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Converging Correlations and Market Shocks: Implications for Managing Risk

Louis Llanes

This paper argues that the risk of equity investing has increased, mainly due to the diverging correlations of global equity markets during periods of turmoil. As a result, it is vital to consider a number of risk-reducing strategies, such as tactical asset allocation during periods of rising interest rates, industry-level security selection, and rebalancing.

INTRODUCTION

Investment professionals who are engaged in asset allocation must deal with the impact of a changing world economy. The development of an efficient portfolio is becoming increasingly difficult due to the structural change in correlation over time. The average world equity market has become increasingly correlated with the U.S. stock market especially during periods of higher volatility. The risk of owning stocks may be higher than what would normally be estimated using long-term statistics such as standard deviation. When the U.S. stock market declines, correlations have increased substantially among global equity markets, leaving little room for a diversification cushion. Synchronized downside price movement between the emerging markets and the United States have caused the global equity allocations to behave

as if they were one asset class. Important geographical, economic, and financial variables may be the cause of the structural change in correlation.

It is helpful to distinguish unexpected price activity as being structural or temporary. This way of categorizing a market's movement can be used to decide how to rebalance and trade investments given the portfolio's time horizon and objectives. A temporary market shock may give the manager a reason to rebalance the portfolio. A structural market shock may be a reason to readjust the allocation given the potential for a different market environment going in the future. It is also useful to understand the common reasons for a market crisis so that you can look for the unexpected. We examine some of the common traits found before a market crisis.

Portfolio management techniques can be used to help investment professionals improve the risk-adjusted performance of their portfolio in an environment where global equity correlation is rising. A mixture of strategic and tactical portfolio management techniques is helpful in mitigating risk and improving the efficiency of client portfolios. Methods for rebalancing based on changes in volatility and monetary policy can also be utilized when making investment decisions regarding a market shock. A shift in the portfolio mix toward international bonds, commodities, natural resource stocks, and Treasury bills and notes have been observed to lower portfolio risk during a structural decline of the U.S. stock market. Developed international markets, emerging markets, and corporate bonds have historically performed poorly during these same periods. Increasing the opportunity set of investments available to clients is more important in this environment. Portfolio managers who are currently avoiding managed futures may consider adding this asset class.

EVIDENCE OF INCREASING CORRELATION OF GLOBAL EQUITIES

The risk and return of a portfolio are determined by the return, standard deviation, and correlation of the underlying investments. The correlation between investments is a crucial element in determining an efficient portfolio. It is also well known that the correlations among most asset classes are typically unstable. The risk of rising correlation can have a significant impact on the asset mix that is appropriate for a client. Increasing correlation usually raises the overall risk of a portfolio because the assets are moving more closely together. In this scenario, the investments in the portfolio begin to behave similar to each other, which dilutes the benefits of diversification.

World equity markets are showing signs of a structural increase in correlation. A structural change in correlation is considered long term and is
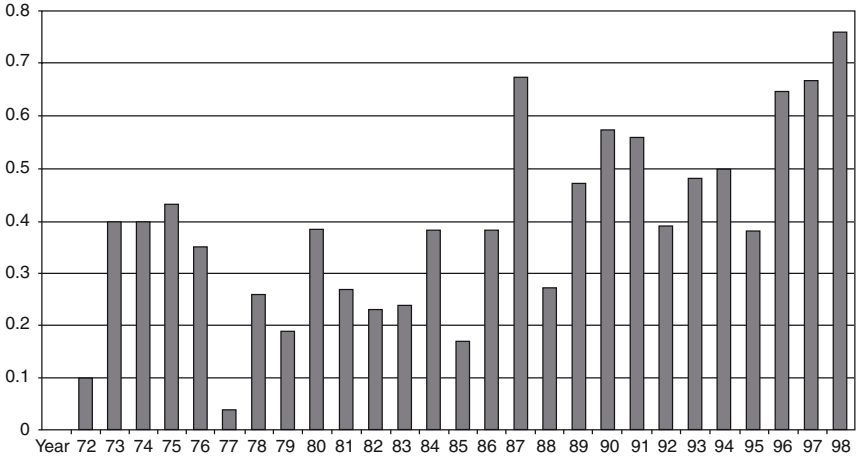
Note: Correlations are estimated using MS C1 monthly returns each year.

FIGURE 13.1   World average correlation.

usually due to permanent changes of the financial structure between the assets. On the other hand, a temporary shift in correlation is short term and is expected to revert to the mean. A graph of the average cross-sectional correlation of example world equity markets is shown in Figure 13.1. During the 26-year period between 1972 and 1998, the average correlation of the countries in the Morgan Stanley Capital International (MSCI) index has increased significantly (Wang 1999). More and more correlations are becoming significantly different from zero. From 1972 to 1979, only 30 percent of the correlation coefficients were significantly different from zero. In contrast, this percentage increased to 90 percent in 1998. Although each individual country has periods when the correlation rises and falls, the underlying structural correlation appears to be rising in developed equity markets.

Market practitioners desire risk reduction the most when the overall level of volatility is rising. Unfortunately, the evidence suggests that global equities move more closely together when the markets are becoming more volatile. Figure 13.2 shows a graph overlaying the correlation between the Europe, Australia, and Far East (EAFE) index and the standard deviation of the S&P 500 index. On a 3-year rolling basis using monthly data, it is
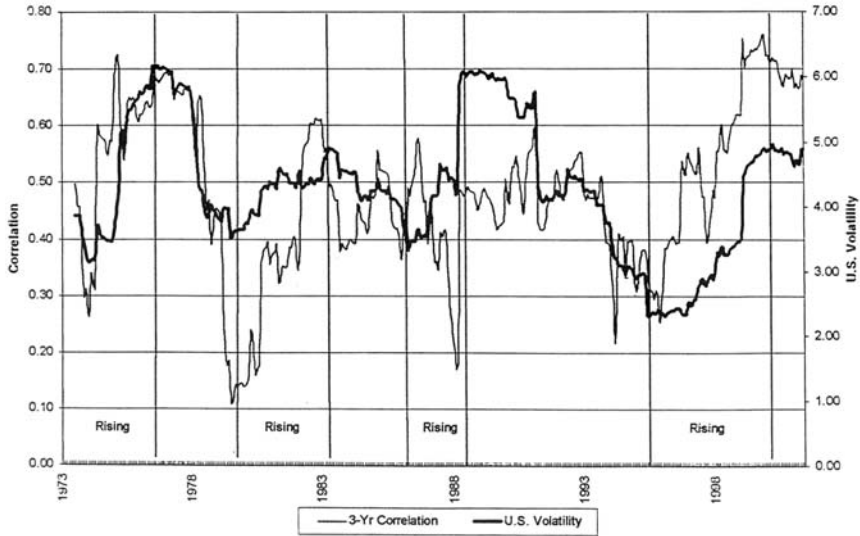
FIGURE 13.2   U.S. volatility versus EAFE correlation from 1971 to 2000.

clear that during the 28-year period between 1973 and 2000, correlation between international and domestic stocks rose when the U.S. stock market became more volatile. It is very possible that the risk tolerance for global equities will decrease when the perceived outlook for stocks in the United States is uncertain.

From 1966 to 2000, the United States experienced 11 pronounced price declines in the stock market. Table 13.1 summarizes declining markets measured by the S&P 500 index. The table lists the beginning and ending months of each decline, the length of time between peaks and troughs, the high and low price level of the S&P 500, and the percent decline. The average bear market during this period lasted 10 ½ months and dropped 25.19 percent in price. Notice that the length of time between a peak and trough became shorter in recent bear markets. For example, the declines beginning in November of 1980 and January of 1973 lasted 22 months. In contrast, the decline in 1998 lasted 4 months.

During falling stock prices in the United States, investors tend to shift assets toward higher-quality Treasury bonds and avoid international stocks. Table 13.2 is a correlation matrix including rising and falling markets. Table 13.3 is a correlation matrix of asset classes during falling markets alone.

TABLE 13.1 U.S. Stock Market Declines from 1966 to 2000

Beginning Month	Ending Month	# of Months	Market High	Market Low	Percent Decline
3/00	12/00	10	1552.87	1254.07	−19.24%
7/98	10/98	4	1190.58	923.30	−22.45%
1/94	4/94	4	482.85	435.86	−9.73%
7/90	10/90	4	369.78	294.51	−20.36%
8/87	10/87	3	337.88	216.46	−35.94%
10/83	7/84	10	173.10	147.77	−14.63%
11/80	8/82	22	141.96	101.44	−28.54%
9/76	3/78	19	107.83	86.44	−19.84%
1/73	10/74	22	120.24	62.28	−48.20%
11/68	5/70	7	108.37	69.29	−36.06%
1/66	10/66	10	93.95	73.20	−22.09%
	Average	10.5			−25.19%

Source: Blythe Lane Investment
Performance is measured using the S&P 500 Index.

TABLE 13.2 Correlation Matrix Including Rising and Falling Markets

	S&P 500	T-Bond	Corp. Bond	Int'l Bond	EAFE	Emg. Mkt.	GSCI
S&P 500	1.00						
T-Bonds	0.30	1.00					
Corp. Bonds	0.37	0.83	1.00				
Int'l Bonds	0.04	0.38	0.29	1.00			
EAFE	0.50	0.18	0.18	0.56	1.00		
Emg. Mkts.	0.53	−0.07	0.07	0.00	0.50	1.00	
GSCI	−0.04	−0.06	−0.12	0.07	−0.01	0.02	1.00

Source: Blythe Lane Investment Management.

Asset Class	Corr.
S&P 500	1.00
Emg. Mkts.	0.53
EAFE	0.50
Corp. Bonds	0.37
T-Bonds	0.30
Int'l Bond	−0.04
GSCI	0.04

TABLE 13.3   Correlation Matrix of Asset Classes During
a Declining U.S. Stock Market

	S&P 500	T-Bond	Corp. Bond	Int'l Bond	EAFE	Emg. Mkt.	GSCI
S&P 500	1.00						
T-Bonds	0.16	1.00					
Corp. Bonds	0.34	0.85	1.00				
Int'l Bonds	−0.02	0.47	0.34	1.00			
EAFE	0.57	0.08	0.14	0.35	1.00		
Emg. Mkts.	0.87	0.02	0.28	0.37	0.73	1.00	
GSCI	0.01	−0.03	−0.08	0.08	−0.11	−0.05	1.00

Source: Blythe Lane Investment

Asset Class	Corr.
S&P 500	1.00
Emg. Mkts.	0.87
EAFE	0.57
Corp. Bonds	0.34
T-Bond	0.16
GSCI	0.01
Int'l Bond	−0.02

Note that the correlation between emerging markets and developed markets increases as the U.S. stock market falls. For example, the correlation of emerging markets increased from an overall sample correlation of .53 to .87 during falling markets. On the other hand, Treasury bonds have historically had lower correlation during falling markets. The correlation of Treasury bonds decreased from .30 during all market conditions to .16 during a falling stock market.

Investors with a significant allocation in U.S. stocks have historically gained the most benefit from international bonds, commodity-linked investments, and higher-quality treasury securities. An inspection of the rank order of correlations does not reveal significant changes in order during rising or falling markets. The Goldman Sachs Commodity Index (GSCI) and international bonds have changed their order during falling prices but not significantly.

Occasionally, the markets experience unusual downside price action simultaneously. In order to isolate these events, we examined seven different asset classes to quantify their historical normal range of monthly returns. A statistical summary is presented on Table 13.4. The asset classes presented

TABLE 13.4   Bottom 5 Percent of Monthly Returns — Statistical Summary

	12/68–12/00	12/79–12/00	12/68–12/00 Corp.	12/77–12/00 Int'l	1/70–12/00	12/87–12/00 Emg.	12/69–12/00
	S&P 500	T-Bond	Bond	Bond	EAFE	Mkt.	GSCI
Number of Observations	384	252	384	276	371	156	372
Median Monthly Return	1.20	0.80	0.60	0.60	1.10	1.45	0.95
High	16.80	14.40	13.80	11.00	17.90	19.00	25.80
Low	−21.50	−7.50	−8.90	−9.30	−14.40	−28.90	−15.60
90th Percentile	−3.97	−3.10	−2.30	−3.00	−4.80	−7.90	−4.89
95th Percentile	−5.79	−4.20	−3.50	−4.70	−7.15	−10.98	−6.80

Source: Blythe Lane Investment Management

are U.S. stocks, domestic Treasury bonds, corporate bonds, developed international markets, emerging markets, international bonds, and commodity-linked investments. The benchmark used for these asset classes were the S&P 500, Salomon Treasury Index, Salomon Corporate Index, Salomon Non-dollar Denominated World Bond Index stated in U.S. dollar terms, MSCI EAFE, International Emerging Market Equity Index, and the Goldman Sachs Commodity Total Return Index. We then classified the lowest 5 percent of returns as being outliers to the downside using a percentile statistical method. For example, from 1968 through 2000, we observed that 95 percent of the monthly returns for the S&P 500 index were greater than −5.79 percent.

It is interesting to note that international equities have historically experienced unusual downside price movement simultaneously with the U.S. stock market. For example, the EAFE index has experienced 19 months with returns less than −7.15 percent. As shown in Tables 13.5 and 13.6, seven of those months occurred in the same month that the S&P 500 experienced returns in the bottom 5 percent. Emerging markets have also experienced this phenomenon; however, conclusions are difficult to make due to the limited amount of data available. From 1987 to 2000, emerging markets experienced 8 months with returns less than −10.98 percent. Two of those months have been synchronized with unusual downside price action in the S&P 500 index.

TABLE 13.5   Simultaneous Declines versus the S&P 500

	# of Declines	Total Declines	% Total
Treasury Bonds	1	14	7.1%
Corporate Bonds	2	21	9.5%
International Bonds	2	15	13.3%
EAFE	7	19	36.8%
Emerging Markets	2	8	25.0%
GSCI	1	20	5.0%

Source: Blythe Lane Investment Management

TABLE 13.6   Month Holding Period Return

Benchmark	90th Percentile	Median	10th Percentile
S&P 500	−6.0	3.1	13.1
T-Bonds	−4.3	2.2	10.0
Corp. Bonds	−3.8	2.0	7.9
Int'l Bonds	−4.8	2.0	11.0
EAFE	−7.8	2.8	15.0
Emg. Markets	−13.8	4.3	22.1
GSCI	−8.4	3.7	14.4

Source: Blythe Lane Investment Management

IMPORTANT DETERMINANTS OF GLOBAL EQUITY CORRELATION

Three main forces including geocultural, economic, and financial factors determine the structural correlation between the price movements of stock markets in different countries (Wang 1999). Geocultural factors include the language spoken and the distance between countries. The culture between countries has a major impact on laws and the level of comfort for conducting trade. Over time, these relationships have actually strengthened. The explanatory power of language and distance has increased from 1972 to 1992. Economic forces also play a major role in determining the co-movement of stock prices between two countries. The degree of correlation between the growth in gross domestic product (GDP), the capitalization to GDP ratios, and the amount of bilateral trade all have been found to have a statistically significant relationship to global stock market correlation

between countries. In addition, interest rates and the slope of the yield curve also play a key role. These factors are becoming increasingly linked through the integration of Europe.

THE INTEGRATION OF EUROPE

The integration of Europe has been at work for some time now and the impact on correlation is becoming evident. For investors outside the Euro zone, currency and interest-rate risk concentration becomes a concern and has triggered portfolio adjustments. This has led some portfolio managers to reclassify the Euro zone as a single asset class.

The correlation of countries in Europe has increased after the introduction of the Euro (Roulet 1999). A study conducted by MSCI analyzed the correlation of 15 countries in Europe before and after the introduction of the Euro. The pre-Euro period analyzed started in April of 1995 and ended in July of 1997. The after-Euro period began in August 1997 and ended in November of 1999. Most of the post-convergence correlations were far above their preconvergence period. The average correlation between the pre- and postconvergence periods increased from 0.41 to 0.55 (+14.2 percent). The major implication of this study is that the value of country asset allocation may be diminished in Europe.

TYPES OF MARKET SHOCKS

A market shock is defined as a large unexpected price movement. They are most noticeable when an unforeseen news event occurs. These large price moves can provide a feedback loop for information and give valuable information about the sentiment of large providers of liquidity in the marketplace.

There are generally two types of market shocks—structural and temporary (Kaufman 1995). A temporary market shock occurs when the price movement is short term in nature and the preexisting price trend continues. After the dissemination of unexpected information, many traders quickly liquidate positions that are perceived to be risky. After some time has passed and the situation can be analyzed, the information may be deemed irrelevant and the prior price trend continues. An example of a temporary price shock occurred in August 1991 with the news regarding the Gorbachev abduction. The Dow Jones Industrial Average gapped down on August 19, 1991 on strong volume. Two days later the news was disregarded and the Dow moved to a higher level than before the announcement. The key factor to watch when analyzing unexpected events is how the market reacts

after the initial shock. Does the prior trend continue? If so, the shock is likely to be temporary. On the other hand, if the price reverses and does not look back, you may have a structural price shock on your hands.

A structural shock will usually continue in the direction of the initial volatile move. The catalyst for a structural shock can happen when economic news is not incorporated in the current price of the market. If the market continues to move in the direction of an initial price shock after enough time has been allowed for information to be analyzed, a trend change may be occurring. This feedback loop can be used when deciding whether to make tactical asset allocation adjustments or to rebalance the strategic allocation.

Common Symptoms of a Structural Market Shock

When a severe market shock occurs, there is usually a large supply-and-demand imbalance due to lack of liquidity (Bookstaber 1999). Although it is very difficult to predict a market shock in advance, we have found it useful keep a list of common symptoms found before a structural market shock occurred in history. The following is our current list:

- Large institutions have a large degree of concentration in a particular asset.
- A relatively small number of investors and institutions are exposed to a market to provide liquidity to the marketplace.
- Investors and/or institutions are using large amounts of leverage compared to the capital employed to finance investment transactions.
- Certain financial transactions remain very popular even though they do not make economic sense or have very little margin of safety incorporated in their pricing.
- A large group of investors begin to have a homogenous tolerance for risk.
- New regulations are implemented that affect the ability of institutions to invest in a certain type of asset.
- The marketplace develops a common expectation about the future prospects of an investment or groups of investments.
- Monetary and/or fiscal policy is changing.

A good example of structural market shock would be the crisis in Thailand in the early 1990s (Warwick 2000). At that time, Thailand was a fast growing country showing much promise. Much of their growth had been due to the currency policy of the country. Thailand had pegged their currency (the baht) to the U.S. dollar. The dollar had been generally weak until 1995. Because the baht was pegged to a declining U.S. dollar, exports were

artificially boosted. The market price of their goods became relatively inexpensive in the world market place. Subsequently, the dollar began to rally, causing their products to be expensive. Due to heavy capital flows from the United States into Thailand, many U.S. financial institutions including banks and brokerage firms had significant risk exposure to the creditworthiness of Thai financial institutions. The real-estate bubble was a warning cry to international investment participants because Thai financial institutions would have much less ability to repay their obligations to foreign providers of capital. U.S. investors wanted out of many investments made in Thailand, causing pressure on the baht. In a futile attempt, the government poured resources into supporting the baht. This made matters worse. The large and quick decline of the baht spread to other Asian economies including Malaysia, Hong Kong, South Korea, and Japan. When very large groups of people decide to take the same action in a very short period of time, liquidity is lost and unusual price action is experienced.

PORTFOLIO MANAGEMENT TECHNIQUES USED TO ADDRESS INCREASING CORRELATION

In this article, we will focus our strategy to deal with the potential for increasing correlation in three areas. The first area is a shift away from country allocation toward global industry allocation. The second is rebalancing portfolios based on tactical triggers. The two most important tactical triggers we use are based on volatility and monetary policy. The third area is increasing the asset classes available included in portfolios.

Shift Away from Country Allocation to Industry Allocation

There is evidence that the integration of Europe has led to a need to focus on global industry allocation as opposed to country allocation. Typically, global portfolio managers tend to view the world from a country perspective—that is, they group securities by the country from which they came. However, the integration of Europe is now leading to less country differentiation. The diversification benefits across industries have been more pronounced because their correlation is lower than country correlation (Roulet 1999).

The shift away from the country allocation model calls for an up-to-date, well-defined industry classification. In August 1999, MSCI and S&P introduced their solution to address this issue—the Global Industry Classification Standard (GICS). There are indications that its use will be widely accepted and followed as many providers have begun to use this information in real time beginning in January 2001.

Rebalancing—Benefits for Risk-Adjusted Returns

It is well documented that portfolio rebalancing can significantly improve risk-adjusted performance (Goodsall 1998). Periodically buying and selling investments to reduce exposure to asset classes that have appreciated and increase exposure to those that have fallen is a key element of managing the converging correlation problem that is faced by money managers today. For example, we compared two portfolios—one implements a buy-and-hold strategy and the other rebalances every 12 months. They both start in 1979 with percentages in U.S. Treasury bills, bonds, and stocks, and international stocks, bonds, and commodities. From 1979 to 2000, the portfolio that is rebalanced once a year has better risk-adjusted returns. The lowest monthly return was also reduced from 7.29 to 6.6 percent. Another study done by First Quadrant observed similar results from a U.K. perspective (Goodsall 1998). They found that quarterly rebalancing of an international portfolio increased returns over a drift strategy and lowered the standard deviation as well. Goodsall did not find a period in which a drift strategy beat rebalancing on a risk-adjusted basis.

Volatility Contingent Rebalancing   Trigger-based rebalancing is when a manager rebalances his or her portfolio due to a specific event or condition that would indicate that an asset class may possibly be under or over extended in price. One of the most studied trigger-based rebalancing techniques has been based on asset drift. If the percentage allocated to a specific asset class is far enough away from the strategic portfolio's normal mix, the manager would rebalance the portfolio. There is evidence that this technique can add value. Art Lutschanig of Fidelity Investments (and presently with Manugistics) reported at an AIM conference that after reviewing the empirical studies and based on internal studies, Fidelity uses a 10 to 12 percent contingent trigger for major asset classes (Evensky 1997). There are three major areas to consider when devising a trigger-based rebalance strategy—the volatility of the asset class, the amount committed to each asset class, and correlation between the asset classes. One major pitfall of rebalancing is that it often will underperform a buy-and-hold portfolio. It is more pronounced over time when certain asset classes (typically stocks) perform better than 4 percent a year and are not mean reverting (Lowe 1998).

Unusual volatility can be a key element in identifying opportunities to rebalance. When volatility increases to a level beyond the normal range, it may be a good idea to reevaluate the portfolio to see if there may be a rebalancing opportunity. A graph of the 3-month rolling returns for the S&P 500 is illustrated in Figure 13.3. An upper and lower boundary line is also plotted to indicate when the 3-month return was unusually high or low. During
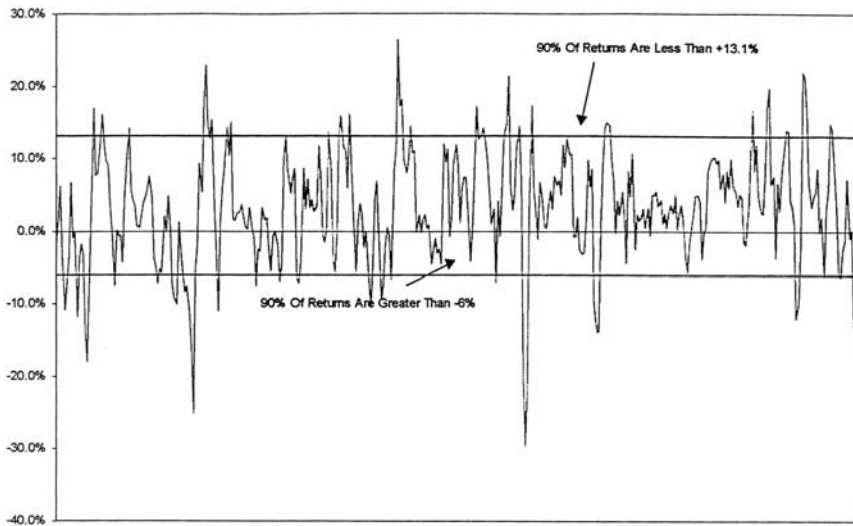
FIGURE 13.3   Rolling 3-month holding period return—S&P 500.

this period, 90 percent of the returns were between +13.1 and −6 percent. When falling outside the range happens, we use that event as an opportunity to see if there are any underlying changes in the fundamentals of the asset class or if this may simply be a temporary price move that should be bought or sold. We generally do not change the strategic allocation based on volatility, but will use it as an opportunity if mean reversion of the return pattern is expected.

Monetary Policy Contingent Rebalancing   Change in monetary policy is often a justification for a shift in the tactical allocation of a portfolio. Changes in the discount rate and the federal fund rate provide significant information about the future direction of the U.S. stock market. The discount rate and federal funds rate can be complimentary to each other because they represent different levels of information. The discount rate is viewed as an indication of the Fed's stance on overall monetary policy. In contrast, the change in the federal funds rate indicates more detailed information because it is more frequently observed and is an operating target that the Fed manipulates.

Monetary policy has a consistent and significant effect on returns and volatility for stocks and bonds. One simple and reliable indicator of U.S.

monetary policy is changes in the discount rate (Jensen 2000). (See Table 13.7.) Not only do changes in monetary policy significantly change the asset allocation outlook, but they also increase the chance that a market shock will occur in stocks. Table 13.8 shows that 85.7 percent of the lowest 5 percent of returns for the S&P 500 occurred when monetary policy has been tight. The implications that monetary policy has on avoiding or reducing exposure to market shocks is fairly clear for the U.S. stock market. The evidence is similar when examining international developed markets and emerging markets with 73.7 and 62.5 percent of the lowest 5 percent of returns occurring during tight U.S. monetary policy.

TABLE 13.7   Global Market Performance by Monetary Policy Period from 1970 to 1998

| Index | Mean Monthly Return | | Standard Deviation | | |
	Expansive Period	Restrictive Period	Expansive Period	Restrictive Period	Percent Change
U.S. Stocks	1.9133%	0.7300%	4.6602%	5.1267%	10.0%
EAFE	1.7896%	0.2601%	4.0373%	5.2113%	29.1%

Source: Monetary Conditions and the Performance of Stocks and Bonds (Jensen 2000)

TABLE 13.8   Bottom 5 Percent Declines During U.S. Fed Tightening

	S&P 500	T-Bonds	Corp. Bonds	Int'l Bonds	EAFE	Emg. Mkts.	GSCI
Total # of Declines (Bottom 5%)	21	14	21	15	19	8	20
Total During Fed Tightening	18	9	12	10	14	5	6
% During Fed Tightening	85.7%	64.3%	57.1%	66.7%	73.7%	62.5%	30.0%
Total During U.S. Bear Markets	9.000	5.000	9.000	3.000	11.000	3.000	6.000
% During U.S. Bear Markets	42.9%	35.7%	42.9%	20.0%	57.9%	37.5%	30.0%

Source: Blythe Lane Investment Management
Discount rate information obtained from The Federal Reserve Bank of St. Louis FRED database.

Correlations tend to rise when monetary policy is tight. As noted previously, global stock correlations tend to increase when volatility is rising, and volatility tends to rise when monetary policy is tight. Table 13.7 indicates that U.S. stocks and international stocks have shown increased volatility during periods of tight monetary policy. It is also interesting to note that international stocks historically have a larger increase in volatility than U.S. stocks when the Fed is tight. The standard deviation of monthly returns for U.S. stocks has increased 10 percent on average and 29.1 percent for international stocks.

Tactical Considerations during Tight Monetary Policy

Since most large declines in the U.S. stock market occur when monetary conditions are tight, we have found it useful to examine the performance of various asset classes when the U.S. stock market is declining. The data suggests that portfolios should overweigh commodities, Treasury bonds, international bonds, and cash equivalents during Fed tightening. The data also suggests that emerging markets, U.S. stocks, and developed markets should be underweighted. Table 13.9 is a statistical performance summary of seven

TABLE 13.9   Summary Statistics During a Declining U.S. Market

|	S&P 500	T-Bonds	Corp. Bonds	Int'l Bonds	EAFE	Emg. Mkts.	GSCI
# of Months	103	57	98	60	102	22	103
# Years	8.6	4.8	8.2	5.0	8.5	1.8	8.6
Compounded Annual Return	−13.4%	8.3%	5.2%	7.1%	−7.9%	−37.3%	20.5%
Mean Monthly Return	−1.063	0.730	0.474	0.631	−0.535	−3.413	1.779
Median Monthly Return	−1.200	0.800	0.400	0.350	−0.200	−1.950	0.500
Standard Deviation	5.121	3.604	3.121	3.465	5.482	8.717	6.792
Kurtosis	3.348	−0.056	2.278	0.948	0.733	2.195	2.195
Skewness	−0.198	0.471	0.672	0.685	−0.091	−0.985	1.169
Range	38.3	16.3	20.4	16.7	30.0	39.4	37.3
Minimum	−21.5	−5.8	−7.7	−5.7	−14.4	−28.9	−11.5
Maximum	16.8	10.5	12.7	11.0	15.6	10.5	25.8

Source: Blythe Lane Investment Management
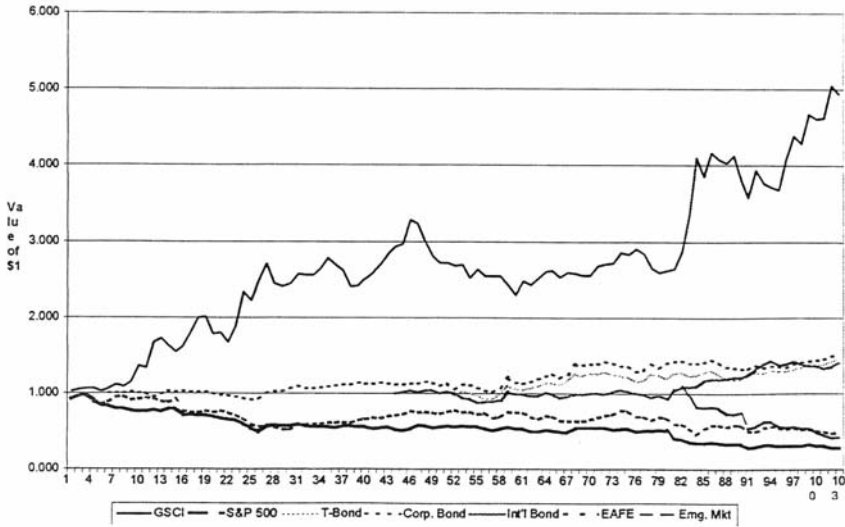
FIGURE 13.4 Performance comparison during bear markets.

different asset classes. During a declining market, the S&P 500 has compounded at a −13.4 percent rate of return. Figure 13.4 graphically illustrates the value of $1 compounded in sequential order during U.S. bear markets. The worse performing asset classes were emerging markets, which compounded at a −37.3 percent return, and developed markets, which realized a −7.9 percent return. The best performing assets classes were commodity-linked investments measured by the GSCI, which compounded at a +20.5 percent return. The asset classes that provided incremental returns for investors during a tough U.S. stock market were commodities (20.5 percent), Treasury bonds (8.3 percent), international bonds (7.1 percent), and corporate bonds (+5.2 percent).

Changes in monetary policy can clearly be a useful trigger to rebalance portfolios. When the Fed increases interest rates, the optimal portfolio has historically shifted considerably. Typically, the portfolio shifts away from U.S. stocks, foreign stocks, and corporate bonds, and buys investments in Treasury bills, managed futures, and natural resource stocks. Rebalancing at the industry level may also be effective. For example, avoid areas that typically perform poorly during restrictive monetary conditions including apparel, construction, and department stores. Traditional defensive industries, such as chemicals, petroleum, mining, and railroad, have historically performed better during restrictive periods and may be a better alternative.

CONCLUSION

The asset class risk of investing in equities is increasing. International equity and bond market correlations are unstable and increase during periods of higher volatility and U.S. stock market declines. Portfolio managers may have limited reduction in the risk of their portfolios when investing in foreign stock to diversify the risk of a declining U.S. stock market. The general risk of being in equities, whether or not they are domestic or foreign, is a significant concern when allocating capital. Estimates of an optimal portfolio can be distorted using long-term correlations. The risks may be understated due to the market shock phenomenon. This may lead to optimization results that allocate too much money in stocks and foreign securities when the stock market declines or volatility increases. Volatility tends to increase when the Fed is tightening monetary policy. This supports the use of tactical allocation strategies to reduce the risk of portfolios. Mean variance optimization methods may have less useful output if the time horizon is very long and may understate the short-term risk of the portfolio. Country selection may have limited value in diversification of a global portfolio in Europe. Industry-level security selection may become more prevalent in Europe. Rebalancing can be a useful tool to mitigate some of the risk of a global portfolio.

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