Economic Factors, Monetary Policy, and Expected Returns on Stocks and Bonds

James R. Booth
and Lena Chua Booth

Department of Finance, College of Business, Arizona State University, and Visiting Scholar, Federal Reserve Bank of San Francisco; and Department of World Business, Thunderbird-American Graduate School of International Management, respectively.

This paper examines the impact of the stance of monetary policy on security returns. The two measures of the stance of monetary policy used, the federal funds rate and an index based on the change in the discount rate, contain significant information that can be used to forecast expected stock and bond portfolio returns. Specifically, we find that a restrictive (expansive) monetary policy stance decreases (increases) returns of large and small stock portfolios and, in some cases, corporate bond portfolios. The monetary policy stance measures have explanatory power in forecasting stock and bond returns, beyond the business conditions proxies.

A growing body of research has focused on forecasting stock and bond returns using economic and monetary factors. Fama and French (1988, 1989), Fama (1990), and Schwert (1990) focus on economic factors and find that three business conditions proxies, the dividend yield, default spread, and term spread, can explain significant variation in expected stock and/or bond returns. These studies generally find that the required returns that investors demand vary over the business cycle.

The majority of the research on monetary policy has focused on its impact in the real sector (see Romer and Romer 1989 and Bernanke and Blinder 1992). Less attention has been directed at the impact of monetary policy actions on stock and bond returns. Recently, Jensen, et al. (1996) used an index of the stance of monetary policy based on changes in the discount rate to show that expected stock returns are higher in expansive periods than in restrictive periods. Combining the previously used business cycle proxies with a measure of monetary policy, they find that the impact of the various business conditions proxies varies across monetary environments. Specifically, they find that the business conditions proxies have explanatory power only during restrictive periods.

In this study, we examine the impact of monetary policy on expected stock and bond returns and expand on previous work in several ways. First, we construct measures of the business conditions proxies in a slightly different way to test the robustness of the findings related to the predictability of stock returns. Second, we use two measures of monetary policy actions, the one developed by Jensen, et al. (1996) related to the directional change of the discount rate and one proxied by the federal funds rate, to determine whether there exists a direct monetary sector effect on stock and bond returns through these measures of monetary policy. Third, we examine a portfolio of small stocks and a portfolio of large stocks to determine whether the findings related to either the business conditions or monetary stringency have a differential impact given firm size. The motivation for this is based on the notion that smaller companies are more directly affected by changes in monetary policy due to their dependence on bank and private market financing.

We find, similar to earlier work on business conditions and expected returns, that the default spread, dividend yield, and the term spread are important in explaining expected returns on both large and small stock portfolios and on a portfolio of corporate bonds. We find that both measures of monetary policy actions have explanatory power for expected excess returns on the large stock portfolio and for the small stock portfolio in monthly returns. For the expected excess returns on corporate bonds, we find that the discount rate change measure of monetary policy stance has explanatory power. When we interact the discount rate change index with the business conditions proxies, we find that the monetary policy effect is direct and does not work through the business conditions proxies as suggested by Jensen, et al. (1996). We do find a larger monetary or business condition effect for smaller firms, consistent with a differential impact on these firms compared to large firms. Overall, these results suggest monetary policy actions can be used to forecast excess returns on stocks and bond portfolios.

I. RELATED RESEARCH

Business Conditions and Security Returns

The recent research on the relation between stock returns and business conditions have focused on three measures of the business environment: dividend yield, the default spread, and the term spread. Dividend yield, as a business conditions proxy, is perhaps the oldest of the measures believed to vary with expected stock returns (see Dow 1920). The intuition for this relation, provided by Fama (1990), is that stock prices are low relative to dividends when discount rates and expected returns are high, and vice versa, so $D(t)/V(t)$ varies with expected returns. Rozeff (1984), Shiller (1984), Campbell and Shiller (1987), Fama and French (1988, 1989), Fama (1990), and Jensen, et al. (1996) document that dividend yields forecast stock returns.

Evidence that the default spread is important in explaining stock and/or bond returns is more recent. Chen, Roll, and Ross (1986) argue that the spread of lower- to higher-grade bonds is a proxy for business conditions. They argue that when business conditions are poor, spreads are likely to be high, and when business conditions are strong, spreads are likely to be low. Studies by Fama and French (1989), Fama (1990), and to a lesser degree Jensen, et al. (1996), find that the default spread captures variations in expected returns in response to business conditions.

The third measure of business conditions that has been used in previous studies is the term spread. The motivation for this is that the term spread is shown to decrease near peaks of economic activity and increase near economic troughs. Consistent with this motivation, Campbell (1987), Fama and French (1989), Fama (1990), Schwert (1990), Shiller (1984), Campbell and Shiller (1987), and Jensen, et al. (1996) find that the term spread also explains similar variations in expected stock returns.

Monetary Policy and Security Returns

It has long been contended that monetary policy affects not only economic activity, but also security returns. An early examination of the link between stock returns and monetary policy by Rozeff (1984) finds a relation between stock returns and contemporaneous monetary policy developments. Additional studies by Shiller (1984), Campbell and Shiller (1987), Geske and Roll (1983), and Kaul (1987) present evidence linking the monetary sector to stock returns.

More recently, Jensen and Johnson (1995) find that stock returns are related to changes in the Federal Reserve discount rate. In Jensen, et al. (1996), this measure of monetary policy is used to show that business conditions proxies used in previous studies (as discussed above) vary dramatically across monetary environments. Their motivation for using the discount rate as a proxy for the stance of monetary policy follows from the view that the discount rate is routinely regarded as a signal of monetary and possibly economic developments. Their argument is based on Waud's (1970) suggestion that discount rate changes affect market participants' expectations about monetary policy because (1) rate changes are made only at substantial intervals, (2) they represent a somewhat discontinuous instrument of monetary policy, and (3) they are established by a public body perceived as being competent in judging the economy's cash and credit needs. Using discount rate change series as their measure of expansive and restrictive policies, they are able to show that the behavior of the business conditions proxies and their influence on expected returns is significantly affected by the monetary environment.

We reexamine the impact of monetary policy based on the measure developed by Jensen, et al. (1996) with slightly different proxies for business conditions. We also use the federal funds rate, based on evidence by Bernanke and Blinder (1992) and Laurent (1988) that the federal funds rate is a good indicator of monetary policy actions. To examine whether business conditions and monetary policy have a differential impact on small versus large stocks, we examine expected returns on a portfolio of the S&P 500 firms, a portfolio of small stocks (approximately the fifth quintile of firms on the New York Stock Exchange), and a portfolio of Aaa and Aa rated bonds. This allows us to test for

a differential impact of both business conditions and monetary policy on large versus small firm returns and on bond returns.

II. DATA

Sample Period

We examine stock and bond returns over the period August 1954 through December 1992. This follows closely the sample period chosen by Jensen, et al. (1996) and the first availability of the federal funds rates. Even though February 1954 reflects the first change in stance through the discount rate since the Federal Reserve/Treasury accord of 1951, we start our sample from August 1954 to match the federal funds rate data. This permits us to compare the information contained in each measure.

Following the Jensen, et al. (1996) approach in constructing the discount rate series, we find this 39-year period includes a total of 99 discount rate changes, 49 increases and 50 decreases. They define a rate change series as a period of time over which discount rate changes are in only one direction, either increasing or decreasing. This results in 23 rate change series, 12 decreasing and 11 increasing. Using this framework, we accept their notion that a series reflects a period in which the Fed is operating under the same monetary policy; the next series occurs when a rate change in the opposite direction is announced. The months in which rates are announced are eliminated from the sample. This results in 439 monthly observations, 239 months following discount rate increases and 200 following discount rate decreases.

In the quarterly sample, we have 131 observations. This is 11 quarters fewer than that of Jensen, et al. (1996) because

TABLE 1

FEDERAL RESERVE DISCOUNT RATE CHANGE SERIES: FEBRUARY 1954 THROUGH DECEMBER 1992

SERIES	INCREASING (I) OR DECREASING (D)	FIRST RATE CHANGE	NUMBER OF RATE CHANGES	MONTHLY OBSERVATIONS
1	D	02/05/54	2	13
2	I	04/14/55	5	30
3	D	11/15/57	4	8
4	I	08/15/58	5	21
5	D	06/30/60	2	36
6	I	07/17/63	3	44
7	D	04/07/67	1	6
8	I	11/20/67	3	8
9	D	08/16/68	1	3
10	I	12/19/68	2	22
11	D	11/11/70	5	7
12	I	07/16/71	1	3
13	D	11/11/71	2	13
14	I	01/15/73	8	22
15	D	12/09/74	7	31
16	I	08/30/77	14	32
17	D	05/29/80	3	3
18	I	09/26/80	4	13
19	D	11/02/81	9	28
20	I	04/09/84	1	6
21	D	11/23/84	7	33
22	I	09/04/87	3	38
23	D	12/18/90	7	24

SOURCE: Extracted from Jensen, et al. (1996).

of the creation of quarters around rate changes. They drop months when the number of months in a rate change series is not divisible by 3. We use the traditional calendar quarters and eliminate the quarters in which a rate change occurred. This analysis places the monthly and quarterly data into one of two subsamples: observations that occur during increasing rate series and observations that occur during decreasing rate series. Table 1 provides the number of months and quarters in each rate change series.

Return and Macroeconomic Variables

The return and explanatory variables follow those used in previous studies, particularly Fama (1990) and Jensen, et al. (1996).

Return Variables

Large stock returns (LS): Monthly stock returns for the large stock portfolio are collected from Ibbotson and Associates for the sample period February 1954 through December 1992. The data comprise the total returns, including dividends, for the S&P 500 after March 1957 and for the S&P 90 stocks before 1957. These represent a portfolio of the largest market value companies in the U.S. The portfolio returns are value-weighted. To obtain a measure of excess returns, we subtract the contemporaneous monthly return on T-bills.

Small stock returns (SS): These are the monthly returns on the Ibbotson small stock portfolio for the same sample period. For the period February 1954 to December 1981, this portfolio was the Dimensional Fund Advisors (DFA) Small Company 9/10 (ninth and tenth) Fund. The fund is a market-value-weighted index of the ninth and tenth deciles of the New York Stock Exchange (NYSE), plus stocks listed on the American Stock Exchange (AMEX) and over-the-counter (OTC) with capitalization that is the same as or less than the upper bound of the NYSE ninth decile.

The weight of each stock within the fund is proportionate to its market capitalization; therefore, stocks with a higher market capitalization value will be weighted more than stocks with a lower market capitalization value. Since the lower bound of the tenth decile is near zero, stocks are not purchased if they are smaller than $10 million in market capitalization (although they are held if they fall below that level). A company's stock is not purchased if it is in bankruptcy; however, a stock already held is retained if the company becomes bankrupt. Stocks remain in the portfolio if they rise into the eighth NYSE decile, but they are sold when they rise into the seventh NYSE decile or higher. The returns for the DFA Small Company 9/10 Fund represent after-transactions-cost returns while the returns on other asset classes and for the pre-1982 small company stocks are before-transactions-cost returns.

For the period after 1982, the small stock portfolio is represented by the historical series developed by Banz (1981). This equals the fifth quintile of the NYSE, based on market value. Every five years the portfolio is rebalanced and the new portfolio includes the new fifth quintile of the NYSE. Excess returns are obtained by subtracting the return on the contemporaneous T-bill.

Corporate bond returns (CB): The corporate bond total returns are represented by the Salomon Brothers Long-Term High-Grade Corporate Bond Index. According to Ibbotson Associates, the index includes nearly all Aaa- and Aa-rated bonds. Capital appreciation returns were calculated from yields assuming a 20-year maturity, a bond price equal to par, and a coupon equal to the beginning-of-period yield. The monthly income return was assumed to be one-twelfth the coupon. The monthly return on the T-bill is subtracted to obtain excess returns.

Explanatory Variables

Dividend yield (D/P): To obtain the dividend yield for the large stock portfolio, we use the income return calculated by Ibbotson Associates. Following Fama and French (1989), we use annual income returns as the independent variable.

Term spread (TERM): To calculate the term spread, we use the long-term government bond return from Ibbotson Associates. For the 1954 to 1976 period, this involved using approximately 20 bonds with reasonably current coupons. For the 1977–1992 period, the return was calculated as the change in the price plus the coupon payments. To develop a measure of TERM, we subtract the contemporaneous T-bill return from the long-term government bond return. This measure differs from Fama (1990) and Jensen, et al. (1996) in that they measure the difference between the 10-year and 1-year T-bond returns.

Default spread (DEF): The default spread is measured as the difference between the return on the corporate bond portfolio and the T-bond portfolio. Our measure is obtained by subtracting the 20-year T-bond portfolio return (approximately) from the return of a portfolio containing Aaa- and Aa-rated corporate bonds. This measure is closest to the Jensen, et al., measure of the Baa corporate bond minus the 10-year T-bond. Fama (1990) and Fama and French (1989) use the difference between a portfolio of all corporate bonds and the yield on the Aaa corporate portfolio. Schwert (1990) uses the difference in yield between Baa and Aa-rated corporate bonds.

Discount rate changes (DIR): This is a binary variable taking on the value of one if the previous discount rate change was an increase and zero if the previous change was a decrease.

Federal funds rate (FFRATE): This annualized rate equals the monthly and quarterly averages of daily federal funds rates collected from the Federal Reserve Bank of St. Louis (FRED) data series.

To obtain security returns for the analysis involving quarterly holding periods, we cumulate monthly observations. Following previous studies, we use excess returns of large stocks (LS), small stocks (SS), and corporate bonds (CB) as dependent variables. Consistent with earlier approaches, we focus on expected returns. In performing the statistical analysis, we lag the independent variables D/P, TERM, DEF, and FFRATE by one period relative to the excess returns variables.

III. EMPIRICAL RESULTS

Variable Means across Monetary Environments

Table 2 presents the means of the variables used in the analysis across the sample period and during the expansive and restrictive monetary periods, based on the discount rate index constructed according to the Jensen, et al. (1996) approach. The excess return variables for our large stock portfolio, which is based on the S&P 500, are similar in magnitude to those reported for the value-weighted CRSP index in Jensen, et al. The excess returns for our small stock portfolio are slightly higher than those reported for the equally weighted CRSP index in Jensen, et al. The excess returns for our portfolio of high-grade corporate bonds are consistent with the findings of Jensen, et al., and Rozeff (1984), who find that stock returns vary across the monetary policy environment.

The results on annual dividend yield are slightly lower than those reported for the CRSP index by Jensen, et al., and by Fama and French (1990). The difference across monetary policy environments is similar to that reported in Jensen, et al. Our measure of TERM differs substantially, both in construction and in results, from other studies. We use the difference between the long-term 20-year T-bond and the T-bill rates; Jensen, et al., uses the difference between the 10-year and 1-year Treasury yields, and Fama (1990), Fama and French (1989), and Schwert (1990) use the difference between corporate bond yields and the T-bill. Compared to the results in Jensen, et al., the mean of our variable is lower, and our measure shows much greater variation across different monetary regimes. We prefer it because it reflects the spread between two of the more liquid Treasury issues and does not contain any potential for a default spread, as do the measures using corporate series.

Our measure of the default spread (DEF) uses the difference between the return on the portfolio of Aaa- and Aa-rated corporate bonds and the return on long-term T-bonds. Earlier studies use the difference between high- and low-grade corporate bonds (Fama 1990 and Schwert 1990).

TABLE 2

MEANS OF OBSERVATIONS OF BUSINESS CONDITIONS PROXIES AND SECURITY RETURNS: AUGUST 1954 THROUGH DECEMBER 1992

VARIABLE	FULL SAMPLE (n = 439)	EXPANSIVE PERIODS (n = 200)	RESTRICTIVE PERIODS (n = 239)	t TEST
SECURITYRETURNS (MONTHLY):				
Large stock excess returns (LS)	0.523	1.299	–0.125	3.49**
Small stock excess returns (SS)	0.885	1.932	0.008	3.42**
High-grade bond excess returns (CB)	0.088	0.418	–0.187	2.70**
BUSINESS CONDITIONS PROXIES (ANNUALIZED):				
Term spread (TERM)	0.072	6.067	–4.884	12.84**
Dividend yield (D/P)	4.065	4.153	3.991	1.89
Default spread (DEF)	0.737	1.325	0.246	2.58**
FEDERALFUNDS RATE (ANNUALIZED):	6.298	5.490	6.975	4.43**

** Statistically significant at the 0.01 level

Our measure is closer to that used in Jensen, et al. (1996), viz, the Baa-rated corporate bond minus the 10-year T-bond yield. Compared to the measure used by Jensen, et al., our measure of the default spread, DEF, has a smaller mean, and it exhibits greater variability over different monetary regimes. This is consistent with the interpretation of Jensen, et al., that there is an increasing concern about a firm's ability to service its debt during expansive periods. This is also consistent with higher risk premiums during economic downturns.

Our results for the second measure of monetary policy actions, the federal funds rate, indicate that the level of the federal funds rate is consistent with the direction of monetary policy indicated by the discount rate change measure. The correlation between the federal funds rate and the discount rate index is 0.22. Thus, they both contain unique information that may affect expected returns.

Business Conditions Proxies and Expected Returns

In Table 3, we provide regressions of business conditions on the expected returns on stocks and bonds. The results presented here are similar to earlier studies by Fama and French (1989) and Jensen, et al. (1996). We find that our measure of the term spread (TERM) has a positive coefficient and is significant in explaining returns of large stocks, small stocks, and corporate bonds for both monthly and quarterly horizons. This finding is consistent with Fama and French (1989), Fama (1990), and Jensen, et al. (1996). The dividend yield (D/P) has explanatory power for large and small stock returns but not for corporate bond returns in the monthly returns. For the quarterly horizon, D/P loses significance for large and small stocks and corporate bonds. These findings differ from those of Fama and French (1989) and the monthly returns of Jensen, et al. (1996), who find that D/P has explanatory power for corporate bond returns. For quarterly returns, we find that D/P does not have explanatory power for either stocks or bonds.

We find the default spread (DEF) has explanatory power for monthly returns of large and small stocks but not for corporate bonds. Over the quarterly return horizon, we find that DEF has explanatory power in forecasting quarterly corporate bond returns as well as large- and small-stock portfolios returns. Jensen, et al. (1996) find that the default spread is important only in explaining equally weighted stock portfolio returns. Overall, we find that the business conditions proxies have explanatory power for explaining stock and bond returns on both monthly and quarterly return horizons. Our results for the dividend yield (D/P) are not as strong as earlier studies but may reflect differences in the computation of this variable.

Monetary Sector and Security Returns

In Table 4, we add the proxies for monetary policy stance, the federal funds rate and the discount rate change series. The coefficients for the federal funds rate (FFRATE) in the monthly regressions are negative and statistically significant for the large and small stock regressions but not significant in the bond return regressions. The coefficient for DIR (value of one during restrictive periods) is negative and statistically significant at the 0.05 level for all the monthly regressions.

For the quarterly regressions in Table 4, the results are quite different. The federal funds rate (FFRATE) is important only in predicting large stock returns. The discount rate change (DIR) has explanatory power only for corporate bond returns. DIR has explanatory power for large stocks returns when FFRATE is not included.

The regressions indicate that both the changes in the federal funds rate (FFRATE) and the discount rate series (DIR) have explanatory power for predicting excess stock returns, but only the DIR measure has explanatory power for predicting excess bond returns. These results indicate that the returns on all portfolios are higher during expansive monetary periods than during restrictive periods.

We also find that the business conditions proxies have explanatory power for stock and bond returns. The addition of the proxies for monetary restrictiveness alters, to a slight degree, the explanatory power of the business conditions proxies for stock and bond portfolio returns. In particular, the coefficient and explanatory power of D/P, the dividend yield, is consistently smaller for large stock, small stock, and corporate bond portfolios. The coefficients on TERM remain statistically significant for most stock regressions. These results differ from those of Jensen, et al. (1996), who find that the introduction of the monetary policy variable causes their measure for the term spread to lose explanatory power for all stock regressions, although it is still significant in the monthly and quarterly bond portfolio regressions. The default spread (DEF) loses explanatory power, although it is still significant at the 0.10 level for the large and small stock portfolios in the monthly regressions. For the quarterly return horizons, DEF continues to be significant at the 0.05 level for the stock regressions. Thus, the introduction of the two proxies only slightly alters the results related to the business conditions proxies. This suggests the potential for a direct monetary policy effect on expected stock and bond returns.

In Table 5, we present evidence related to the stability of the slope parameters across monetary policy environments. To do this, we interact DIR with the business conditions proxies TERM, D/P, and DEF, and this is done with and without the federal funds rate (FFRATE) included. In

TABLE 3

RESULTS OF REGRESSIONS OF BUSINESS CONDITIONS ON THE EXPECTED RETURNS OF STOCKS AND BONDS: FEBRUARY 1954 THROUGH DECEMBER 1992

MONTHLY RETURNS

DEPENDENT VARIABLE	CONSTANT	TERM	D/P	DEF	ADJ. R^2	F TEST
(1) LARGE STOCK PORTFOLIO	–0.011 (–1.197)	0.269 (3.112)**	0.404 (1.809)	0.404 (2.256)*	0.02	4.62 [0.01]
(2) SMALL STOCK PORTFOLIO	–0.015 (–1.172)	0.409 (3.446)**	0.582 (1.899)	0.549 (2.232)*	0.03	5.35 [0.01]
(3) BOND PORTFOLIO	0.003 (0.660)	0.116 (2.441)*	–0.063 (–0.513)	0.086 (0.881)	0.01	2.10 [0.10]
(4) LARGE STOCK PORTFOLIO	–0.011 (–1.155)	0.184 (2.354)*	0.402 (1.790)		0.02	4.35 [0.01]
(5) SMALL STOCK PORTFOLIO	–0.014 (–1.131)	0.294 (2.735)**	0.579 (1.879)		0.02	5.48 [0.01]
(6) BOND PORTFOLIO	0.003 (0.674)	0.097 (2.286)*	–0.063 (–0.518)		0.01	2.75 [0.06]
(7) LARGE STOCK PORTFOLIO	0.005 (2.626)**	0.268 (3.092)**		0.403 (2.242)*	0.02	5.27 [0.01]
(8) SMALL STOCK PORTFOLIO	0.009 (3.140)**	0.408 (3.423)**		0.547 (2.217)*	0.02	6.18 [0.01]
(9) BOND PORTFOLIO	0.001 (0.732)	0.116 (2.446)*		0.087 (0.884)	0.01	3.01 [0.05]

QUARTERLY RETURNS

DEPENDENT VARIABLE	CONSTANT	TERM	D/P	DEF	ADJ. R^2	F TEST
(1) LARGE STOCK PORTFOLIO	–0.033 (–1.042)	0.558 (3.507)**	1.114 (1.444)	1.122 (2.589)**	0.10	5.66 [0.00]
(2) SMALL STOCK PORTFOLIO	–0.037 (–0.767)	0.875 (3.676)**	1.457 (1.262)	1.669 (2.619)**	0.10	5.86 [0.00]
(3) BOND PORTFOLIO	0.010 (0.610)	0.240 (2.862)**	–0.236 (–0.579)	0.485 (2.118)*	0.05	3.26 [0.02]
(4) LARGE STOCK PORTFOLIO	–0.032 (–0.989)	0.411 (2.709)**	1.128 (1.432)		0.06	4.92 [0.01]
(5) SMALL STOCK PORTFOLIO	–0.035 (–0.719)	0.654 (2.874)**	1.478 (1.253)		0.06	5.13 [0.01]
(6) BOND PORTFOLIO	0.011 (0.627)	0.177 (2.227)*	–0.230 (–0.557)		0.02	2.57 [0.08]
(7) LARGE STOCK PORTFOLIO	0.012 (1.726)	0.570 (3.575)**		1.126 (2.588)**	0.09	7.38 [0.00]
(8) SMALL STOCK PORTFOLIO	0.022 (2.183)	0.892 (3.742)**		1.705 (2.622)**	0.10	7.96 [0.00]
(9) BOND PORTFOLIO	0.001 (0.209)	0.238 (2.842)**		0.484 (2.119)*	0.05	4.74 [0.01]

* Statistically significant at the 0.05 level

** Statistically significant at the 0.01 level

NOTES: *t* statistics in parentheses; *p* values in brackets.

TABLE 4

RESULTS OF REGRESSIONS OF BUSINESS CONDITIONS AND MONETARY POLICY PROXIES ON THE EXPECTED RETURNS OF STOCKS AND BONDS: AUGUST 1954 THROUGH DECEMBER 1992

MONTHLY RETURNS

DEPENDENT VARIABLE	CONSTANT	TERM	D/P	DEF	FFRATE	DIR	ADJ. R^2	F TEST
(1) LARGE STOCK PORTFOLIO	–0.008 (–0.840)	0.242 (2.806)**	0.616 (2.577)**	0.383 (2.149)*	–0.193 (–3.210)**		0.04	5.93 [0.00]
(2) SMALL STOCK PORTFOLIO	–0.012 (–0.947)	0.383 (3.219)**	0.854 (2.585)**	0.526 (2.137)*	–0.222 (–2.662)**		0.04	5.78 [0.00]
(3) BOND PORTFOLIO	0.004 (0.678)	0.113 (2.364)*	–0.039 (–0.297)	0.082 (0.829)	–0.017 (–0.520)		0.01	1.62 [0.17]
(4) LARGE STOCK PORTFOLIO	–0.001 (–0.074)	0.216 (2.456)*	0.294 (1.301)	0.358 (1.991)*		–0.011 (–2.749)**	0.04	5.22 [0.00]
(5) SMALL STOCK PORTFOLIO	–0.003 (–0.202)	0.346 (2.853)**	0.476 (1.529)	0.488 (1.969)*		–0.015 (–2.587)**	0.04	5.68 [0.00]
(6) BOND PORTFOLIO	0.007 (1.357)	0.092 (1.888)	–0.090 (–0.724)	0.056 (0.570)		–0.005 (–2.307)*	0.02	2.90 [0.02]
(7) LARGE STOCK PORTFOLIO	–0.001 (–0.151)	0.206 (2.356)*	0.529 (2.190)*	0.341 (1.908)	–0.163 (–2.634)**	–0.009 (–2.054)*	0.05	5.62 [0.00]
(8) SMALL STOCK PORTFOLIO	–0.004 (–0.264)	0.335 (2.770)**	0.737 (2.206)*	0.469 (1.900)	–0.180 (–2.109)*	–0.011 (–2.015)*	0.05	5.47 [0.00]
(9) BOND PORTFOLIO	0.007 (1.355)	0.092 (1.886)	–0.092 (–0.684)	0.057 (0.570)	0.001 (0.032)	–0.005 (–2.244)*	0.01	2.31 [0.04]

QUARTERLY RETURNS

DEPENDENT VARIABLE	CONSTANT	TERM	D/P	DEF	FFRATE	DIR	ADJ. R^2	F TEST
(1) LARGE STOCK PORTFOLIO	–0.007 (–0.211)	0.481 (3.252)**	1.277 (1.595)	1.001 (2.411)*	–0.527 (–2.582)**		0.12	5.62 [0.00]
(2) SMALL STOCK PORTFOLIO	–0.015 (–0.307)	0.826 (3.609)**	1.754 (1.416)	1.613 (2.510)*	–0.527 (–1.670)		0.11	5.21 [0.00]
(3) BOND PORTFOLIO	0.017 (0.923)	0.161 (1.839)	–0.179 (–0.379)	0.357 (1.463)	–0.180 (–1.498)		0.03	1.87 [0.12]
(4) LARGE STOCK PORTFOLIO	0.010 (0.292)	0.355 (2.145)*	0.464 (0.610)	0.971 (2.279)*		–0.029 (–1.960)*	0.11	4.81 [0.00]
(5) SMALL STOCK PORTFOLIO	–0.005 (–0.099)	0.745 (2.915)**	0.971 (0.828)	1.642 (2.500)*		–0.020 (–0.864)	0.10	4.63 [0.00]
(6) BOND PORTFOLIO	0.032 (1.693)	0.052 (0.548)	–0.500 (–1.155)	0.261 (1.075)		–0.023 (–2.782)**	0.07	3.31 [0.01]
(7) LARGE STOCK PORTFOLIO	0.010 (0.298)	0.368 (2.257)*	1.130 (1.412)	0.865 (2.053)*	–0.477 (–2.324)*	–0.024 (–1.620)	0.14	5.07 [0.00]
(8) SMALL STOCK PORTFOLIO	–0.005 (–0.099)	0.758 (2.981)**	1.666 (1.333)	1.531 (2.329)*	–0.497 (–1.552)	–0.014 (–0.624)	0.11	4.23 [0.00]
(9) BOND PORTFOLIO	0.032 (1.695)	0.055 (0.585)	–0.314 (–0.677)	0.231 (0.948)	–0.133 (–1.123)	–0.022 (–2.583)**	0.07	2.91 [0.02]

* Statistically significant at the 0.05 level

** Statistically significant at the 0.01 level

NOTES: *t* statistics in parentheses; *p* values in brackets.

TABLE 5

Results on the Stability of the Slope Parameters across Monetary Policy Environments

Monthly returns

Dependent variable	Constant	TERM	D/P	DEF	FFRATE	DIR	TERM*DIR	D/P*DIR	DEF*DIR	Adj. R^2	F test
(1) Large Stock Portfolio	0.016	0.106	–0.106	0.438		–0.044	0.286	0.806	–0.299		4.26
	(1.134)	(0.844)	(–0.313)	(1.989)*		(–2.314)*	(1.616)	(1.767)	(–0.929)	0.05	[0.00]
(2) Small Stock Portfolio	0.012	0.297	0.126	0.810		–0.042	0.163	0.677	–0.557		3.83
	(0.588)	(1.715)	(0.268)	(2.164)*		(–1.593)	(0.663)	(1.073)	(–1.113)	0.04	[0.00]
(3) Bond Portfolio	0.003	0.074	0.025	0.088		0.003	0.030	–0.199	–0.067		1.79
	(0.335)	(1.055)	(0.132)	(0.585)		(0.267)	(0.312)	(–0.782)	(–0.332)	0.01	[0.09]
(4) Large Stock Portfolio	0.014	0.123	0.136	0.558	–0.149	–0.039	0.231	0.740	–0.364		4.48
	(0.998)	(0.984)	(0.385)	(2.075)*	(–2.392)*	(–2.037)*	(1.301)	(1.629)	(–1.012)	0.06	[0.00]
(5) Small Stock Portfolio	0.009	0.317	0.409	0.834	–0.174	–0.036	0.098	0.600	–0.633		3.88
	(0.471)	(1.833)	(0.835)	(2.234)*	(–2.013)*	(–1.357)	(0.399)	(0.951)	(–1.266)	0.05	[0.00]
(6) Bond Portfolio	0.003	0.073	0.024	0.088	0.001	0.003	0.031	–0.198	–0.066		1.57
	(0.335)	(1.051)	(0.121)	(0.583)	(0.015)	(0.263)	(0.311)	(–0.779)	(–0.330)	0.01	[0.13]

Quarterly returns

Dependent variable	Constant	TERM	D/P	DEF	FFRATE	DIR	TERM*DIR	D/P*DIR	DEF*DIR	Adj. R^2	F test
(1) Large Stock Portfolio	0.062	0.324	–0.748	0.747		–0.126	0.209	2.398	0.609		3.21
	(1.293)	(1.534)	(–0.654)	(1.296)		(–1.978)*	(0.583)	(1.548)	(0.708)	0.11	[0.00]
(2) Small Stock Portfolio	0.045	1.020	–0.424	2.368		–0.103	–0.588	2.154	–1.459		2.97
	(0.608)	(3.121)**	(–0.239)	(2.655)**		(–1.094)	(–1.059)	(0.898)	(–1.095)	0.10	[0.00]
(3) Bond Portfolio	0.003	–0.125	0.307	–0.099		0.023	0.412	–1.205	0.698		2.83
	(0.125)	(–1.053)	(0.477)	(–0.306)		(0.663)	(2.041)*	(–1.382)	(1.441)	0.09	[0.01]
(4) Large Stock Portfolio	0.057	0.395	–0.065	0.782	–0.440	–0.110	0.029	2.144	0.319		3.41
	(1.210)	(1.870)	(–0.055)	(1.374)	(–2.057)*	(–1.748)	(0.080)	(1.398)	(0.370)	0.13	[0.00]
(5) Small Stock Portfolio	0.038	1.120	0.535	2.417	–0.617	–0.081	–0.840	1.798	–1.866		3.08
	(0.524)	(3.414)**	(0.293)	(2.735)**	(–1.859)	(–0.834)	(–1.484)	(0.755)	(–1.396)	0.11	[0.00]
(6) Bond Portfolio	0.002	–0.111	0.447	–0.092	–0.089	0.027	0.375	–1.257	0.638		2.53
	(0.090)	(–0.916)	(0.664)	(–0.283)	(–0.735)	(0.743)	(1.801)	(–1.434)	(1.298)	0.09	[0.01]

* Statistically significant at the 0.05 level
** Statistically significant at the 0.01 level

Notes: *t* statistics in parentheses; *p* values in brackets.

the monthly regressions for the large stock portfolio, the coefficient on TERM*DIR is positive but not statistically significant at traditional levels. However, the addition causes the statistical significance of TERM to be reduced. DEF continues to be significant, but DEF*DIR lacks explanatory power in explaining large and small stock returns and corporate bond returns. The default spread DEF continues to have explanatory power for large and small stock returns, but not corporate bonds, while the interaction of DEF*DIR is insignificant in forecasting any of the return series. DIR, the proxy for a restrictive monetary environment, continues to have explanatory power in many of the monthly regressions, particularly for the large stock portfolio. For both small stocks and corporate bonds, we find that DIR is not significant whether FFRATE is included or not.

In the quarterly regressions, we find that only one of the interaction terms (TERM*DIR) has explanatory power in forecasting bond return series. The coefficient on DIR is significant at the 0.05 level in forecasting returns on the large stock portfolio. For the small stock portfolio, we find that both the term spread (TERM) and the default spread (DEF) are significant in explaining quarterly returns.

Overall, from these results, we conclude that monetary policy has explanatory power in forecasting large and small stock portfolio returns, as well as returns on high grade corporate bonds. This is supported by both measures of the stance of monetary policy: the index of change in the discount rate and the federal funds rate. Tests of the stability of the slope parameters across the monetary regimes indicate that the slopes do not change in the restrictive monetary policy environments and that monetary policy continues to forecast large stock returns in most regressions. These results differ from those of Jensen, et al. (1996) in which they cannot determine that monetary policy explains unique variations in security returns beyond that explained by the business conditions proxies. We find that monetary policy has unique explanatory power in forecasting large and small stock monthly portfolio returns, even after controlling for its potential effect through the business conditions proxies. We find that the discount rate change proxy is important in forecasting excess bond and stock returns. After controlling for interaction of this measure and the business conditions proxies, we find it only predicts large stock returns.

IV. SUMMARY AND CONCLUSIONS

We present evidence that the stance of monetary policy has explanatory power for large stocks, small stocks, and corporate bonds. These results confirm earlier findings by Jensen, et al. (1996). Using two measures of monetary policy actions, the federal funds rate and an index based on the change in the discount rate, we show that monetary conditions have explanatory power beyond business conditions proxies. In particular, we find that a restrictive monetary policy stance lowers monthly returns of large and small stock portfolios, and in some cases, corporate bonds.

These results differ from those of Jensen, et al.(1996) in that our business conditions proxies play substantially different roles in explaining variations in expected stock and bond returns, depending on monetary stringency. We do not confirm their findings that only during restrictive monetary policy environments do the business conditions proxies contain significant explanatory power for stocks and bonds. The difference in the findings can possibly be explained by differences in the definitions of the business conditions proxies or by differences in the stock and bond portfolios we examine. If this is the case, it suggests that earlier findings may not be robust to slightly different ways of measuring the business conditions proxies, or they may be sensitive to the particular stock and bond portfolios considered.

Overall, these results indicate that monetary policy actions contain significant information that may be used to forecast expected stock and bond portfolio returns. In addition, we find that information is reflected in the federal funds rate, beyond that indicated by the discount rate changes. This information can be used to forecast stock and bond returns beyond that contained in proxies for the business cycle.

REFERENCES

Banz, Rolf W. 1981. "The Relationship between Return and the Market Value of Common Stock." *Journal of Financial Economics* 9, pp. 3–18.

Bernanke, Ben S., and Alan S. Blinder. 1992. "The Federal Funds Rate and the Channels of Monetary Transmission." *American Economic Review* 82, pp. 901–921.

Campbell, John Y. 1987. "Stock Returns and the Term Structure." *Journal of Financial Economics*, 18, pp. 373–399.

_____, and Robert Shiller. 1987. "The Dividend-Price Ratio and Expectations of Future Dividends and Discount Factors." Unpublished manuscript. Princeton University.

Chen, Nai-fu. 1991. "Financial Investment Opportunities and the Macroeconomy." *Journal of Finance* 46, pp. 529–554.

_____, Richard Roll, and Steven Ross. 1986. "Economic Forces and the Stock Market." *Journal of Business* 59, pp. 383–404.

Dow, Charles H. 1920. "Scientific Stock Speculation." *The Magazine of Wall Street.*

Fama, Eugene F. 1981. "Stock Returns, Real Activity, Inflation, and Money." *American Economic Review* 71, pp. 545–565.

_____. 1990. "Stock Returns, Expected Returns, and Real Activity." *Journal of Financial Economics* 45, pp. 1089–1108.

_____, and Kenneth R. French. 1989. "Business Conditions and Expected Returns on Stocks and Bonds." *Journal of Financial Economics* 25, pp. 23–49.

_____, and _____. 1988. "Dividend Yields and Expected Stock Returns." *Journal of Financial Economics* 22, pp. 3–25.

Geske, Robert, and Richard Roll. 1983. "The Fiscal and Monetary Linkage between Stock Returns and Inflation." *Journal of Finance* 38, pp. 1–33.

Jensen, Gerald R., Jeffery M. Mercer, and Robert R. Johnson. 1996. "Business Conditions, Monetary Policy, and Expected Security Returns." *Journal of Financial Economics* 40, pp. 213–237.

_____, and Robert R. Johnson. 1995. "Discount Rate Changes and Security Returns in the U.S., 1962–1991." *Journal of Banking and Finance* 19, pp.79–95.

Kaul, Gautum. 1987. "Stock Returns and Inflation: The Role of the Monetary Sector." *Journal of Financial Economics* 18, pp. 253–276.

Kiem, Donald B., and Robert F. Stambaugh. 1986. "Predicting Returns in the Stock and Bond Markets." *Journal of Financial Economics* 17, pp. 357–390.

Laurent, Robert D. 1988. "Testing the 'Spread'." Federal Reserve Bank of Chicago *Economic Perspectives* 12, pp. 3–14.

Romer, Christina, and David Romer. 1989. "Does Monetary Policy Matter? A New Test in the Spirit of Friedman and Schwartz," pp. 121–169. In *NBER Macroeconomics Annual*. Cambridge, MA: MIT Press.

Rozeff, Michael. 1984. "Dividend Yields Are Equity Risk Premiums." *Journal of Portfolio Management* 10, pp. 68–75.

Schwert, G. William. 1990. "Stock Returns and Real Activity: A Century of Evidence." *Journal of Finance* 45, pp. 1237–1257.

Shiller, Robert. 1984. "Stock Prices and Social Dynamics." *Brookings Papers on Economic Activity* 2, pp. 457–498.

Waud, Roger N. 1970. "Public Interpretation of Federal Reserve Discount Rate Changes: Evidence on the Announcement Effect." *Econometrica* 38, pp. 231–250.