −0.11 | −0.11 |
| Aa | 0.08 | 7.02 | 0.23 | −0.14 | −0.12 | −0.21 | −0.17 | −0.06 | −0.05 | −0.14 |
| A | 0.55 | 7.29 | 0.26 | −0.13 | −0.19 | −0.15 | −0.02 | −0.02 | −0.07 | −0.18 |
| Baa | 1.38 | 7.36 | 0.26 | −0.20 | −0.17 | −0.11 | 0.01 | 0.05 | −0.01 | −0.15 |
| LG | 2.71 | 9.88 | 0.30 | −0.01 | −0.13 | −0.03 | 0.17 | 0.16 | 0.06 | −0.02 |
| VW | 6.97 | 16.25 | −0.03 | −0.27 | 0.08 | 0.30 | 0.13 | −0.13 | 0.18 | 0.05 |
| EW | 9.84 | 21.58 | 0.06 | −0.27 | −0.03 | 0.18 | −0.01 | −0.22 | 0.12 | −0.03 |
| *D/P* | 4.33 | 1.20 | 0.79 | 0.62 | 0.52 | 0.43 | 0.36 | 0.35 | 0.37 | 0.30 |
| *DEF* | 0.74 | 0.45 | 0.74 | 0.61 | 0.34 | 0.38 | 0.42 | 0.51 | 0.46 | 0.43 |
| *TERM* | 1.76 | 1.23 | 0.46 | 0.24 | 0.04 | 0.13 | 0.20 | 0.01 | 0.06 | −0.13 |

[a] One-year excess returns are sums of one-month excess returns (the difference between the continuously compounded one-month return on a portfolio and the one-month bill rate). Aaa, ..., LG are bond portfolios formed according to Moody's rating groups. VW and EW are the value- and equal-weighted NYSE stock portfolios. *D/P* is the ratio of dividends on the VW portfolio for year *t* to the value of the portfolio at the end of the year. *DEF* is the difference between the end-of-year yield on All (the portfolio of the 100 corporate bonds in the sample) and the Aaa yield. *TERM* is the difference between the end-of-year Aaa yield and the one-month bill rate. The yields and the bill rate in *DEF* and *TERM* are annualized. As in the later regressions, the periods for *D/P*, *DEF*, and *TERM* are one year prior to those for returns, e.g., 1926–1986 rather than 1927–1987.

If bonds are priced rationally, the default spread, a spread of lower- over high-grade bond yields, is a measure of business conditions. Fig. 1 shows that *DEF* indeed takes its highest values during the depression of the 1930s, and there are upward blips during the less severe recessions after World War II – for example, 1957–1958, 1974–1975, and 1980–1982. Although *DEF* shows some business-cycle variation, its major swings seem to go beyond the business cycles measured by the NBER. *DEF* is high during the 1930s and the early years of World War II, a period of general economic uncertainty [Officer

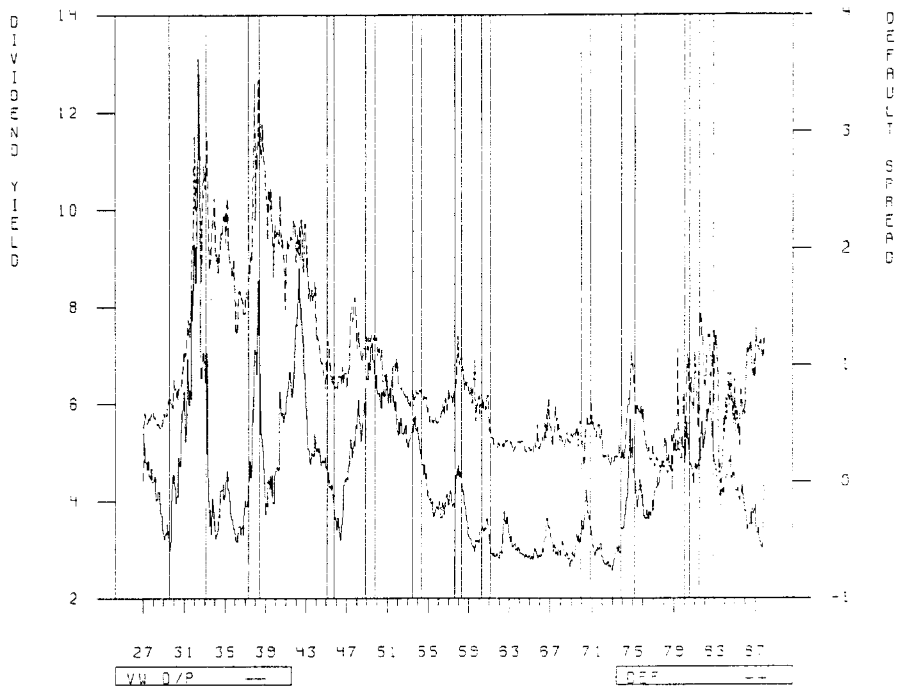

Fig. 1. Beginning-of-month values of the value-weighted dividend yield, *D/P*, and the default spread, *DEF*, in percent.

Vertical grid lines are NBER business-cycle peaks (P) and trough (T). The dates are:

8/29(P)
5/37(P)
2/45(P)
3/33(T)
6/38(T)
10/45(T)
11/48(P)
7/53(P)
8/57(P)
10/49(T)
5/54(T)
4/58(T)
4/60(P)
12/69(P)
11/73(P)
2/61(T)
11/70(T)
3/75(T)
1/80(P)
7/81(P)
7/80(T)
11/82(P)

(1973) and Schwert (1988)]. It is consistently lower during the 1953–1973 period of stronger and more stable economic conditions, which nevertheless includes four measured recessions.

Similar comments apply to the dividend yield. Indeed, the correlation between *D/P* and *DEF* (0.61 for 1927–1987 and 0.75 for 1941–1987) is apparent in fig. 1. We interpret the figure as saying that the forecast power of the dividend yield and the default spread reflects time variation in expected bond and stock returns in response to aspects of business conditions that tend to persist beyond measured business cycles. This interpretation is buttressed by the high and persistent autocorrelation of *D/P* and *DEF* observed in table 1.

In contrast, fig 2 shows that, except for the 1933–1951 period, the variation of the term spread is more closely related to measured business cycles. *TERM*

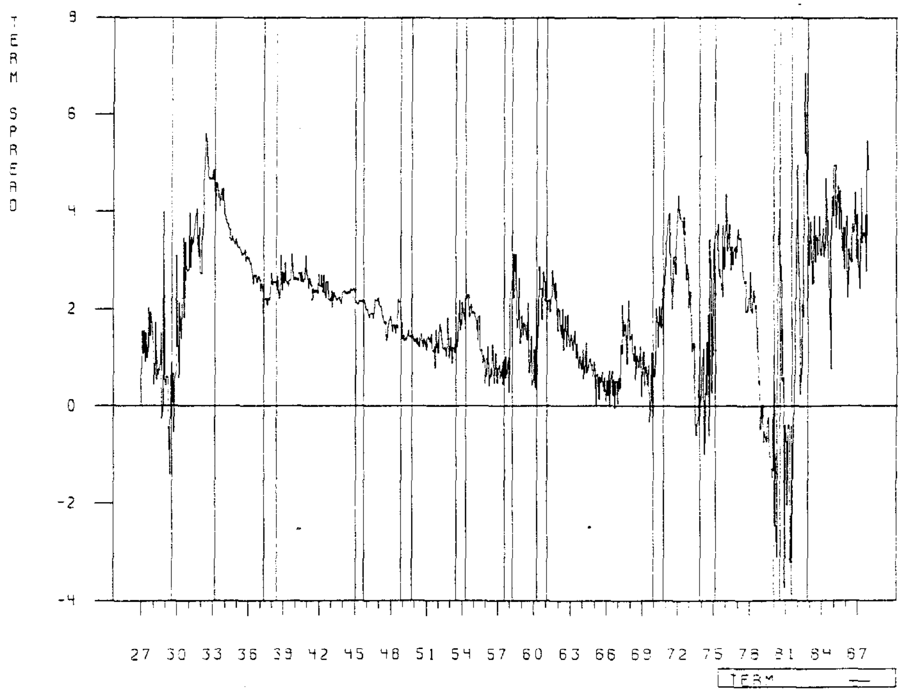

Fig. 2. Beginning-of-month values of the term spread, *TERM*, in percent.

Vertical grid lines are NBER business-cycle peaks (P) and troughs (T). The dates are:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8/29(P) | 3/33(T) | 11/48(P) | 10/49(T) | 4/60(P) | 2/61(T) | 1/80(P) | 7/80(T) |
| 5/37(P) | 6/38(T) | 7/53(P) | 5/54(T) | 12/69(P) | 11/70(T) | 7/81(P) | 11/82(P) |
| 2/45(P) | 10/45(T) | 8/57(P) | 4/58(T) | 11/73(P) | 3/75(T) | | |

tends to be low near business-cycle peaks and high near troughs. The details of the story are in fig. 3 which shows the components of *TERM*, the Aaa yield and the one-month bill rate.

From 1933 to 1951, the bill rate is stable and close to 0. This period includes much of the Great Depression and then the period during and after World War II, when the Federal Reserve fixed bill rates. For the rest of the sample, the bill rate always rises during expansions and falls during contractions. Indeed, fig. 3 suggests that, outside of the 1933–1951 period, the bill rate comes close to defining the business peaks and troughs identified by the NBER. (The NBER says that interest rates are not used to date business cycles.)

Fama (1988) argues that the business-cycle variation in short-term interest rates is a mean-reverting tendency, which implies that the variation in long-term rates is less extreme. This is confirmed by the behavior of the Aaa yield in

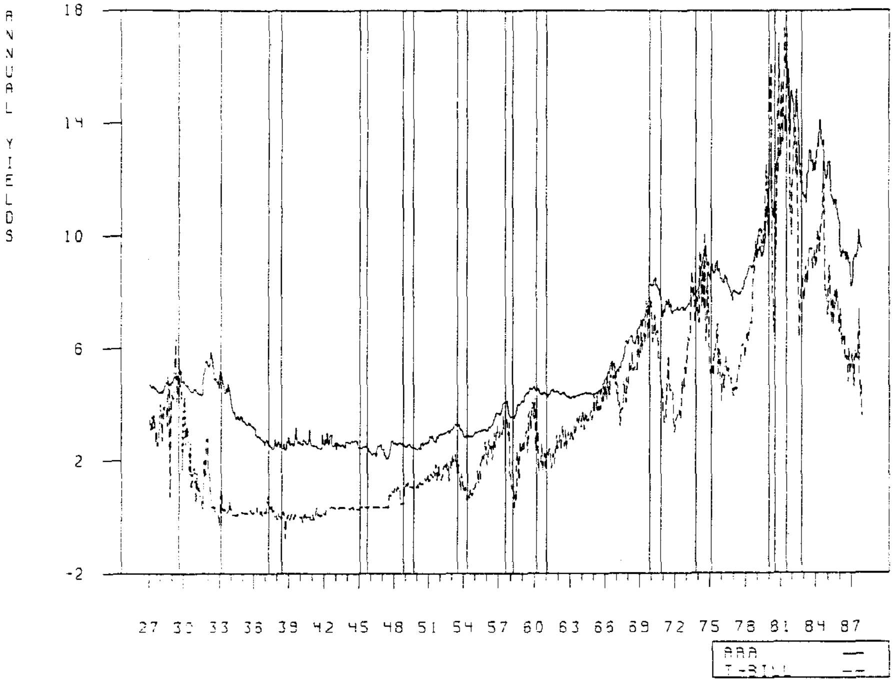

Fig. 3. Beginning-of-month values of the Aaa bond yield and the (annualized) one-month Treasury bill rate, in percent.

Vertical grid lines are NBER business-cycle peaks (P) and troughs (T). The dates are:

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 8/29(P) | 3/33(T) | 11/48(P) | 10/49(T) | 4/60(P) | 2/61(T) | 1/80(P) | 7/80(T) |
| 5/37(P) | 6/38(T) | 7/53(P) | 5/54(T) | 12/69(P) | 11/70(T) | 7/81(P) | 11/82(P) |
| 2/45(P) | 10/45(T) | 8/57(P) | 4/58(T) | 11/73(P) | 3/75(T) | | |

fig. 3. The Aaa yield rises less than the bill rate during expansions and falls less during contractions. As a result, the term spread – the Aaa yield minus the bill rate – has a clear business-cycle pattern. For all business cycles after 1951, *TERM* is higher at the trough than at the preceding or following peak.[1,2]

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[1] Kessel (1965) documents that yields on long-term Treasury bonds rise less during business expansions and fall less during contractions than yields on short-term bills. Thus spreads of long-term over short-term Treasury yields have a clear countercyclical pattern. Figs. 2 and 3 show that the cyclical behavior of interest rates documented by Kessel extends to the 1963–1987 period not included in his sample.

[2] The business-cycle behavior of the one-month bill rate suggests that the ‘anomalous’ negative relations between stock returns $r(t, t+T)$ and the time $t$ bill rate [documented by Fama and Schwert (1977) and others] just reflects countercyclical variation in expected returns like that captured by *TERM*. Chen (1989) finds that the bill rate and *TERM* indeed have similar roles in stock-return regressions. He also finds that the negative relations between stock returns and the bill rate are typically weaker than the positive relations between stock returns and *TERM*.

Table 2

Slopes, $t$-statistics, and $R^2$ from multiple regressions of excess returns on the term spread ($TERM$) and the value-weighted dividend yield ($D/P$) or the default spread ($DEF$); 1927–1987.[a]

| | Portfolios | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $T$ | Aaa | Aa | A | Baa | LG | VW | EW | Aaa | Aa | A | Baa | LG | VW | EW |
| | $r(t, t+T) = a + bD(t)/P(t) + cTERM(t) + e(t, t+T)$ | | | | | | | | | | | | | |
| | Slopes for $D/P$ | | | | | | | $t$-statistics for $D/P$ slopes | | | | | | |
| M | 0.04 | 0.01 | −0.05 | −0.03 | 0.07 | 0.21 | 0.43 | 0.96 | 0.21 | −0.55 | −0.23 | 0.43 | 0.78 | 1.26 |
| Q | 0.20 | 0.14 | 0.03 | 0.14 | 0.48 | 1.09 | 2.05 | 1.07 | 0.69 | 0.09 | 0.31 | 0.79 | 1.09 | 1.58 |
| 1 | 0.30 | −0.21 | −0.64 | −0.49 | 0.39 | 2.79 | 5.75 | 0.65 | −0.45 | −0.87 | −0.68 | 0.30 | 1.31 | 2.31 |
| 2 | 1.09 | 0.25 | 0.99 | 0.91 | 3.92 | 8.89 | 15.66 | 1.38 | 0.31 | 0.95 | 0.62 | 1.62 | 3.13 | 4.98 |
| 3 | 1.83 | 1.17 | 2.91 | 2.87 | 7.83 | 12.20 | 20.21 | 2.24 | 1.66 | 6.49 | 2.62 | 3.21 | 3.77 | 4.91 |
| 4 | 2.72 | 2.16 | 4.14 | 4.47 | 10.54 | 15.37 | 23.29 | 3.91 | 2.76 | 5.20 | 6.22 | 5.94 | 5.08 | 4.74 |
| | Slopes for $TERM$ | | | | | | | $t$-statistics for $TERM$ slopes | | | | | | |
| M | 0.23 | 0.24 | 0.26 | 0.26 | 0.26 | 0.31 | 0.47 | 3.12 | 3.57 | 3.23 | 3.19 | 2.27 | 1.68 | 1.93 |
| Q | 0.57 | 0.52 | 0.59 | 0.55 | 0.60 | 0.65 | 0.96 | 1.75 | 1.63 | 1.83 | 1.74 | 1.37 | 1.03 | 1.10 |
| 1 | 3.36 | 3.30 | 3.92 | 3.36 | 3.61 | 1.56 | 2.69 | 5.44 | 5.25 | 5.81 | 4.88 | 3.78 | 0.82 | 1.01 |
| 2 | 4.23 | 4.22 | 4.46 | 4.15 | 4.41 | −1.27 | −0.38 | 3.98 | 3.83 | 2.83 | 2.80 | 1.85 | −0.38 | −0.07 |
| 3 | 5.01 | 4.62 | 4.86 | 4.63 | 4.66 | −1.54 | −0.17 | 3.52 | 3.27 | 2.56 | 2.47 | 1.70 | −0.36 | −0.03 |
| 4 | 5.09 | 4.61 | 5.50 | 5.22 | 6.06 | 0.32 | 4.07 | 2.39 | 2.15 | 2.36 | 2.66 | 2.95 | 0.09 | 0.73 |
| | Regression $R^2$ | | | | | | | | | | | | | |
| M | 0.04 | 0.04 | 0.03 | 0.02 | 0.01 | 0.01 | 0.01 | | | | | | | |
| Q | 0.06 | 0.04 | 0.03 | 0.02 | 0.02 | 0.02 | 0.04 | | | | | | | |
| 1 | 0.39 | 0.33 | 0.30 | 0.20 | 0.11 | 0.02 | 0.07 | | | | | | | |
| 2 | 0.28 | 0.22 | 0.17 | 0.13 | 0.15 | 0.12 | 0.22 | | | | | | | |
| 3 | 0.26 | 0.19 | 0.21 | 0.18 | 0.24 | 0.18 | 0.27 | | | | | | | |
| 4 | 0.24 | 0.19 | 0.28 | 0.26 | 0.36 | 0.25 | 0.34 | | | | | | | |

| | Portfolios | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $T$ | Aaa | Aa | A | Baa | LG | VW | EW | Aaa | Aa | A | Baa | LG | VW | EW |
| | $r(t, t+T) = a + bDEF(t) + cTERM(t) + e(t, t+T)$ | | | | | | | | | | | | | |
| | Slopes for $DEF$ | | | | | | | $t$-statistics for $DEF$ slopes | | | | | | |
| M | 0.07 | 0.07 | 0.07 | 0.05 | 0.27 | 0.04 | 0.41 | 0.78 | 0.74 | 0.50 | 0.30 | 0.99 | 0.09 | 0.67 |
| Q | 0.31 | 0.34 | 0.47 | 0.54 | 1.30 | 0.99 | 2.78 | 0.85 | 0.91 | 0.84 | 0.85 | 1.30 | 0.56 | 1.12 |
| 1 | 0.76 | 0.41 | 0.76 | 1.49 | 4.12 | 4.38 | 11.59 | 0.79 | 0.46 | 0.57 | 1.12 | 1.62 | 1.15 | 2.38 |
| 2 | 4.18 | 3.51 | 6.41 | 6.70 | 13.49 | 14.62 | 29.22 | 1.96 | 1.75 | 2.86 | 2.47 | 3.04 | 2.18 | 2.73 |
| 3 | 7.21 | 7.14 | 11.12 | 11.83 | 22.25 | 19.96 | 37.61 | 2.01 | 2.14 | 3.21 | 5.51 | 4.61 | 2.25 | 2.52 |
| 4 | 10.11 | 9.66 | 13.62 | 15.29 | 27.07 | 24.56 | 41.41 | 2.11 | 2.07 | 3.20 | 4.46 | 4.64 | 2.42 | 2.80 |
| | Slopes for $TERM$ | | | | | | | $t$-statistics for $TERM$ slopes | | | | | | |
| M | 0.22 | 0.23 | 0.24 | 0.24 | 0.22 | 0.34 | 0.47 | 2.81 | 3.21 | 3.02 | 3.04 | 1.99 | 1.83 | 2.00 |
| Q | 0.55 | 0.48 | 0.49 | 0.47 | 0.42 | 0.70 | 0.83 | 1.51 | 1.36 | 1.48 | 1.41 | 0.97 | 1.01 | 0.92 |
| 1 | 3.25 | 3.15 | 3.58 | 2.89 | 2.73 | 1.20 | 1.35 | 4.41 | 4.49 | 4.89 | 3.96 | 3.08 | 0.60 | 0.52 |
| 2 | 3.48 | 3.41 | 3.13 | 2.73 | 2.10 | −2.53 | −3.47 | 2.89 | 3.07 | 2.04 | 1.97 | 1.19 | −0.74 | −0.81 |
| 3 | 3.63 | 3.06 | 2.75 | 2.32 | 1.02 | −3.30 | −4.29 | 1.80 | 1.74 | 1.26 | 1.24 | 0.50 | −0.84 | −0.80 |
| 4 | 3.09 | 2.56 | 2.94 | 2.29 | 1.68 | −1.89 | −0.45 | 0.98 | 0.88 | 1.03 | 0.99 | 0.76 | −0.51 | −0.12 |
| | Regression $R^2$ | | | | | | | | | | | | | |
| M | 0.04 | 0.04 | 0.03 | 0.02 | 0.01 | 0.00 | 0.01 | | | | | | | |
| Q | 0.05 | 0.04 | 0.03 | 0.03 | 0.03 | 0.01 | 0.02 | | | | | | | |
| 1 | 0.39 | 0.33 | 0.29 | 0.20 | 0.15 | 0.00 | 0.07 | | | | | | | |
| 2 | 0.32 | 0.26 | 0.25 | 0.22 | 0.25 | 0.05 | 0.16 | | | | | | | |
| 3 | 0.34 | 0.29 | 0.33 | 0.31 | 0.36 | 0.09 | 0.20 | | | | | | | |
| 4 | 0.34 | 0.31 | 0.40 | 0.41 | 0.45 | 0.13 | 0.23 | | | | | | | |

[a] The regressions for $T$ = one month (M), one quarter (Q), and one year use nonoverlapping returns. The regressions for two- to four-year returns use overlapping annual observations. The numbers of observations in the regressions are (M) 732, (Q) 244, (1 yr) 61, (2 yr) 60, (3 yr) 59, and (4 yr) 58. The standard errors in the $t$-statistics for the slopes are adjusted for heteroscedasticity and (for two- to four-year returns) the sample autocorrelation of overlapping residuals with the method of Hansen (1982) and White (1980). See note to table 1 for definition of portfolios.

Table 3

Slopes, $t$-statistics, and $R^2$ from multiple regressions of excess returns on the term spread ($TERM$) and the value-weighted dividend yield ($D/P$) or the default spread ($DEF$); 1941–1987.[a]

| | Portfolios | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $T$ | Aaa | Aa | A | Baa | LG | VW | EW | Aaa | Aa | A | Baa | LG | VW | EW |
| | $r(t,t+T)=a+bD(t)/P(t)+cTERM(t)+e(t,t+T)$ | | | | | | | | | | | | | |
| | Slopes for $D/P$ | | | | | | | $t$-statistics for $D/P$ slopes | | | | | | |
| M | 0.13 | 0.11 | 0.11 | 0.13 | 0.30 | 0.40 | 0.53 | 2.75 | 2.58 | 2.54 | 2.81 | 3.82 | 2.88 | 2.99 |
| Q | 0.36 | 0.34 | 0.36 | 0.42 | 0.94 | 1.31 | 1.78 | 1.91 | 1.89 | 1.97 | 2.42 | 3.28 | 2.93 | 3.03 |
| 1 | 0.40 | 0.27 | 0.74 | 1.23 | 3.33 | 5.49 | 7.96 | 0.75 | 0.47 | 1.31 | 2.14 | 3.91 | 3.45 | 3.67 |
| 2 | 1.00 | 0.62 | 2.05 | 3.15 | 7.67 | 11.84 | 16.70 | 0.87 | 0.49 | 1.58 | 2.56 | 3.97 | 4.18 | 3.87 |
| 3 | 1.41 | 0.91 | 2.93 | 4.34 | 10.88 | 15.65 | 21.22 | 1.37 | 0.78 | 2.27 | 3.11 | 3.65 | 4.94 | 3.31 |
| 4 | 2.41 | 1.76 | 3.87 | 5.29 | 12.66 | 18.48 | 23.43 | 3.78 | 1.94 | 3.65 | 3.83 | 4.21 | 5.26 | 3.18 |
| | Slopes for $TERM$ | | | | | | | $t$-statistics for $TERM$ slopes | | | | | | |
| M | 0.25 | 0.28 | 0.31 | 0.32 | 0.31 | 0.48 | 0.51 | 2.77 | 3.55 | 4.35 | 4.81 | 3.32 | 3.29 | 2.97 |
| Q | 0.62 | 0.60 | 0.73 | 0.75 | 0.77 | 1.13 | 1.17 | 1.51 | 1.52 | 2.07 | 2.43 | 1.89 | 2.17 | 1.82 |
| 1 | 3.64 | 3.56 | 3.87 | 3.57 | 3.27 | 1.64 | 1.33 | 4.74 | 5.07 | 5.68 | 5.57 | 4.10 | 0.94 | 0.66 |
| 2 | 4.29 | 4.18 | 4.25 | 4.16 | 3.71 | −1.34 | −2.90 | 3.25 | 3.48 | 3.64 | 4.06 | 3.04 | −0.63 | −0.89 |
| 3 | 4.41 | 3.81 | 3.83 | 3.62 | 2.71 | −3.95 | −6.35 | 2.13 | 2.09 | 1.95 | 2.31 | 2.01 | −1.23 | −1.27 |
| 4 | 3.73 | 3.07 | 3.27 | 3.51 | 3.27 | −2.40 | −2.67 | 1.11 | 0.97 | 1.02 | 1.40 | 1.45 | −0.75 | −0.64 |
| | Regression $R^2$ | | | | | | | | | | | | | |
| M | 0.04 | 0.06 | 0.08 | 0.08 | 0.05 | 0.03 | 0.03 | | | | | | | |
| Q | 0.06 | 0.05 | 0.08 | 0.10 | 0.10 | 0.06 | 0.06 | | | | | | | |
| 1 | 0.39 | 0.37 | 0.44 | 0.41 | 0.35 | 0.16 | 0.18 | | | | | | | |
| 2 | 0.21 | 0.18 | 0.24 | 0.30 | 0.44 | 0.36 | 0.37 | | | | | | | |
| 3 | 0.13 | 0.08 | 0.15 | 0.24 | 0.46 | 0.53 | 0.48 | | | | | | | |
| 4 | 0.09 | 0.04 | 0.13 | 0.25 | 0.51 | 0.60 | 0.50 | | | | | | | |

| | Portfolios | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $T$ | Aaa | Aa | A | Baa | LG | VW | EW | Aaa | Aa | A | Baa | LG | VW | EW |
| | $r(t, t+T) = a + bDEF(t) + cTERM(t) + e(t, t+T)$ | | | | | | | | | | | | | |
| | Slopes for $DEF$ | | | | | | | $t$-statistics for $DEF$ slopes | | | | | | |
| M | 0.23 | 0.27 | 0.30 | 0.36 | 0.84 | 0.52 | 0.91 | 1.87 | 2.35 | 2.93 | 3.08 | 3.89 | 1.43 | 1.77 |
| Q | 0.57 | 0.68 | 0.80 | 1.09 | 2.72 | 2.18 | 3.70 | 1.22 | 1.49 | 1.80 | 2.31 | 3.25 | 1.61 | 1.84 |
| 1 | 1.42 | 1.11 | 2.87 | 4.51 | 11.15 | 10.98 | 18.62 | 1.08 | 0.73 | 1.90 | 2.79 | 4.37 | 2.12 | 2.79 |
| 2 | 6.25 | 5.13 | 9.01 | 11.73 | 24.48 | 24.83 | 39.56 | 1.62 | 1.20 | 2.24 | 3.74 | 5.79 | 3.01 | 3.82 |
| 3 | 10.01 | 8.66 | 13.83 | 17.45 | 36.15 | 36.07 | 54.33 | 1.65 | 1.31 | 2.49 | 5.00 | 9.42 | 4.17 | 4.04 |
| 4 | 13.35 | 11.16 | 16.32 | 19.90 | 40.18 | 41.99 | 57.36 | 1.85 | 1.44 | 2.56 | 4.26 | 11.52 | 3.94 | 3.78 |
| | Slopes for $TERM$ | | | | | | | $t$-statistics for $TERM$ slopes | | | | | | |
| M | 0.25 | 0.27 | 0.30 | 0.31 | 0.29 | 0.46 | 0.48 | 2.64 | 3.39 | 4.13 | 4.52 | 2.99 | 3.21 | 2.83 |
| Q | 0.61 | 0.58 | 0.71 | 0.71 | 0.68 | 1.09 | 1.08 | 1.44 | 1.44 | 1.96 | 2.25 | 1.64 | 2.03 | 1.62 |
| 1 | 3.60 | 3.53 | 3.79 | 3.46 | 3.03 | 1.75 | 1.31 | 4.59 | 4.97 | 5.61 | 5.55 | 4.41 | 0.99 | 0.61 |
| 2 | 4.05 | 3.95 | 4.01 | 3.94 | 3.44 | −0.89 | −2.57 | 3.26 | 3.61 | 3.86 | 4.89 | 4.82 | −0.38 | −0.70 |
| 3 | 3.94 | 3.33 | 3.38 | 3.18 | 2.19 | −3.47 | −6.12 | 1.74 | 1.69 | 1.51 | 1.74 | 1.28 | −0.96 | −1.16 |
| 4 | 3.22 | 2.59 | 2.85 | 3.12 | 2.92 | −1.60 | −1.97 | 0.87 | 0.75 | 0.81 | 1.12 | 1.05 | −0.40 | −0.49 |
| | Regression $R^2$ | | | | | | | | | | | | | |
| M | 0.04 | 0.06 | 0.08 | 0.08 | 0.06 | 0.02 | 0.02 | | | | | | | |
| Q | 0.05 | 0.05 | 0.08 | 0.10 | 0.11 | 0.04 | 0.04 | | | | | | | |
| 1 | 0.40 | 0.38 | 0.46 | 0.45 | 0.45 | 0.09 | 0.13 | | | | | | | |
| 2 | 0.27 | 0.22 | 0.32 | 0.41 | 0.59 | 0.21 | 0.29 | | | | | | | |
| 3 | 0.23 | 0.16 | 0.29 | 0.42 | 0.70 | 0.39 | 0.44 | | | | | | | |
| 4 | 0.21 | 0.14 | 0.27 | 0.43 | 0.71 | 0.43 | 0.42 | | | | | | | |

[a] The regressions for $T$ = one month (M), one quarter (Q), and one year use nonoverlapping returns. The regressions for two- to four-year returns use overlapping annual observations. The numbers of observations in the regressions are (M) 564, (Q) 188, (1 yr) 47, (2 yr) 46, (3 yr) 45, and (4 yr) 44. The standard errors in the $t$-statistics for the slopes are adjusted for heteroscedasticity and (for two- to four-year returns) the sample autocorrelation of overlapping residuals with the method of Hansen (1982) and White (1980). See note to table 1 for definition of portfolios.

The term spread is not highly correlated with the dividend yield or the default spread. (Over the 1941–1987 period, *TERM* has a correlation of 0.16 with *D/P* and 0.18 with *DEF*.) Yet all three variables are related to business conditions. Since the regressions, presented next, show that *D/P*, *DEF*, and *TERM* forecast returns on bonds and stocks, we infer that the variation of expected returns has a rich mix of components that relate to long- and short-term aspects of business conditions.

## 4. The regressions

Tables 2 and 3 show results for 1927–1987 and 1941–1987 from multiple regressions of bond and stock returns on the term spread and the dividend yield or the default spread. Slopes and $t$-statistics (not shown) for 1946–1987 and 1957–1987 are similar to those for 1941–1987. Thus the results for 1941–1987 are a good view of expected-return variation for the 47-year period after the Great Depression.

We argue that the regressions for 1927–1987 and 1941–1987 tell a similar story about the expected-return variation tracked by *D/P*, *DEF*, and *TERM*. The regression $R^2$ and the $t$-statistics for the regression slopes in tables 2 and 3 nevertheless illustrate that the forecast power of the three variables is stronger and more consistently reliable across different portfolios and return horizons for periods after the Great Depression. (See also table 5 below.)

### *4.1. Business conditions and common variation in expected returns*

Tables 2 and 3 show that our forecasting variables have information about expected returns on stocks and bonds. All the regression slopes for the default spread and almost all the slopes for the dividend yield and the term spread are positive. Many of the slopes, especially for 1941–1987, are more than 2 standard errors from 0. The dividend yield, a variable from the stock market that is known to forecast stock returns, also forecasts corporate bond returns. The default and term spreads, variables from the bond market that are known to forecast bond returns, also forecast stock returns. In short, the three forecasting variables track components of expected returns that are common across assets.

The relatively high correlation between *DEF* and *D/P* (0.61 for 1927–1987 and 0.75 for 1941–1987) implies that the default spread and the dividend yield track similar predictable components of returns. Given the relation between long-term business conditions and these two forecasting variables (fig. 1), we infer that *DEF* and *D/P* track components of expected returns that are high during periods like the Great Depression, when business is persistently poor and low during periods like 1953–1973, when business is persistently strong. Fig. 1 and the regression slopes also imply that there are upward blips in the expected-return variation signaled by *DEF* and *D/P* during post-World War II recessions, especially the two major recessions of 1974–1975 and 1980–1982.

Fig. 2 says that the term spread is related to the shorter-term business cycles identified by the NBER. The component of expected returns captured by *TERM* is low around business-cycle peaks and high around troughs. This *TERM* component of expected returns is less persistent than the expected-return variation captured by *D/P* and *DEF*. Nevertheless, a general message from the regressions is that all three forecasting variables signal that expected returns are low when times are good and higher when they are poor.

### 4.2. Business conditions and cross-sectional patterns in expected returns

As indicated earlier, the slopes from regressions of returns on the default spread are in line with intuition about the business risks of bonds and stocks. The *DEF* slopes tend to be larger for lower-grade than for higher-grade bonds, larger for stocks than for bonds, and larger for the equal-weighted stock portfolio than for the value-weighted portfolio. The slopes for the dividend yield, especially for 1941–1987, also tend to increase from higher- to lower-grade bonds, from bonds to stocks, and from big stocks to small stocks.

The pattern in the slopes for *D/P* and *DEF* implies that the two variables track variation in expected returns that is largest for stocks and smallest for high-grade bonds. Thus, like the general level of expected returns, the differences between the expected returns on stocks and bonds vary with *D/P* and *DEF*. The spreads of the expected returns of stocks over bonds, and of low-grade over high-grade bonds, are high when the economy is weak, but they narrow when business conditions are strong.

Unlike the slopes for the default spread and the dividend yield, the slopes for the term spread in tables 2 and 3 are quite similar for different (long-term) bond portfolios. For example, in the monthly regressions for 1927–1987, the *TERM* slopes for the bond portfolios are between 0.22 and 0.24. The *TERM* slopes for the stock portfolios are in turn similar to those for bonds, at least for monthly, quarterly, and annual returns, where the slopes are estimated more precisely. The results suggest that *TERM* captures a term premium in expected returns that is largely a function of maturity and so is similar for all long-term securities. This inference is supported by the evidence in Keim and Stambaugh (1986) and Fama (1988) that variables like *TERM* (spreads of long-term over short-term bond yields) capture variation in the expected returns on Treasury bonds that increases with maturity.

What risk is associated with the term premium? The major difference between short- and long-maturity securities of the same quality is the higher sensitivity of long-maturity prices to general shifts in the level of discount rates. An old hypothesis [for example, Hicks (1947) and Kessel (1965)], easily accommodated in modern multifactor asset-pricing models, is that the term premium compensates for this discount-rate risk. The compensation is low around business-cycle peaks and high around troughs.

### 4.3. Cross-sectional patterns in expected returns: Formal tests

Table 4 shows *F*-tests of the hypothesis that the slopes for *D/P*, *DEF*, or *TERM* are equal across portfolios. *F*-tests are shown for nonoverlapping monthly, quarterly, and annual returns, where larger sample sizes imply that the tests are likely to have power. The *F*-tests are largely consistent with our inferences about the patterns in the regression slopes in tables 2 and 3.

The *F*-tests always reject the hypothesis that the slopes for *DEF* or *D/P* are the same for the seven stock and bond portfolios. The tests, especially for 1941–1987, also reject the equal-slope hypothesis for the five bond portfolios. Thus the pattern in the slopes for *DEF* or *D/P* (increasing from high-grade to low-grade bonds, from bonds to stocks, and from big stocks to small stocks) apparently reflects reliable differences across assets in the variation through time of expected returns.

The *F*-tests of the hypothesis that *TERM* tracks a maturity premium that is the same for all long-term securities are less clearcut. When only bonds are considered, the *F*-tests are all consistent with the hypothesis that the *TERM* slopes are the same for the five portfolios. When stocks are included, however, the tests for 1941–1987 and the tests on the monthly slopes for 1927–1987 tend to reject the hypothesis that the *TERM* slopes are the same for the seven stock and bond portfolios. We infer that *TERM* tracks what is essentially, but perhaps not entirely, a maturity premium in expected returns.

### 4.4. Explanatory power and the return horizon

The regression $R^2$ in tables 2 and 3 tend to increase with the holding period for both stock and bond returns. The $R^2$ are typically less than 0.1 for monthly and quarterly returns, but are often greater than 0.3 for one- to four-year returns. This pattern of stronger explanatory power for longer return horizons has a simple and interesting explanation that is linked to our business-conditions story for the variation in expected returns.

The dividend yield and the default spread are largely measures of long-term business conditions. Their autocorrelations decay slowly across longer lags (table 1). Thus the information in *D/P* and *DEF* about future one-period expected returns also decays slowly; that is, the current values of *D/P* and *DEF* contain information about distant one-period expected returns. Since the slopes for long-horizon returns cumulate the information in the independent variables, the slopes for *D/P* and *DEF* in tables 2 and 3 almost always increase with the return horizon.

Table 4

*F*-tests that regression slopes are equal across portfolios.[a]

| | | 5 bond & 2 stock portfolios | | 5 bond portfolios | |
|---|---|---|---|---|---|
| | Part A: | $R(t,t+T)=a+bD(t)/P(t)+cTERM(t)+e(t,t+T)$ | | | |
| *T* | Obs. | *D/P* | *TERM* | *D/P* | *TERM* |
| | | 1927–1987 | | | |
| M | 732 | 9.97 | 1.84 | 3.72 | 0.40 |
| | | (0.000) | (0.075) | (0.005) | (0.807) |
| Q | 244 | 13.21 | 0.43 | 2.11 | 0.11 |
| | | (0.000) | (0.887) | (0.077) | (0.978) |
| 1 | 61 | 9.77 | 1.53 | 2.13 | 0.65 |
| | | (0.000) | (0.154) | (0.077) | (0.627) |
| | | 1941–1987 | | | |
| M | 564 | 14.42 | 5.27 | 5.94 | 1.51 |
| | | (0.000) | (0.000) | (0.000) | (0.196) |
| Q | 188 | 13.60 | 2.34 | 5.01 | 0.71 |
| | | (0.000) | (0.022) | (0.001) | (0.586) |
| 1 | 47 | 24.55 | 2.67 | 9.61 | 0.36 |
| | | (0.000) | (0.010) | (0.000) | (0.839) |
| | Part B: | $R(t,t+T)=a+bDEF(t)+cTERM(t)+e(t,t+T)$ | | | |
| *T* | Obs. | *DEF* | *TERM* | *DEF* | *TERM* |
| | | 1927–1987 | | | |
| M | 732 | 2.23 | 1.88 | 1.37 | 0.10 |
| | | (0.029) | (0.068) | (0.243) | (0.982) |
| Q | 244 | 5.03 | 0.49 | 2.44 | 0.21 |
| | | (0.000) | (0.844) | (0.046) | (0.932) |
| 1 | 61 | 7.11 | 1.72 | 2.66 | 0.62 |
| | | (0.000) | (0.103) | (0.033) | (0.652) |
| | | 1941–1987 | | | |
| M | 564 | 10.17 | 4.66 | 8.57 | 1.17 |
| | | (0.000) | (0.000) | (0.000) | (0.324) |
| Q | 188 | 11.78 | 1.81 | 8.60 | 0.44 |
| | | (0.000) | (0.081) | (0.000) | (0.782) |
| 1 | 47 | 23.45 | 2.44 | 16.65 | 0.62 |
| | | (0.000) | (0.019) | (0.000) | (0.652) |

[a] The *F*-statistics test the hypothesis that the slopes (tables 2 and 3) from regressions of monthly (M), quarterly (Q), or annual (1) returns on the term spread (*TERM*) and the default spread (*DEF*) or the dividend yield (*D/P*) are equal for the five bond portfolios or for the five bond portfolios and the two stock portfolios. [See Theil (1971, p. 314).] *P*-values are in parentheses.

Table 5

Slopes, *t*-statistics, and $R^2$ from multiple regressions of real returns on the term spread (*TERM*) and the value-weighted dividend yield (*D*/*P*) or the default spread (*DEF*); 1953–1987.[a]

| | Portfolios | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *T* | Aaa | Aa | A | Baa | LG | VW | EW | Aaa | Aa | A | Baa | LG | VW | EW |
| | $r(t, t+T) = a + bD(t)/P(t) + cTERM(t) + e(t, t+T)$ | | | | | | | | | | | | | |
| | Slopes for *D*/*P* | | | | | | | *t*-statistics for *D*/*P* slopes | | | | | | |
| M | 0.27 | 0.24 | 0.23 | 0.25 | 0.28 | 0.57 | 0.76 | 1.88 | 1.84 | 1.87 | 2.07 | 2.02 | 2.31 | 2.50 |
| Q | 0.76 | 0.73 | 0.77 | 0.81 | 0.88 | 2.01 | 2.65 | 1.38 | 1.40 | 1.54 | 1.73 | 1.72 | 2.87 | 2.72 |
| 1 | 0.32 | 0.32 | 1.10 | 1.58 | 1.83 | 7.80 | 11.28 | 0.24 | 0.23 | 0.85 | 1.31 | 1.29 | 2.69 | 3.01 |
| 2 | 2.09 | 2.01 | 3.97 | 4.74 | 5.82 | 16.76 | 22.67 | 0.55 | 0.51 | 1.02 | 1.28 | 1.48 | 2.93 | 3.20 |
| 3 | 3.50 | 3.37 | 5.98 | 6.41 | 8.30 | 18.64 | 24.02 | 0.80 | 0.76 | 1.33 | 1.52 | 1.75 | 2.60 | 2.71 |
| 4 | 5.66 | 5.34 | 7.85 | 8.08 | 9.32 | 19.18 | 23.35 | 1.23 | 1.21 | 1.63 | 2.03 | 1.98 | 2.75 | 2.44 |
| | Slopes for *TERM* | | | | | | | *t*-statistics for *TERM* slopes | | | | | | |
| M | 0.27 | 0.31 | 0.34 | 0.35 | 0.33 | 0.54 | 0.54 | 2.87 | 3.71 | 4.45 | 4.93 | 3.31 | 3.61 | 3.04 |
| Q | 0.74 | 0.73 | 0.85 | 0.86 | 0.84 | 1.36 | 1.30 | 1.75 | 1.80 | 2.36 | 2.73 | 1.99 | 2.58 | 1.99 |
| 1 | 4.40 | 4.38 | 4.64 | 4.28 | 4.00 | 2.47 | 1.58 | 4.45 | 4.70 | 5.15 | 5.11 | 4.15 | 1.32 | 0.75 |
| 2 | 4.99 | 4.98 | 4.93 | 4.75 | 4.19 | −0.94 | −3.83 | 2.53 | 2.72 | 2.79 | 3.03 | 2.65 | −0.39 | −1.13 |
| 3 | 4.53 | 4.07 | 3.85 | 3.45 | 2.18 | −4.08 | −8.39 | 1.54 | 1.58 | 1.45 | 1.50 | 0.92 | −1.01 | −1.53 |
| 4 | 3.05 | 2.55 | 2.53 | 2.48 | 1.44 | −3.00 | −5.53 | 0.64 | 0.57 | 0.57 | 0.65 | 0.37 | −0.69 | −1.18 |
| | Regression $R^2$ | | | | | | | | | | | | | |
| M | 0.05 | 0.07 | 0.09 | 0.09 | 0.06 | 0.04 | 0.03 | | | | | | | |
| Q | 0.07 | 0.07 | 0.10 | 0.12 | 0.08 | 0.08 | 0.07 | | | | | | | |
| 1 | 0.39 | 0.40 | 0.46 | 0.44 | 0.33 | 0.17 | 0.18 | | | | | | | |
| 2 | 0.17 | 0.17 | 0.21 | 0.25 | 0.23 | 0.33 | 0.38 | | | | | | | |
| 3 | 0.08 | 0.06 | 0.10 | 0.13 | 0.14 | 0.38 | 0.44 | | | | | | | |
| 4 | 0.03 | 0.02 | 0.07 | 0.11 | 0.12 | 0.35 | 0.33 | | | | | | | |

| | Portfolios | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $T$ | Aaa | Aa | A | Baa | LG | VW | EW | Aaa | Aa | A | Baa | LG | VW | EW |
| | $r(t, t+T) = a + bDEF(t) + cTERM(t) + e(t, t+T)$ | | | | | | | | | | | | | |
| | Slopes for $DEF$ | | | | | | | $t$-statistics for $DEF$ slopes | | | | | | |
| M | 0.68 | 0.99 | 0.97 | 0.91 | 1.08 | 1.04 | 1.29 | 1.73 | 2.91 | 3.20 | 2.79 | 3.01 | 1.43 | 1.43 |
| Q | 1.87 | 2.65 | 2.72 | 2.77 | 3.60 | 4.78 | 5.85 | 1.24 | 1.98 | 2.12 | 2.09 | 2.56 | 1.97 | 1.80 |
| 1 | 5.79 | 7.29 | 9.49 | 10.51 | 12.75 | 23.33 | 30.27 | 1.56 | 2.11 | 2.61 | 3.16 | 2.99 | 2.27 | 2.52 |
| 2 | 24.22 | 24.98 | 29.73 | 29.25 | 30.91 | 43.43 | 52.31 | 2.95 | 3.06 | 3.68 | 4.04 | 3.22 | 2.42 | 2.43 |
| 3 | 35.21 | 36.54 | 41.55 | 38.99 | 42.02 | 46.14 | 49.56 | 3.45 | 3.61 | 4.77 | 5.04 | 4.50 | 2.70 | 2.20 |
| 4 | 44.16 | 43.67 | 48.24 | 44.49 | 45.21 | 53.55 | 49.21 | 3.67 | 3.67 | 4.75 | 4.24 | 5.72 | 3.22 | 2.14 |
| | Slopes for $TERM$ | | | | | | | $t$-statistics for $TERM$ slopes | | | | | | |
| M | 0.26 | 0.29 | 0.32 | 0.33 | 0.31 | 0.53 | 0.52 | 2.68 | 3.47 | 4.22 | 4.62 | 3.12 | 3.55 | 2.97 |
| Q | 0.72 | 0.70 | 0.82 | 0.83 | 0.80 | 1.32 | 1.25 | 1.65 | 1.70 | 2.24 | 2.56 | 1.89 | 2.43 | 1.85 |
| 1 | 4.31 | 4.25 | 4.55 | 4.22 | 3.91 | 2.83 | 2.17 | 4.54 | 4.96 | 5.67 | 5.68 | 4.99 | 1.52 | 0.97 |
| 2 | 4.95 | 4.92 | 5.05 | 4.96 | 4.52 | 0.56 | −1.73 | 3.30 | 3.83 | 4.47 | 5.40 | 4.51 | 0.24 | −0.46 |
| 3 | 4.55 | 4.05 | 4.12 | 3.81 | 2.75 | −2.18 | −5.82 | 1.49 | 1.51 | 1.43 | 1.48 | 1.02 | −0.54 | −0.99 |
| 4 | 3.80 | 3.26 | 3.54 | 3.52 | 2.63 | −0.64 | −2.68 | 0.75 | 0.69 | 0.75 | 0.85 | 0.61 | −0.15 | −0.61 |
| | Regression $R^2$ | | | | | | | | | | | | | |
| M | 0.05 | 0.09 | 0.10 | 0.10 | 0.07 | 0.04 | 0.03 | | | | | | | |
| Q | 0.06 | 0.08 | 0.11 | 0.13 | 0.11 | 0.07 | 0.04 | | | | | | | |
| 1 | 0.43 | 0.45 | 0.54 | 0.53 | 0.45 | 0.17 | 0.14 | | | | | | | |
| 2 | 0.38 | 0.39 | 0.47 | 0.50 | 0.46 | 0.22 | 0.20 | | | | | | | |
| 3 | 0.34 | 0.36 | 0.42 | 0.44 | 0.42 | 0.24 | 0.20 | | | | | | | |
| 4 | 0.32 | 0.33 | 0.38 | 0.41 | 0.37 | 0.28 | 0.12 | | | | | | | |

[a] The regressions for $T$ = one month (M), one quarter (Q), and one year use nonoverlapping returns. The regressions for two- to four-year returns use overlapping annual observations. The numbers of observations in the regressions are (M) 420 (Q) 140, (1 yr) 35, (2 yr) 34, (3 yr) 33, and (4 yr) 32. The standard errors in the $t$-statistics for the slopes are adjusted for heteroscedasticity and (for two- to four-year returns) the sample autocorrelation of overlapping residuals with the method of Hansen (1982) and White (1980). See note to table 1 for definition of portfolios.

The term spread is more closely related to shorter-term measured business cycles. The first-order autocorrelations of annual observations on *TERM* are large for both 1927–1987 and 1941–1987 (table 1), but the higher-order autocorrelations for 1941–1987 are close to 0. Consistent with this pattern, the 1941–1987 *TERM* slopes in table 3 tend to increase with the return horizon out to one or two years, and then flatten or decline.

Since the variances of the regression fitted values grow like the squares of the slopes, slopes that increase with the return horizon can explain, in large part, why the regression $R^2$ tends to increase with the return horizon. In economic terms, $D/P$, $DEF$, and, to a lesser extent, *TERM* track autocorrelated components of expected returns, generated by persistence in business conditions, that become larger fractions of return variation for longer return horizons. In this view, the explanatory power (high $R^2$) of regressions for long-horizon returns is a simple consequence of persistence in short-horizon expected returns. [Fama and French (1988b) discuss this in more detail.]

## 5. Interpretation

### *5.1. Consumption smoothing*

Consumption smoothing is a common feature of intertemporal asset-pricing models [see, for example, Merton (1973), Lucas (1978), and Breeden (1979)]. Like the permanent-income model of Modigliani and Brumberg (1955) and Friedman (1957), the asset-pricing models predict that consumption depends on wealth rather than current income. When income is high in relation to wealth, investors want to smooth consumption into the future by saving more. If the supply of capital-investment opportunities is not also unusually large, higher desired savings lead to lower expected security returns. Conversely, investors want to save less when income is temporarily low. Again, without an offsetting reduction in capital-investment opportunities, lower desired savings tend to push expected returns up. Thus variation in expected returns opposite to business conditions is consistent with modern asset-pricing models.

We find that expected *excess* returns (returns net of the one-month bill rate) are inversely related to business conditions. Some versions of the consumption-smoothing story – for example, Abel (1988) as interpreted by Chen (1989) – do predict that expected excess returns vary opposite to current business conditions. More typically, however, consumption-smoothing models predict that expected *real* returns vary opposite to business conditions. See, for example, Hansen and Singleton (1983) and Breeden (1986). It is thus interesting to check whether our forecasting variables also track expected real returns.

Table 5 replicates the regressions using real returns on the bond and stock portfolios for 1953–1987. We choose 1953–1987 to show some results for a period that is free of any unusual effects of the Great Depression, World War II, the Korean War, and the pegging of Treasury-bill interest rates preceding the 1951 accord between the Treasury and the Federal Reserve. (The potential effects of these episodes on the results for 1927–1987 and 1941–1987 seem to concern many readers.) The timeliness and reliability of inflation rates estimated from the U.S. Consumer Price Index also improve in 1953 [Fama (1975)].

The 1953–1987 results for real returns are similar to the 1941–1987 results for excess returns. In short, given that *D/P*, *DEF*, and *TERM* move opposite to business conditions, the regressions for real returns show that, like expected excess returns, expected real returns move opposite to business conditions.

### 5.2. Other explanations

We do not mean to suggest that consumption smoothing is the whole story for the variation in expected returns. Another reasonable hypothesis is that the risks for which *D/P*, *DEF*, and *TERM* are proxies are higher when times are poor and lower when times are good. [Schwert (1988) provides suggestive evidence.]

It also seems likely that variation in capital-investment opportunities (the 'productivity shocks' of the business-cycles literature) generates some of the variation in expected returns. For example, there is suggestive evidence that investment opportunities play a role in the expected-return variation tracked by the term spread. Thus Chen (1989) formally documents the clear impression from fig. 2 that *TERM* is positively related to future real activity. Since *TERM* is low near business-cycle peaks and high near troughs, Chen's results suggest that poor prospects for future real activity (and thus investments) near business peaks may help explain low expected returns around peaks. Likewise, good prospects for future activity and investment after business troughs may contribute to high expected returns around troughs.

Our evidence documents variation in expected returns related to business conditions, but the evidence does not distinguish among the many potential explanations. Fleshing out the theoretical and empirical details of a story for the apparently rich variation in expected returns on bonds and stocks in response to business conditions is an exciting challenge.

## 6. Comparisons

### 6.1. Keim and Stambaugh (1986)

The paper closest to ours is Keim and Stambaugh (1986). They also test for common variation in expected returns on bonds and stocks. At least for bonds, they also find strong evidence that expected returns vary through time. Their tests are limited to monthly returns, however, so they miss the increase in forecast power for longer return horizons observed here. Moreover, they do not attempt to relate expected returns to business conditions.

Keim and Stambaugh's evidence for stock returns is rather weak. They find strong evidence of time-varying expected returns only for the month of January. In their (table 2) regressions for all months of the 1928–1978 sample period, six of nine regression slopes for stock returns are within 2 standard errors of 0. When they split the data into subperiods (1928–1952 and 1953–1978), even this weak evidence of forecast power disappears.

To some extent, our stronger evidence on the predictability of stock returns comes from looking at return horizons longer than a month. Like those of Keim and Stambaugh, our results for monthly 1927–1987 returns are not strong. On the other hand, there is nothing in their subperiod tests that corresponds to our strong evidence on the predictability of stock returns for 1941–1987 (table 3), 1953–1987 (table 5), and 1967–1986 (table 6, below). We think these differences in results are due more to the choice of forecasting variables.

Their yield variable is the spread between the yield on bonds rated under Baa and the one-month bill rate. In our terms, their yield spread is like the sum of the default spread and the term spread. Since *DEF* and *TERM* track different components of expected returns, the sum can give an attenuated picture of the variation in expected returns. The sum also smears the differences in the patterns of the slopes for *DEF* and *TERM* that are among our more interesting and novel results.

The other two variables Keim and Stambaugh use to forecast returns are (1) minus the log of the ratio of the value of the Standard and Poor's 500 index to its average value over the preceding 45 years, and (2) minus the log of the average price of the shares of firms in the smallest quintile of NYSE stocks. Our tests indicate that these variables have less power to forecast stock returns than the dividend yield, the default spread, and the term spread, especially for periods after the Great Depression.

Our purpose is not to criticize Keim and Stambaugh. Their paper is painstaking and pathbreaking. A reasonable view of our work is that it (1) refines their choice of forecasting variables, (2) extends their tests on monthly returns to longer return horizons, (3) explains why expected (bond and stock) returns account for more return variation for longer return horizons, and, most important, (4) begins to tell a story that relates the common variation in expected bond and stock returns to business conditions.

### *6.2. Chen, Roll, and Ross (1986)*

Our time-series evidence on the expected-return variation tracked by the default and term spreads complements the cross-section evidence of Chen, Roll, and Ross (1986). They argue (as we do) that the default spread is a measure of business conditions. Thus covariances of asset returns with shocks to *DEF* are likely to help explain differences in expected returns in the multifactor asset-pricing models of Merton (1973) and Ross (1976). Their cross-section tests on stock returns support this hypothesis. They find that business risks (measured by the covariances of returns with shocks to *DEF*) and expected returns are larger for the stocks of smaller firms.

We find complementary evidence in our time-series tests. The variation in expected returns tracked by the default spread increases from high-grade to low-grade bonds, from bonds to stocks, and from big stocks to small stocks. Thus our results support and enrich their default-spread story.

Chen, Roll, and Ross also argue that the term spread is a measure of business conditions. In their tests, however, covariances with shocks to *TERM* show little power to explain the cross-section of expected stock returns. Again, this is consistent with our evidence. Our time-series tests suggest that all long-term securities (stocks and bonds) will have similar covariances with shocks to *TERM*. As a result, *TERM* will have power in cross-section tests only when securities with a range of maturities are included.

## 7. Out-of-sample forecasts

### 7.1. A statistical issue

In models like (1) that regress future returns on current yields, it is reasonable to assume that the residual, $\varepsilon(t, t+T)$, is uncorrelated with the independent variable, $X(t)$, and with past values of $X$. Stambaugh (1986) argues, however, that the residual is often correlated with future values of $X$. For example, in regressions of nominal bond returns on bond yields, the unexpected return from $t-T$ to $t$, $\varepsilon(t-T, t)$, and the yield shock between $t-T$ and $t$ will be negatively correlated because shocks to yields produce opposite shocks to returns. In this case, Stambaugh shows that if the yield, $X(t)$, is positively autocorrelated, the ordinary least-squares (OLS) slope in (1) is upward biased; the estimated slope overstates forecast power.

When we apply Stambaugh's bias-adjustment procedure to our excess-return regressions, the estimates suggest that OLS slopes for $D/P$ and *DEF* are slightly upward biased, but the slopes for *TERM* are downward biased. The bias-adjusted slopes do not change the inferences about explanatory power drawn above. Since the bias-adjusted slopes are based on strong assumptions [$X(t)$ is a first-order autoregression, and $\varepsilon(t-T, t)$ and shocks to $X(t)$ are only contemporaneously correlated], we do not show them. Instead, we examine the robustness of the OLS results with out-of-sample forecasts.

### 7.2. Construction of the forecasts

We forecast returns for horizons from one month to four years. Since the effective samples for the longer horizons are small, we would like a long period to estimate the regressions and a long period to examine their out-of-sample forecasts. As tables 2 and 3 illustrate, however, the precision of the regression slopes falls if much of the volatile 1926–1940 period is used in the estimates. As a compromise, we forecast returns for the 21-year period 1967–1987 using rolling 30-year regression estimates that start in 1937.

Each forecast is from a regression estimated with returns that begin and end in the preceding 30-year period. For example, to forecast the first one-year return (1967), we use coefficients estimated with the 30 returns for 1937–1966. To forecast the first four-year return (1967–1970), we use coefficients estimated with the 27 overlapping annual observations on four-year returns that begin and end in the 1937–1966 period. For monthly and quarterly returns, the 30-year estimation period rolls forward in monthly or quarterly steps. For one- to four-year returns, the estimation period rolls forward in annual increments.

Although $D/P$ and $DEF$ capture similar components of expected returns, the results in tables 2 and 3 ($t$-statistics and regression $R^2$) suggest that $D/P$ makes better forecasts of stock returns, while $DEF$ is more informative for bond returns. Thus for the out-of-sample forecasts for bonds we use regressions of returns on $DEF$ and $TERM$. For stocks, regressions of returns on $D/P$ and $TERM$ are used to forecast monthly and quarterly returns. Since tables 2 and 3 say that $TERM$ does not have explanatory power for horizons beyond a quarter, only $D/P$ is used to forecast longer-horizon stock returns.

### 7.3. *Forecast results*

Table 6 compares the out-of-sample forecasts for 1967–1987 with the in-sample $R^2$ from regressions estimated on the 1967–1987 period. To simplify the comparisons, out-of-sample forecast power is also measured in terms of $R^2$. The out-of-sample $R^2$ is $1-(MSE_R/MSE_N)$, where $MSE_R$ is the mean-squared-error of the out-of-sample regression forecasts for 1967–1987 and $MSE_N$ is the mean-squared-error of naive forecasts. Each naive forecast is just the average return during the 30-year period preceding the out-of-sample forecast (the same 30-year period used to obtain the slopes for the out-of-sample regression forecast). For example, the naive one-year return forecast for 1967 is the average annual return for 1937–1966. The naive four-year return forecast for 1967–1970 is four times the average annual return for 1937–1966.

The out-of-sample $R^2$ in table 6 tend to be smaller than the in-sample $R^2$ for 1967–1987, but the differences between in-sample and out-of-sample forecast power also tend to be small. Overall the results suggest that our OLS regressions have a bit of the Stambaugh (1986) bias problem; that is, the regression slopes and $R^2$ are slightly overstated.

The important result in table 6, however, is that the out-of-sample $R^2$ behave much like the in-sample $R^2$. Thus for higher-grade bonds (Aaa, Aa, A,

Table 6

$R^2$ for out-of-sample forecasts and for in-sample regressions for the 1967–1987 period.[a]

| | Out | In | Out | In | Out | In | Out | In | Out | In |
|---|---|---|---|---|---|---|---|---|---|---|
| | Aaa | | Aa | | A | | Baa | | LG | |
| M | 0.03 | 0.04 | 0.06 | 0.08 | 0.08 | 0.09 | 0.08 | 0.09 | 0.06 | 0.06 |
| Q | −0.00 | 0.05 | 0.02 | 0.06 | 0.05 | 0.09 | 0.05 | 0.09 | 0.06 | 0.09 |
| 1 | 0.41 | 0.51 | 0.44 | 0.52 | 0.48 | 0.60 | 0.40 | 0.50 | 0.47 | 0.57 |
| 2 | 0.33 | 0.34 | 0.34 | 0.34 | 0.39 | 0.42 | 0.37 | 0.40 | 0.52 | 0.52 |
| 3 | 0.26 | 0.28 | 0.29 | 0.29 | 0.37 | 0.38 | 0.37 | 0.34 | 0.58 | 0.52 |
| 4 | 0.10 | 0.23 | 0.12 | 0.22 | 0.23 | 0.31 | 0.22 | 0.30 | 0.41 | 0.41 |
| | VW | | EW | | | | | | | |
| M | 0.04 | 0.05 | 0.03 | 0.04 | | | | | | |
| Q | 0.07 | 0.10 | 0.05 | 0.08 | | | | | | |
| 1 | 0.18 | 0.15 | 0.19 | 0.23 | | | | | | |
| 2 | 0.33 | 0.39 | 0.35 | 0.45 | | | | | | |
| 3 | 0.40 | 0.53 | 0.45 | 0.53 | | | | | | |
| 4 | 0.38 | 0.59 | 0.46 | 0.50 | | | | | | |

[a] Each out-of-sample forecast is from regression coefficients estimated on the returns that begin and end in the preceding 30-year period. The bond return forecasts use *DEF* and *TERM*. The monthly (M) and quarterly (Q) stock return forecasts use *D/P* and *TERM*; longer-horizon stock return forecasts use only *D/P*. See note to table 1 for definitions of portfolios and variables. For monthly and quarterly returns, the 30-year estimation period and the subsequent forecast period roll forward in monthly or quarterly steps. For one- to four-year returns, the estimation and forecast periods roll forward in annual increments.

The out-of-sample $R^2$ (Out) is $1 - (MSE_R/MSE_N)$, where $MSE_R$ is the mean-squared-error of the out-of-sample regression forecasts for 1967–1987 and $MSE_N$ is the mean-squared-error of naive forecasts. Each naive forecast is just the average return during the 30-year period preceding the out-of-sample forecast (the same 30-year period used to obtain the slopes for the out-of-sample regression forecast). The in-sample $R^2$ (In) are from regressions for 1967–1987.

The out-of-sample $R^2$ for two-, three-, and four-year stock returns are substantially larger than those in Fama and French (1988b). The higher values here reflect the use of $MSE_N$ as the benchmark (the denominator in $R^2$) against which the out-of-sample $MSE_R$ are compared. Fama and French (1988b) use the variance of the out-of-sample realized returns as the denominator for the out-of-sample $R^2$. For the overlapping two- to four-year returns, the out-of-sample variance and the resulting $R^2$ are biased downward.

and Baa), the shorter-term forecast power of *TERM* is more important than the longer-term forecast power of *DEF*. As a result, for these portfolios, both in- and out-of-sample $R^2$ increase from 0.09 or less for monthly and quarterly returns to an impressive 0.40 or more for annual returns, and then decay some for two-, three-, and four-year returns. In contrast, the longer-term forecast power of *DEF* and *D/P* is relatively more important for low-grade bonds and the two stock portfolios. For these portfolios, the in- and out-of-sample $R^2$ increase from 0.10 or less for monthly returns to an impressive 0.40 or more in three- and four-year returns. In short, since the out-of-sample $R^2$ reproduce the interesting patterns in the in-sample $R^2$, the out-of-sample tests support our basic inferences about the variation in expected returns.

## 8. Conclusions

The default spread is a business-conditions variable, high during periods like the Great Depression when business is persistently poor and low during periods like 1953–1973 when the economy is persistently strong. The dividend yield is correlated with the default spread and moves in a similar way with long-term business conditions. For most of the 1927–1987 period, the term spread is related to shorter-term measured business cycles. It is low near business-cycle peaks and high near troughs. The fact that the three variables forecast stock and bond returns then suggests that the implied variation in expected returns is largely common across securities, and is negatively related to long- and short-term variation in business conditions.

One story for these results is that when business conditions are poor, income is low and expected returns on bonds and stocks must be high to induce substitution from consumption to investment. When times are good and income is high, the market clears at lower levels of expected returns. It is also possible, however, that variation in expected returns with business conditions is due to variation in the risks of bonds and stocks. Our regressions allow us to identify variation in expected returns. To decide how this variation splits between changes in the levels of different risks and their prices, other approaches will be needed.

What economic forces drive the economy between long- and short-term good and bad times? Invention? Changes in tastes for current versus uncertain future consumption? Government monetary and fiscal policies? These are, of course, the central and largely unanswered questions of macroeconomics. Answers to such questions are probably necessary, however, to explain our evidence that long- and short-term economic conditions produce a rich mix of variation in expected asset returns.

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