The Real Estate Asset Allocation Decision: Monetary Policy Implications

Executive Summary. Previous research establishes that Federal Reserve monetary policy influences both stock and bond returns. This research extends past research and shows that similar patterns exist for real estate investment trust returns. We find that the correlation structure of asset returns changes with alternative monetary policy environments. Mean-variance analysis indicates that optimal asset allocations differ dramatically in different monetary policy environments, and that the exposure to real estate should be prominent only in expansive environments. Overall, the findings suggest that investors may wish to realign their portfolios in reaction to, or anticipation of, Federal Reserve actions.

Introduction

The relationship between Federal Reserve monetary policy and security returns has been recognized for many years. The conventional view suggests that a restrictive monetary environment serves as bad news and is generally associated with higher future interest rates and decreases in the level of economic activity. In contrast, an expansive environment is commonly viewed as good news as these periods are usually associated with lower future interest rates and increases in economic activity. Fridson (1998) explains that when the Federal Reserve loosens its grip on the money supply, stock prices benefit in several ways. First, the corporate earnings outlook improves. Reduced interest rates enable companies to build up their inventories and increase customers' credit lines. To the extent that price-earnings ratios determine equity values, a jump in earnings necessitates a jump in the index. A second, more direct impact on stock prices derives from the increased availability of loans for financing security purchases. Finally, a drop in interest rates reduces the attractiveness of fixed-income investments, relative to equities. The logical consequence is a shift of investment capital from bonds to stocks.

term patterns in equity returns correlated with Fed monetary policy. In particular, stock and bond returns are shown to be significantly higher in periods characterized by an expansive policy than security returns during restrictive monetary periods.

Previous researchers have investigated the association between the performance of the real estate market and interest rates, in general, and Federal Reserve monetary policy in particular. Hemel, Sakwa and Bhattacharjee (1995) and Mueller and Pauley (1995) found that real estate investment trust (REIT) price movements had a low positive correlation with changes in bond prices (i.e., negative correlation with interest rates) and a lower correlation with interest rates than with movements in the stock market as a whole. Gyourko and Linneman (1988), Murphy and Klieman (1989) and Park, Mullineaux and Chew (1990) found that REIT returns were negatively correlated with expected inflation. Finally, Darrat and Glascock (1989) concluded that monetary policy measures have significant lagged relationships with current REIT returns.

The objective of this study is to examine the implications that previous monetary policy research has for asset allocation decisions in the area of real estate. Returns to various REIT indices, as well as other capital market indices, are examined. In addition, using mean-variance analysis, asset allocation to real estate is examined in alternative monetary policy periods. The findings highlight the importance of monetary conditions on real estate market performance and asset allocation decisions.

**Data and Methodology**

This study analyzes monthly returns from January 1973 through December 2000. Returns are examined using four alternative indexes developed by the National Association of Real Estate Investment Trusts (NAREIT). NAREIT classifies REITs into three categories: (1) Equity REITs that have direct ownership of income producing real estate, principally office buildings, shopping centers, warehouses and apartments; (2) Mortgage REITs that consist of investments in debt instruments secured by mortgages; and (3) Hybrid REITs that combine both direct ownership of real estate and mortgage debt. This study employs four market weighted NAREIT indexes: (1) Equity; (2) Mortgage; (3) Hybrid; and (4) All REIT. Returns are also analyzed on the S&P 500, ninety-day Treasury Bill and Long-Term Treasury Bond Indexes for comparative purposes. The S&P 500, T-Bond and T-Bill returns were obtained from Ibbotson (2000).

This study employs a broad measure of monetary conditions advanced by Jensen and Johnson (1995) and later employed by Jensen, Mercer and Johnson (1996) and Booth and Booth (1997), among others. The procedure classifies the monetary environment as either expansive or restrictive based on the most recent discount rate change. As any introductory economics textbook would state, the discount rate is one of the Fed’s three principal policy tools (the others being reserve requirements and open market operations). It is perhaps the weakest of the three tools. Technically, the discount rate is the rate at which member institutions can borrow reserves from the Federal Reserve. However, much evidence exists that changes in the discount rate are interpreted as signals of the future course of monetary policy. Discount rate increases are frequently seen as signals of tighter money, higher future interest rates, and decreases in the level of economic activity. Discount rate decreases, on the other hand, are viewed as a signal for an easier future economic environment. As such, they receive considerable attention in the financial media.

Discount rate changes are often made at substantial intervals and represent a rather discontinuous tool of monetary policy. Additionally, a public body having special information and competence to judge whether changes in bank money and credit are consistent with the economy’s cash needs establishes the discount rate. From 1972 through December 2000, the discount rate was changed a total of seventy-five times. However, the crucial variable signaling changes in economic environment concerns the direction of the last discount rate adjustment. Simply put, if the last discount rate change was an increase, the Federal Reserve is pursuing a restrictive monetary policy. On the other hand, if the last change was a decrease, the Fed is pursuing an expansionary monetary policy. From 1972
through December 2000, the Fed only changed the direction of the discount rate thirteen times.

Utilizing a binary classification of monetary policy, Johnson and Jensen (1998) demonstrate that over a forty-year period from 1957 through 1996, returns to stocks and bonds are significantly higher during expansive monetary policy periods, while returns to T-Bills are higher during restrictive periods. Additionally, a risk difference in the two periods was identified. Following rate decreases, the average annual standard deviation of returns was lower for all asset classes than following rate increases. Periods of expansive monetary policy were associated with both higher returns and lower volatility of returns.

While this classification technique has been effectively employed to differentiate fundamentally different monetary conditions, the procedure is not advocated as the best technique of identifying minor changes in the stringency of monetary policy. A more refined approach that adjusts more frequently would be required to accomplish that task (see Thorbecke, 1997 and Patelis, 1997 for examples). Use of such measures, however, require more frequent trading, more subjective evaluation, and a more astute investor. The major advantages of this binary classification scheme are its simplicity and lack of ambiguity.1

In the twenty-eight-year period, 336 months were classified into either an expansive or restrictive monetary environment. A “new” monetary environment starts when the discount rate is changed in the opposite direction from the previous discount rate change (e.g., the rate is increased following one or more decreases).2

Months that mark the beginning of a “new” monetary policy environment were excluded. The elimination of months in which a change occurs is done in order to eliminate any announcement period effects and to focus on longer-term relationships.3 The exclusion of the month in which the first rate change in the opposite direction occurs ensures that an investor could replicate the strategy in an ex-ante manner, since one cannot know with certainty at the start of a month whether a rate change will occur in that month.

A total of thirteen months were excluded because they mark the beginning of a new monetary environment, thus reducing the sample to 323 monthly observations. The sample consists of 177 months in expansive environments and 146 months in restrictive environments.

Results

Returns

Exhibit 1 presents the mean monthly returns and standard deviation of monthly returns for the seven indices examined. Each of the four REIT indices, as well as the S&P 500 Index, experienced statistically significantly higher returns during expansive monetary policy periods than during restrictive periods. Consistent with previous researchers, only the T-Bill index experienced higher returns during restrictive periods, and this return difference is statistically significant at the 1% level.4 These findings are consistent with the hypothesis that an expansive monetary policy is “good news” for the capital markets, while a restrictive monetary policy is “bad news.”

The T-Bill results are not surprising. As a proxy for expected near term inflation, one would expect the Fed to initiate a more restrictive monetary policy during periods when T-Bill yields (and returns) have increased. The magnitudes of the differences in returns across the two monetary environments are surprising. On an annualized basis, the difference between the All REIT returns in expansive periods versus restrictive periods is 19.43% (18.96% versus –0.47%). The Hybrid REIT index exhibits a 22.82% difference (17.88% versus –4.94%). With the exception of the Equity REIT index, the magnitude of the return differences in the four REIT indices is larger than the difference exhibited by any of the other three asset classes. For comparative purposes, the return difference for the S&P 500 index is 16.7% on an annualized basis.

What is also somewhat surprising is that three of the REIT indices actually experienced negative absolute returns during restrictive periods. The Equity REIT was the lone real estate index to experience a positive return during restrictive periods.
Exhibit 1
Mean Monthly Returns and Standard Deviations of Returns—Expansive and Restrictive Periods

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>Expansive Periods</th>
<th>Restrictive Periods</th>
<th>Difference in Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All REIT</td>
<td>1.58 [-1.18]</td>
<td>-0.04 [-0.90]</td>
<td>1.619*</td>
</tr>
<tr>
<td>Equity REIT</td>
<td>1.65 [3.57]</td>
<td>0.39 [4.36]</td>
<td>1.264*</td>
</tr>
<tr>
<td>Mortgage REIT</td>
<td>1.26 [5.72]</td>
<td>-0.44 [5.73]</td>
<td>1.701*</td>
</tr>
<tr>
<td>Hybrid REIT</td>
<td>1.49 [5.34]</td>
<td>-0.41 [5.90]</td>
<td>1.902*</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>1.76 [4.10]</td>
<td>0.37 [4.95]</td>
<td>1.392*</td>
</tr>
<tr>
<td>T-Bill</td>
<td>0.48 [0.17]</td>
<td>0.65 [0.23]</td>
<td>-0.186*</td>
</tr>
<tr>
<td>L-T Treasuries</td>
<td>0.84 [2.92]</td>
<td>0.70 [3.07]</td>
<td>0.139</td>
</tr>
</tbody>
</table>

Notes: In percent, standard deviations of monthly returns are in parentheses. *Indicates statistically significant at the 1% level.

However, the return on the Equity REIT index during restrictive periods is markedly lower than the return on T-Bills, 0.386% versus 0.645%, respectively. In fact, Treasury Bills have a higher mean monthly return during restrictive periods than all asset classes with the exception on Long-term Treasuries. This is surprising considering the level of risk of the other asset classes and seems to contradict one of the fundamental tenets of financial theory—the monotonic relationship between risk and return. However, it is consistent with the “safe haven” notion of Treasury Bills.

Variability of Returns

Patterns in the variability of returns are also quite pronounced. For all seven indices, the returns during restrictive periods are more variable than those realized during expansive periods. Thus, one cannot conclude that the extra returns realized during expansive periods were the result of compensation for bearing added risk during those periods. In terms of absolute levels of volatility, the Hybrid REIT Index exhibited the largest variability during both restrictive periods and the Mortgage REIT Index had the largest variability during expansive periods. As expected, Treasury Bills show the least volatility during both periods. The S&P 500 and All REIT Indexes exhibited nearly identical absolute levels of volatility. Thus, with the exception of Treasury Bills, periods of decreasing discount rates are associated with both higher returns and lower variability of returns.

Correlation Structure of Returns

An underlying factor that influences mean-variance asset allocation decisions is the correlation structure of asset returns. The stability of cross-country correlations is the focus of several international diversification studies (see Longin and Solnik, 1995 and Solnik, Boucrelle and LeFur, 1996). These studies show that the correlation structure has fluctuated widely over time, but on average, has risen only slightly during the thirty-year period examined. Erb, Harvey and Viskanta (1994) provide evidence that the economic cycle in the United States, and by association the world business cycle, has significant effects on world capital markets. The correlation between two countries tends to be highest when the countries’ economies are in recession, and lowest when their economies are expanding. These results indicate that diversification benefits vary dependent on countries’ economic environments, and further, the benefits of international diversification are lowest...
when diversification is most needed. The present study examines the correlation structure of broad classes of U.S. asset returns across alternative monetary policy environments and investigates whether investors should change their asset allocations dependent on Fed monetary policy environment.

As indicated in Exhibit 2, the correlations between each of the REIT indices and the S&P 500 are higher during restrictive periods than during expansive periods. Similar to the Erb, et al. results from international markets, it appears that the correlations are highest during restrictive monetary policy periods, indicating that diversification benefits are lowest when diversification is most needed. In particular, if one examines the correlations between REIT returns and the S&P 500, the correlations are lower during expansive environments than restrictive environments. The results indicate that T-Bill returns and all other asset returns are virtually independent in both expansive and restrictive monetary policy environments. This suggests that the T-Bills offer diversification benefits during both expansive and restrictive periods.

The identification of significant return patterns and correlation structures related to alternative Federal Reserve monetary policy periods should not be interpreted as documentation that monetary policy changes cause asset return patterns or is the only factor involved. The issue of causation is difficult to determine, because monetary policy is not only a function of economic and business conditions but also influences business and economic conditions. Instead the evidence indicates that a broadly defined measure of monetary conditions may be used to identify periods of significantly different returns in real estate, T-Bill and equity markets. The correlation structure between all asset classes is certainly different between the two policy regimes, which are strongly related to the business cycle. Other underlying factors related to asset return patterns are likely to include current and expected future economic and business conditions as well as current and expected future monetary conditions.

### Mean-Variance Analysis

To analyze whether investors’ allocations should be influenced by monetary policy environment, the mean-variance frontiers were examined during expansive and restrictive periods. The assets examined are U.S. T-Bills, S&P 500 Index, Long-Term Government Bonds and the Equity REIT Index. The Equity REIT Index was selected as a proxy for real estate because it is believed to be the most investable and representative of the REIT industry.

#### Exhibit 2

**Correlations of Mean Monthly Returns Between Asset Classes—Expansive and Restrictive Periods**

<table>
<thead>
<tr>
<th>Asset Class</th>
<th>All REIT</th>
<th>Equity REIT</th>
<th>Mortgage REIT</th>
<th>Hybrid REIT</th>
<th>S&amp;P 500</th>
<th>T-Bills</th>
<th>LT Govt Bonds</th>
</tr>
</thead>
<tbody>
<tr>
<td>All REIT</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equity REIT</td>
<td>.872</td>
<td>.845</td>
<td></td>
<td></td>
<td>.488</td>
<td>.307</td>
<td>.251</td>
</tr>
<tr>
<td></td>
<td>(.892)</td>
<td>(.861)</td>
<td></td>
<td></td>
<td>(.599)</td>
<td>(.010)</td>
<td>(.297)</td>
</tr>
<tr>
<td>Mortgage REIT</td>
<td>.642</td>
<td>.691</td>
<td>.756</td>
<td></td>
<td>.489</td>
<td>.203</td>
<td>.229</td>
</tr>
<tr>
<td></td>
<td>(.662)</td>
<td>(.713)</td>
<td>(.789)</td>
<td></td>
<td>(.621)</td>
<td>(.023)</td>
<td>(.183)</td>
</tr>
<tr>
<td>Hybrid REIT</td>
<td>.756</td>
<td>.542</td>
<td>.443</td>
<td>.454</td>
<td>.307</td>
<td>.239</td>
<td>.239</td>
</tr>
<tr>
<td></td>
<td>(.789)</td>
<td>(.542)</td>
<td>(.415)</td>
<td>(.500)</td>
<td>(.023)</td>
<td>(.415)</td>
<td>(.297)</td>
</tr>
<tr>
<td>S&amp;P 500</td>
<td>.454</td>
<td>.203</td>
<td>.239</td>
<td>.307</td>
<td>.489</td>
<td>.229</td>
<td>.229</td>
</tr>
<tr>
<td></td>
<td>(.500)</td>
<td>(.023)</td>
<td>(.415)</td>
<td>(.010)</td>
<td>(.621)</td>
<td>(.183)</td>
<td>(.183)</td>
</tr>
<tr>
<td>T-Bills</td>
<td>.041</td>
<td>.017</td>
<td>.248</td>
<td>.389</td>
<td>.248</td>
<td>.248</td>
<td>.248</td>
</tr>
<tr>
<td></td>
<td>(.060)</td>
<td>(.058)</td>
<td>(.267)</td>
<td>(.279)</td>
<td>(.267)</td>
<td>(.267)</td>
<td>(.267)</td>
</tr>
<tr>
<td>LT Govt Bonds</td>
<td>.098</td>
<td>.098</td>
<td>.098</td>
<td>.098</td>
<td>.098</td>
<td>.098</td>
<td>.098</td>
</tr>
<tr>
<td></td>
<td>(−.003)</td>
<td>(−.003)</td>
<td>(−.003)</td>
<td>(−.003)</td>
<td>(−.003)</td>
<td>(−.003)</td>
<td>(−.003)</td>
</tr>
</tbody>
</table>

Note: Restrictive Period Correlations are in parentheses.
Exhibit 3 presents the mean-variance frontier developed utilizing data from restrictive monetary environments. The analysis indicates that the frontier consists of full investment (or nearly full investment) in U.S. Treasury Bills. This was first introduced during the explanation of Exhibit 2. Clearly, a 100% allocation to T-Bills is not representative of a diversified portfolio. However, the average REIT investor would realize superior results if they would allocate their portfolio to T-Bills during restrictive periods. The inclusion of the T-Bill during restrictive periods is particularly dominating. Notice that the frontier is almost linear during restrictive periods.

The efficient frontier developed utilizing data from expansive monetary environments is completely different as illustrated in Exhibit 4. The minimum variance portfolio has a 100% allocation to Treasury Bills. The maximum return portfolio has a 100% allocation to equities. As one moves from the minimum variance portfolio to the maximum return portfolio, the exposure to Equity REITs increases until it hits a maximum exposure of approximately 57%.

These findings are extraordinarily important because they suggest a tactical asset allocation strategy that would be easy to implement. Following the change in monetary environment, investors may want to either allocate assets to T-Bills or equities and equity REITs depending on the direction of the discount rate change. The investor would then retain that allocation until the next discount rate reversal. This strategy would be greatly facilitated if derivative securities existed that enabled the portfolio manager to synthetically allocate the resources in such a manner. Exhibit 5 presents some representative points along each frontier.

These findings are also illustrative of another interesting phenomenon. Michaud (1998) explains that the mean-variance analysis has some serious implementation issues since the frontier itself varies through time. Exhibits 3 and 4 are certainly examples of this property. Exhibit 6 is particularly interesting in this respect. Notice the significant differences between the two frontiers when they are graphed together. Michaud suggests an interesting and elegant procedure to minimize this problem. However, the frontier should be expected to change over time since the analysis ignores so many exogenous variables. Monetary policy is simply one of the many variables that produce this phenomenon.

The analysis presented in this paper is not intended to be prescriptive in the sense that portfolio managers should change allocations on announcements of Federal Reserve monetary policy changes.
Exhibit 4
Mean Variance Frontier During Expansions

Exhibit 5
A Sample of Points on the MVEF During Each Period

<table>
<thead>
<tr>
<th>Monthly Return</th>
<th>Variance of Monthly Return</th>
<th>S&amp;P 500 (%)</th>
<th>Bonds (%)</th>
<th>T-Bill (%)</th>
<th>REIT-Equity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: Expansionary MVEF Points</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.476</td>
<td>0.030</td>
<td>0.00</td>
<td>0.00</td>
<td>100.00</td>
<td>0.00</td>
</tr>
<tr>
<td>1.526</td>
<td>8.014</td>
<td>37.05</td>
<td>0.00</td>
<td>13.75</td>
<td>49.20</td>
</tr>
<tr>
<td>1.686</td>
<td>10.639</td>
<td>42.69</td>
<td>0.00</td>
<td>0.60</td>
<td>56.71</td>
</tr>
<tr>
<td>Panel B: Restrictive MVEF Points</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.645</td>
<td>0.054</td>
<td>0.17</td>
<td>0.60</td>
<td>99.23</td>
<td>0.00</td>
</tr>
<tr>
<td>0.666</td>
<td>1.456</td>
<td>0.00</td>
<td>39.06</td>
<td>60.94</td>
<td>0.00</td>
</tr>
<tr>
<td>0.698</td>
<td>9.230</td>
<td>0.00</td>
<td>99.03</td>
<td>0.97</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Exhibit 6
Combined Mean Variance Frontiers
to those of the efficient sets. However, the findings suggest that portfolio managers may wish to re-align portfolio holdings within the constraints of their investment policies in reaction to, or in anticipation of, Federal Reserve actions. However, an allocation of over 50% to real estate is unrealistic as is an allocation of 100% to Treasury Bills. Practical limitations within the asset allocation process imposed by investment policy considerations would force the manager to place additional constraints on each asset class weight. For example, the allocation to real estate might be constrained be between 5% and 10%. If these additional constraints are imposed on the mean variance analysis, then at moderate risk levels the allocation to real estate will be 10% during expansive periods and 5% during restrictive periods. By limiting the changes in real estate allocations, some of the liquidity concerns presented earlier are mitigated. Of course, by incorporating these additional constraints, the benefits of the strategy are reduced but the portfolio results will likely still be better than by not altering allocations to real estate with respect to monetary policy changes.

It is apparent that investors in all markets should monitor Federal Reserve actions, since employing discount rate changes as a rough proxy for Federal Reserve monetary policy changes yields significant results. The results cited in this study excluded any announcement period returns. Previous evidence shows that significant announcement period returns, in the same direction as the long-term returns, are present. If a portfolio manager can correctly anticipate Federal Reserve actions, and reallocate resources prior to Fed moves, actual investment results may be enhanced.

**Conclusion**

The findings have shown that U.S. Federal Reserve monetary policy has a significant association with both the risk-return properties of real estate and the subsequent mean-variance efficient asset allocation decisions. Specifically, the results suggest a tactical asset allocation strategy that is fully vested in either Equity REITs or T-Bills depending on the monetary policy environment. This suggests that real estate investors, and institutional investors in general, would be best served by monitoring Federal Reserve policy very closely.

**Notes**

1. The federal funds rate is the most prominent alternative measure of monetary conditions [see Bernanke and Blinder (1992) for a discussion of the federal funds rate as a monetary policy measure]. This study relies on changes in the discount rate, however, because of the desire to identify a measure that indicates a fundamental change in the direction of future monetary policy. While recent changes in direction of the federal funds rate target have been infrequent, during the 1970s and 1980s the Fed changed the funds target relatively frequently. For example, there were nine cases in which the Fed changed the direction of the Fed funds target within three months. Furthermore, in three cases the Fed changed direction within a month. In contrast, the shortest interval for a change in the direction of the discount rate was four months and that happened only twice during the past three decades. The evidence indicates that in many cases historical changes in the Fed funds target represented short-term adjustments and were not intended to signal the Fed’s long-term policy intentions. Thus, the discount rate is a more appropriate measure in this study.

2. For example, on August 30, 1977, the Fed raised the discount rate from 5.25% to 5.75%. The seven rate changes prior to that change had all been decreases. Following the August 30, 1977, decrease, fourteen subsequent rate changes were all increases, the last occurring on February 15, 1980, before there was a shift in the direction of rate changes with a decrease on May 29, 1980. Thus, the August 1977 and May 1980 monthly observations are excluded from the sample, and the months from September 1977 through April 1980 are classified as “restrictive” months.


4. A standard t-test for the differences in means was performed.

5. With respect to real estate, another factor that may have contributed to this phenomenon is the growth of the REIT industry over the decade of the 1990s. With this growth came liquidity and increased market efficiency that may have allowed market participants to more accurately capture the unique risk characteristics of real estate relative to the other asset classes. Additionally, one should not assume that the correlation structures are consistent across time as the composition of the indices is not consistent over time. For example, during the period 1993–2000, the share of technology stocks in the S&P 500 went from 8% to 38%. Since REIT returns are less correlated with the returns to...
technology stocks than other industries, the correlation structures may not be consistent through time. The authors would like to thank an anonymous reviewer for this insight.

6. See Jensen, Mercer and Johnson (1996) for further discussion of this relationship.

References


