Investment Strategies and FOMC Rate Decisions

Peter Basciano
Associate Professor of Finance
Hull College of Business Administration
Georgia Regents University
2500 Walton Way
Augusta, GA 30904-2200
pbasciano@gru.edu

Christopher L. Cain
Assistant Professor of Finance
School of Business
College of Charleston
66 George Street
Charleston, SC 29424
caincl@cofc.edu

James Grayson
Professor of Management Science
Hull College of Business Administration
Georgia Regents University
2500 Walton Way
Augusta, GA 30904-2200

Abstract

This paper furthers the research into portfolio allocation decisions around FOMC announcements. Given publicly available information, such as FOMC rate decisions, is it possible to apply simple trading rules to generate excess returns? We document the historical returns available to investors employing simple trading rules and optimized portfolio allocation weights for various levels of investor risk tolerance informed by FOMC rate decisions. If such trading strategies prove profitable, then this information is valuable to individual investors and others who have the flexibility to vary their investment allocations between debt and equity securities across time.

INTRODUCTION

Active bond portfolio managers often pursue strategies tied to correct timing of interest rate changes. Given the link between changing interest rates and the business cycle, it seems likely that such timing might also benefit those wishing to swap between equity exposure and fixed income investments. This paper seeks to investigate the benefits of such a strategy.

Other studies have looked at the benefits of tactical shifts between long and short-term bonds in anticipation of interest rate changes. This study builds upon previous work by including allocations between equity and debt positions. In addition, the time period of this study allows the investigation of the performance of these strategies during and immediately after the Great Recession.

Literature Review

The use of interest rates to help predict future asset returns is not new. Indeed, the voluminous literature surrounding the expectations of interest rates can be viewed as an attempt to estimate future bond prices. A review of this entire stream of literature is well beyond the scope of this paper, but there are several papers which are more closely related to the current examination. Keim and Stambaugh (1986) use several variables, including the spread between yields on low grade corporate bonds and one month Treasury bills to predict future risk premiums. Campbell (1987) uses several measures constructed from interest rates to estimate future risk premiums on select U.S. Treasury securities and a value weighted portfolio of common stocks. Fama and French (1989) further explore the link between business conditions and the return on stocks and bonds. Their work extends that of Keim and Stambaugh by refining the forecasting variables and looking at longer time periods. In addition, Fama and French explicitly include stocks in their analysis.

Balvers, Cosimano, and McDonald (1990) develop a theoretical general equilibrium model for asset returns and empirically link the excess return in financial assets to changes in aggregate output. Jensen, Mercer, and Johnson (1996) use changes in the bank discount rate as one variable to help explain security returns. Renshaw (1996) explores the relationship between the business cycle and the returns on corporate bonds and U.S. T-bills. He finds that corporate bonds generally outperform T-bills during recessionary troughs. Galvani and Landon (2013) explore the returns from "riding the yield curve", a strategy of investing in long-term bonds over short investment horizons in order to capture the higher yields thought to exist in long-term bonds. They find that these strategies do not work. If stocks are viewed as an infinitely long investment, their work can be viewed as a precursor to the current research, although they do not attempt to link their strategy to changes in monetary policy.

Prather and Bertin (1999) research the relationship between discount rate changes and stock returns. They find that a strategy of entering and exiting the stock market based on Federal Reserve discount rate changes outperforms buy and hold strategies. While this paper considers the link between discount rate changes and stock returns, it does not include bond returns in the analysis.

Boyd and Mercer (2010) research an issue most similar to the one evaluated in this paper. They review in detail the profit opportunities available from various bond swapping strategies. Essentially, these strategies involve swapping from long-term bonds to short-term bonds, or vice versa, upon the observation of certain easily identifiable events, such as Federal Reserve policy changes. This paper, and most like it, limits itself to bond swaps because most mutual funds that engage in these strategies are fixed income mutual funds, and are prohibited from owning equities. No such prohibition applies to private individuals, and Federal Reserve interest rate changes are easily observable and well publicized events. Therefore, the question remains as to whether individual investors or institutional investors, such as hedge funds, that are not constrained to hold only fixed income securities may profit by following simple trading rules swapping between debt and equity around Federal Reserve policy changes. The present research will attempt to answer that question.

DATA

Data on monthly total returns from the S&P 500, U.S. 30 day T-bills, U.S. intermediate term government bonds, U.S. long-term government bonds, and U.S. long-term corporate bonds were obtained from Ibbotson and Associates. Data on the federal reserve discount rate were obtained from the Federal Reserve website. Consistent with the approach used by Boyd and Mercer, the discount rate is used instead of the Fed Funds rate for a variety of reasons, but most notably because an official federal funds target rate did not exist for much of the sample period. The data covers the period from January 1973 until November 2015. This period results in an even split of eight restrictive monetary policy cycles, and eight expansive monetary policy cycles, and ends at arguably the beginning of a new restrictive cycle. This time period also includes the great recession, and most of the recovery afterwards. The use of monthly data instead of daily data is dictated by data availability and price, and the use of such data should understate any results relative to the use of daily data.

Trading Strategies

This paper will review three relatively simple trading strategies that can be applied in real time from existing information. Following the methodology of Boyd and Mercer, a discount rate that is lower than the previous rate is designated as an expansive monetary policy period. The expansive monetary policy period will remain until the discount rate is raised from its previous level, at which point a restrictive monetary policy period is created, and will continue until rates are lowered. The application of this methodology is straightforward throughout most of the sample period. However, the recovery from the great recession does potentially present a problem of interpretation. In February of 2010, the discount rate was raised from .5% to a still low .75%. This increase was accompanied by Federal Reserve statements, or jawboning, that this increase was not the start of a more restrictive policy, and in fact the rate did not rise again until November of 2015. Because of this, and because a rate of .75% is low enough to generally be thought expansionary, there is room for debate as to when the last expansionary cycle ends. Results are calculated for both a scenario where an investor ignores this jawboning and switches to a restrictive monetary policy investing strategy in February of 2010, and for a scenario where the investor acts upon this jawboning and continues to employ an expansive monetary policy strategy until the end of the data sample.

From this basic division of time into expansive and restrictive monetary policy periods, three trading strategies are developed. For simplicity, the first two strategies assume 100% or 0% investment in each asset class. Optimization is not employed initially to keep the strategies as simple as possible, and to more accurately replicate the probable investing style of an individual investor. Each strategy is measured using each of the available bond sectors in turn as the bond investment option.

The first strategy is to move to bonds at the start of an expansionary cycle and remain in bonds until the start of a restrictive cycle. At the start of the restrictive cycle, the investor moves out of bonds and into stocks. The strategy behind this rule is to capture the increase in bond prices during a decreasing interest rate environment, but avoid the decrease in bond prices when rates are rising.

The second strategy is merely the opposite of the first. Invest in stocks at the start of the expansionary cycle, and remain in stocks until the start of a restrictive cycle. At the start of the restrictive cycle, remove all money from stocks and invest in bonds. The strategy behind this rule is to capture the increase in stock prices that typically occurs during expansionary fiscal policy periods, but to avoid the decrease in stock prices that typically occurs during restrictive monetary policy periods.

The third strategy is slightly more sophisticated than the first two strategies. In order to further explore the potential for improving returns by switching investments after monetary policy changes, several rolling optimized portfolios were constructed. For this strategy, no investment takes place during the first expansionary or restrictive policy periods. Instead, the returns are observed, and an optimal portfolio is constructed based on the returns in either the expansive or restrictive period. Optimal portfolios for both types of periods are constructed around several standard deviation levels, chosen to span the range from low risk tolerance to high risk tolerance. The first three levels correspond to those used by Boyd and Mercer, but two higher risk portfolios are added to reflect the higher returns possible with the addition of a stock investing option. Finally, a portfolio is optimized around the highest Sharpe Ratio. Each optimized portfolio is updated on a rolling basis. For example, after the second expansionary period ends, the expansionary portfolios are optimized again based on observations from the first two expansionary periods. This process repeats itself until the end of the observed period.

Results

Table 1 reports the average return, standard deviation, and Sharpe Ratio for each of the asset classes over the sample period. Because the strategies evaluated here involve swapping from bonds to stocks and back again, it is somewhat difficult to evaluate the returns in terms of risk. CAPM or the Fama-French model may work for stocks, but not bonds. Duration is not appropriate for stocks. Therefore, standard deviation is used as the primary risk measure and the Sharpe Ratio is used to evaluate the risk return tradeoff. The return levels and risk generally follow prior expectations. Using the Sharpe Ratio to evaluate the risk return tradeoff, investing in the S&P 500 appears to be the best investment over this time period, although it should be noted this result comes at the cost of a high level of overall risk.

Table 2 reports results for the first switching strategy. All of these strategies are inferior to a buy and hold investment in the S&P 500. Investing in risky assets, represented by the S&P 500, during restrictive monetary policy periods and relatively safer assets during expansionary periods could be viewed as a "fighting the Fed" strategy. The results here suggest that the old adage "Don't fight the Fed" is indeed good advice.

If fighting the Fed is a bad strategy, does the converse also hold true? Table 3 reports results for the second strategy of investing in stocks during expansive monetary policy periods and relatively safer assets during restrictive policy periods. The results are very different from strategy one, and ultimately the results depend on whether or not the investor pays attention to the Fed's jawboning. If the investor follows the traditional rule of switching to a restrictive strategy in February of 2010, all of the switching strategies are inferior to investing in the S&P 500, as determined by the Sharpe Ratio. However, switching from stocks into either long term government bonds or long term corporate bonds does yield a superior Sharp Ratio to all of the other asset classes.

If the investor listens to the Fed's jawboning, and maintains an expansive monetary policy strategy, all of the switching strategies offer Sharpe Ratios that are higher than investing in stocks or any of the other asset classes alone. The best strategy over this time period is to invest in stocks during expansionary periods and long-term government bonds during restrictive periods, but investing in intermediate term government bonds or long term corporate bonds also provide viable options.

Table 4 helps to explain the performance of strategies one and two. Table 4 reports the average monthly return for each asset class during either an expansionary or restrictive month. With one exception, the asset classes all perform better during expansionary months. The one exception is thirty day T-bills, whose returns are of course rising with interest rates during restrictive cycles. For the other asset classes, the gap in performance between the cycles is much greater for stocks than for any other asset class. Stocks perform the best of all the asset classes during expansionary periods, and they perform the worst during restrictive periods. Therefore, the "penalty" of being in stocks during a restrictive period for strategy one was easily greater than the reward of being in bonds during an expansionary period. For strategy two, just the reverse occurs.

Optimization Results

While the optimized portfolio weights are not reported in the interest of brevity, Table 5 reports the results from the portfolio optimized around the Sharpe Ratio and various standard deviations used to account for varying degrees of risk tolerance. The standard deviation targets represent the target around which the portfolio was optimized, while the reported standard deviation refers to the actual standard deviation achieved by an application of the optimized portfolios. Unsurprisingly, the actual standard deviations observed consistently exceed the targets. Finally, two sets of results are reported. For the standard rule, the rate increase in February of 2010 is taken as the beginning of a new restrictive phase. For the jawboning rule, this singular rate increase is ignored because of the Federal Reserve statements, so the expansionary phase continues until October of 2015. It is important to note that these Federal Reserve statements were made contemporaneously with the rate increase, so the information was available to investors at the time. It is simply a matter of the investors judgment as to whether the statements are believed or not.

The results here are significant, at least judged by the Sharpe Ratio. The Sharpe Ratios exceed those of any buy and hold strategy involving only one asset class, regardless of whether or not the investor listens to the Federal Reserve's jawboning. As before, the better performing strategies generally result from ignoring the rate increase in February of 2010. One of these strategies yields a Sharpe ratio of .7021.

One exception is the case of portfolios optimized around the Sharpe ratio, which actually performs better for investors following the standard strategy. Optimizing a portfolio around the Sharpe Ratio using the standard rule results in a portfolio that delivers a Sharpe Ratio of 0.6084, dramatically better than the ratio achieved by investing in stocks alone. The average return for this strategy is still well in excess of 9%, so it remains a viable means of accruing wealth while greatly reducing risk. Using the jawboning rule, a portfolio optimized around the Sharpe Ratio delivers a ratio of .5662, which still exceeds the Sharpe Ratio achieved by investing in the S&P 500 alone. This portfolio also yields a return of roughly 11.3%, almost as much as investing in the S&P 500 alone.

As stated previously, all of the optimization strategies deliver higher Sharpe Ratios than those available from any buy and hold strategy. Interestingly, many of the portfolios optimized around particular risk levels actually achieve a higher Sharpe Ratio than the portfolio optimized around the Sharpe Ratio. Finally, most of the optimization strategies exceed the Sharpe Ratio achieved by the simple switching strategies described above as well. Therefore, it seems clear that portfolio optimization offers significant improvement to the risk return trade off. This raises the question, what is driving the returns? Is it the optimization or the switching strategy?

To further evaluate these results, an optimized portfolio was formed from both the first restrictive and the first expansive phase. This portfolio was optimized around the Sharpe Ratio, with the intention to create one optimized buy and hold strategy to compare to the switching strategy. The results are reported in Table 6. Interestingly, this optimized portfolio turns out to be a 100% investment in Intermediate Term Government Bonds. The returns, standard deviation, and Sharpe Ratio are slightly different from those reported in Table 1 because the investment begins at a later date. The Sharpe Ratio of 0.4445 is inferior to the ratio achieved by most of the switching strategies, including the simple non-optimization strategies.

In order to further explore the results, optimization was employed on the first restrictive phase and the first expansive phase separately. The portfolios are optimized one time only. The resulting weights are then used to form portfolios in subsequent restrictive and expansive phases respectively. This strategy results in a higher Sharpe ratio of .5216. This number is better than the Sharpe ratio achieved by investing in the S&P 500. It is also better, but very close to the ratios achieved by the better performing simple switching strategies. While both the switching strategy and the rolling portfolio optimization are contributing to a better risk return tradeoff, it appears that the majority of the improvement is coming from the switching strategy, not the optimization.

CONCLUSION

A relatively simple strategy of investing in stocks the month subsequent to the first decrease in the Federal Reserve discount rate and moving into bonds in the month subsequent to the first discount rate increase can increase an individual investor's risk return tradeoff, as measured by the Sharpe Ratio. While several specific strategies provide different combinations of risk and return, the specific strategy of switching from the S&P 500 into long-term government bonds provides the highest Sharpe Ratio, while generating returns that are very close to those from buy and hold stock investing alone.

For more sophisticated investors, switching between optimized portfolios around Federal Reserve discount rate changes provides an even greater means of improving the risk return tradeoff. This study provides evidence that investors can profit by changing investment strategies based on the Federal Reserve discount rate. Taking advantage of this opportunity only requires that investors observe Federal Reserve discount rate changes at some point during the month that those changes occur. No forecasting of future Federal Reserve policy is necessary to implement this investment strategy. Whether such forecasting or quicker reaction to discount rate changes might further increase returns is an open question that may warrant further study.

Table 1

Table 1 reports the average annual return, standard deviation, and Sharpe Ratio for each of the five asset classes. The average is calculated by first calculating the average monthly returns, and then multiplying this result by 12 to approximate the annual return. The standard deviation is calculated by first calculating the monthly standard deviation of returns, then multiplying this result by the square root of 12 to approximate the annual standard deviation. The Sharpe Ratio is calculated by subtracting the T-bill return from the asset class return and dividing by the asset class standard deviation. The asset classes are U.S. 30 day Treasury Bills, Intermediate Term U.S. Government bonds (ITG) for all, Long-term U.S. Government Bonds (LTG), Long-term Corporate Bonds (LT Corp), and the S&P 500 index (S&P 500).

	T-Bill	IT G	LT G	LT Corp	S&P 500
Arithmetic Average	4.70%	7.17%	9.10%	10.21%	12.06%
Standard Deviation	1.03%	5.55%	11.18%	13.45%	15.06%
Sharpe Ratio	0	.4445	.3934	.4094	.4883

Table 2

Table 2 reports results for a trading strategy of investing 100% of assets in stocks during restrictive monetary policy periods, and 100% of assets in bonds during expansionary monetary policy periods. A restrictive monetary policy period is determined by the first Federal Reserve discount rate increase, and an expansive period is determined by the first Federal Reserve discount rate decrease. The Sharpe Ratio is computed as the return in excess of the 30-day t-bill return divided by the standard deviation.

Standard Rule				
	T-Bill	IT Gov	LT Gov	LT Corp
Return	7.9945%	9.5615%	9.9853%	10.1281%
σ	10.2201%	10.8650%	12.9775%	12.4190%
Sharpe Ratio	.3230	.4481	.4078	.4376
Jawboning Rule				
	T-Bill	IT Gov	LT Gov	LT Corp
Return	5.9280%	7.9117%	9.2052%	10.6724%
σ	8.8708%	9.6964%	12.6180%	14.9261%
Sharpe Ratio	.1392	.3319	.3576	.4006

Table 3

Table 3 reports results for a trading strategy of investing 100% of assets in stocks during expansive monetary policy periods, and 100% of assets in bonds during restrictive monetary policy periods. The specific bond class chosen is indicated by the column heading. A restrictive monetary policy period is determined by the first Federal Reserve discount rate increase, and an expansive period is determined by the first Federal Reserve discount rate decrease.

Standard Rule				
	T-Bill	IT Gov	LT Gov	LT Corp
Return	8.6898%	9.5812%	11.0809%	12.0507%
σ	11.1976%	11.8448%	13.5330%	15.9016%
Sharpe Ratio	.3569	.4127	.4720	.4627
Jawboning Rule				
	T-Bill	IT Gov	LT Gov	LT Corp
Return	10.7564%	11.2310%	11.8610%	11.5064%
σ	12.2553%	12.8011%	13.8600%	13.5805%
Sharpe Ratio	.4947	.5107	.5172	.5017

Table 4

Table 4 reports the average monthly returns and annualized monthly returns for each asset class according to whether the month belongs to and expansive or restrictive monetary policy period.

	S&P 500	LT Corp	LT Gvt	IT Gvt	T-bill
Expansionary	1.1787%	.9070%	.8436%	.7265%	.3885%
Restrictive	.4506%	.4815%	.5890%	.5484%	.5714%
Annualized Expansionary	14.1441%	10.8839%	10.1229%	8.7183%	4.6617%
Annualized Restrictive	5.4077%	5.7781%	7.0674%	6.5810%	6.8564%

Table 5

Table 5 reports the results from a rolling optimization strategy. Optimized portfolios are formed for both expansive and restrictive monetary policy periods, and investments are changed from one optimized portfolio to the other when the Federal Reserve discount rate changes direction. The portfolios are optimized around several risk levels, as measured by standard deviation, and around the maximum possible Sharpe Ratio. The portfolio weights are updated as each succeeding period is encountered.

Standard Rule						
Optimization Criteria	Sharpe	SD .006	SD .012	SD .018	SD .025	SD .035
Return	9.0679%	5.6703%	6.7265%	7.7855%	8.9150%	9.9505%
σ	7.1746%	1.8751%	3.4426%	5.0568%	7.2882%	10.2723%
Sharpe Ratio	0.6084	0.5158	0.5158	0.6095	0.5779	0.5108
Jawboning Rule						
Optimization Criteria	Sharpe	SD .006	SD .012	SD .018	SD .025	SD .035
Return	11.3009%	5.7135%	6.8256%	7.9412%	9.5840%	10.9448%
σ	11.6529%	1.7587%	3.1727%	4.6452%	6.9522%	10.1775%
Sharpe Ratio	0.5662	0.5745	0.6690	0.6971	0.7021	0.6133

Table 6

Table 6 reports the return for two buy and hold portfolio optimization strategies. For the Sharpe Combined, one restrictive and one expansive monetary policy cycle are observed, and one optimal portfolio is formed from both sets of information combined. This portfolio is then held until the end of the observation period. For the Sharpe by Policy, two separate portfolios are formed, one for expansionary periods, and one for restrictive periods. The portfolio composition is not updated, but the portfolios are swapped according to monetary policy conditions. The portfolios are optimized around the maximum possible Sharpe Ratio.

Optimization Criteria	Sharpe Combined	Sharpe by Policy
Return	7.1716%	7.8653%
σ	5.5538%	6.0621%
Sharpe Ratio	0.4445	0.5216

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