The (In)Stability Of The Relationship Between Stocks, Bonds And Managed Futures

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Abstract

This study re-examines the traditional belief that futures contracts have very low and, in some cases, negative correlations with stocks and bonds. Specifically, it looks at the stability of the correlations between five indices of futures market performance and two stock and bond indices over various holding periods. Results show that large positive correlations occur over short holding periods, but over the long run, the relationship is fairly stable, in particular for certain indices.

1. Introduction

Futures contracts have a variety of uses in the typical institutional portfolio. Hedging, speculation, asset allocation, overlays, and managing cash inflows and outflows are all commonly employed by professional investment managers. In addition, futures have come to play the role of an asset class in many investment portfolios. Such programs, in which a portion of the portfolio is allocated to a group of professional futures traders, are commonly referred to as *managed futures*. The purpose of this kind of program is to permit these independent traders to invest in such a way that their collective trading has a low correlation with the other components of the portfolio. The benefits accrue from the fact that futures traders take short as well as long positions, trade in futures contracts that cover a broad spectrum of underlying instruments, and usually trade independently of movements in stock and bond markets.

Indeed the evidence has been overwhelming that managed futures have a low correlation with more traditional asset classes. That being the case, greater diversification, both naive and efficient, can be achieved with a managed futures program. Yet, statistical correlation and diversification are temporal concepts. The correlation between futures and stocks, for example, is measured over a specific time period. One might reasonably question whether that correlation is stable. If not, a managed futures program adopted by an equity manager, might, during certain periods of time, be highly correlated with the equity market resulting somewhat surprisingly in either huge gains or losses on the overall portfolio.

In this article, the stability of the relationship between managed futures and stocks and bonds is examined. The tests are conducted by estimating correlation coefficients between five major indices of futures markets and one stock and one bond index. These correlations are calculated over all possible one-, three-, five- and ten-year holding periods over the years 1980-1994. The results show that the correlations are indeed quite unstable, they vary significantly by index, and that they stabilize only over a somewhat long period of time. The implication is not that the low correlations cannot be relied upon, but rather that the relationships can be expected to hold only over a reasonably long period of time. If investment managers can accept that fact, then they more likely to evaluate managed futures programs over a longer period of time and not make hasty decisions to terminate programs.

Readers with comments or questions are encouraged to contact the author via email.

2. Managed Futures Programs and the Correlations with Stocks and Bonds[i]

2.1. The Structure of Managed Futures Programs

A managed futures program can take one of three general forms. The investor, whether an institution or individual, can place the funds in a futures fund, a type of mutual fund that takes positions in futures contracts.[ii] Such funds are typically organized by a group of experienced futures traders and are sold to the public. Many funds guarantee that the investor cannot lose more than the original amount invested. The performance of futures funds have been studied at great length. They have not shown particularly strong performance and their expenses are quite high.

Alternatively, the investor can place funds in a commodity pool. This is a type of private fund, typically open to a limited number of investors, and not sold to the general public. A commodity pool is organized by an individual known as a commodity pool operator (CPO) who solicits individuals for participation. Commodity pools have acquired a reputation for extremely high costs.

Finally, and what is becoming increasingly more common, a private investment management contract is structured between the investor and a manager of managers (MOM). In a typical arrangement of this sort, the MOM would select several registered investment advisors (RIAs), which are normally firms that specialize in selecting and managing futures traders. Each RIA would then select a number of traders, known as commodity trading advisors (CTAs). The MOM would in effect manage the RIAs but might also have authority to hire and fire individual CTAs, though the latter would be more directly managed by the RIAs. A typical CTA is an individual or small firm operating out of an office, not from the trading floor. In fact many CTAs are located in small towns away from the primary financial centers.

A program such as the above is usually arranged by private negotiation between an institutional investor and the MOM and RIAs, resulting in fees that are considerably lower than those of a fund or pool. Many large institutional investors have used these arrangements, though there have also been some well-known cases in which pension funds dropped their managed futures programs.[iii]

There is one other class of a similar investment vehicle, the hedge fund, which is a private investment arrangement generally geared toward high net worth individuals with a high tolerance for risk. Hedge funds traditionally invest in a broader spectrum of instruments than commonly seen in managed futures programs. We do not investigate hedge funds in this study.

3. Previous Research on the Correlations Between Managed Futures and Traditional Asset Classes

Bodie and Rosansky (1980) examined the performance of 23 commodity futures contracts using quarterly data over the period of December, 1949 through December, 1976. The correlation between futures and stocks was -.24, and between futures and bonds was -.16.

A classic paper on managed futures was done by Lintner (1983). Using monthly returns on 15 CTAs and eight commodity funds over the period July, 1979 through December, 1982, he found that the correlation between the futures funds and stocks was .234 and between the futures funds and bonds was .151. The correlation between the CTAs and stocks was .059 and between the CTAs and bonds was .148. The correlation between the futures funds and a 60-40 mix of stocks and bonds was -.024 and the correlation of the CTAs with the 60-40 mix of stocks and bonds was .116.

Irwin and Brorsen (1985) looked at 84 futures funds using quarterly data over the period January, 1975 through May, 1984. The correlation between the futures funds and T-bills was -.367, between the funds and bonds was -.529, and between funds and stocks was -.633.

Baratz and Eresian (1986) used monthly data on the performance of twelve CTAs for the period 1980 through 1985. The correlation of the CTAs with stocks was -.036 and with bonds was -.101.

Elton, Gruber and Rentzler (1987) used monthly data on futures funds for the period of June, 1979 through June, 1985. Their results showed a correlation with stocks of -.121 and with bonds of -.003 although it should be noted that the funds did not offer sufficient returns to justify adding them to a portfolio.

More recent research was conducted by Abanomey and Mathur (1999), Schneeweis and Spurgin (1997), McCarthy and Schneeweis (1996), Chung (2000), Anson (1998), and Henker and Martin (1998). These studies generally confirm the widely held belief that the correlation between managed futures and more mainstream asset classes is relatively low, thereby implying that there are significant diversification benefits to adding managed futures to a portfolio of stocks and/or bonds.

One limitation of these studies, however, is that they were conducted over specific periods of time. Any correlation so calculated was but the single correlation over that specific time period. There is no evidence on the stability of this correlation. If the time period had been six months earlier or later, what would the results have been? In the derivatives world of today, the risk of a changing correlation is becoming an increasing concern to those who trade in derivative instruments involving multiple assets. This risk, referred to as "correlation risk," has been examined in great length,[iv] but not in the context that we do so here. The objective of this paper is to determine how stable the correlations are between stocks, bonds and managed futures.

4. Design of the Study

4.1. Data

Monthly rates of return from the period February, 1980 through January, 1995 are used. The returns are on five measures of futures performance: the Managed Account Reports Fund/Pool Index, the Managed Account Reports Trading Advisor Index, the Mount Lucas Management BARRA Index, the Goldman Sachs Commodity Index and the Commodity Research Bureau Index.

Managed Account Reports (MAR) is a New York firm that publishes a newsletter providing articles, news and statistical information on the performance of CTAs and funds. MAR's Fund/Pool Index (MARFP) measures the performance of over 400 funds and pools. MAR's Trading Advisor Index (MARTA) measures the performance of over 300 CTAs. The MAR indices are widely cited as measures of performance in managed futures. The MAR indices go back to January of 1980.

Mount Lucas Management is an investment advisory firm in Princeton, New Jersey that specializes in the selection and management of CTAs. MLM combined forces with BARRA to produce the Mount Lucas Management/BARRA Index (MLMB). This index is unique in several ways. For one, the index is a mechanical trading rule based on a moving average applied to various futures contracts. MLM states that its choice of this rule is based on its belief that the rule generates returns that are reasonably representative of the returns to managed futures in general. More importantly, however, the MLMB Index is tradable. MLM and BARRA created a fund in which investors can actually earn the returns off of this trading strategy. Regardless of whether one agrees with the particular technical trading rule, the fund provides an opportunity to earn diversified futures returns at extremely low cost, owing to its need for no real active management. The MLMB Index has been constructed back to 1961.

The Goldman Sachs Commodity Index (GSCI) was created by Goldman Sachs and offered as a futures contract itself at the Chicago Mercantile Exchange. It is an index of nearby futures contracts, in which each futures is weighted by the underlying commodity's world production resulting in it being heavily weighted toward oil. Obviously no financial futures are included in it. This "futures on a futures" began trading at the CME in 1992. The index itself is constructed back to 1970. It should be noted that the index is based on a constant long position in the component futures contracts.

The Commodity Research Bureau Index (CRB) is also a futures on a futures, which began trading at the New York Futures Exchange in 1986. The component commodities are equally weighted, however, meaning that the index is not as influenced by a single commodity as is the GSCI. No financial futures are included. The index itself is constructed back to 1970. Like the GSCI, it is based on a constant long position in the underlying futures.

Neither the GSCI nor the CRB indices have generated much futures trading on them but that is of no consequence for this study. Both indices are widely quoted as measures of futures market performance; thus, they are worth examining in studies of the correlation between futures and other asset classes.[v]

For stocks, the monthly returns on the Standard and Poor's 500 Total Return Index after its date of inception, June, 1988, are used. Prior to that date stock returns are based on the regular Standard & Poor's 500 Index with the dividends estimated from S&P yield data. Bond returns are based on the Lehman Government Bond Index, which includes bonds with a wide range of maturities.

Since the MAR indices were begun in January, 1980, their first return was in February, 1980. Monthly returns on these seven indices from February, 1980 through January, 1995, a period of fifteen full years, are used.[vi]

Table 1 contains some descriptive statistics of the monthly returns from these indices over the full period. Some interesting comparisons can be made. The largest mean monthly return is from the MAR Trading Advisor Index, which also has the largest standard deviation. The average return is nearly matched, however, by the S&P 500, whose risk is somewhat lower. The Mount Lucas Management/BARRA Index mean return matches the MAR Fund/Pool Index but has considerably lower risk. The Goldman Sachs Commodity Index nearly matches the S&P 500 in terms of risk but has a considerably lower average return. The CRB Index average return is slightly negative. Interestingly, the worst individual return is not on a futures index but rather on the S&P 500, a 21.54 % loss incurred, not surprisingly, in October of 1987.[vii]

Table 1
Descriptive Statistics of Monthly Returns on Stock, Bond and Futures Indices
February, 1980 through January, 1995

Index	$\bar{R}$	σ	Maximum	Minimum
S&P TR	.0127	.0433	.1347	-.2154
LGB	.0090	.0185	.0958	-.0513
MARFP	.0102	.0495	.1857	-.0145
MARTA	.0130	.0529	.2122	-.0996
MLMB	.0102	.0218	.0837	-.0471
GSCI	.0071	.0427	.2294	-.1398
CRB	-.0007	.0291	.0723	-.1054

Note: S&P TR is the Standard & Poor's 500 Total Return Index, LGB is the Lehman Government Bond Index, MARFP is the Managed Accounts Report Fund/Pool Index, MARTA is the Managed Accounts Report Trading Advisor Index, MLMB is the Mount Lucas Management/BARRA Index, GSCI is the Goldman Sachs Commodity Index, and CRB is the Commodity Research Bureau Index.

The Mount Lucas/BARRA index shows some of the characteristics of the Lehman Government Bond Index. Their mean returns, standard deviations, maximum and minimum returns are quite similar.

Table 2 presents the correlations between the stock and bond indices and each of the five futures indices computed over the full time period. The results agree with previous studies. Indeed the MAR Trading Advisor Index and the Mount Lucas Management/BARRA Index each have negative correlations with the S&P 500 and all of the correlations with the S&P 500 are less than .1. All of the correlations with the Lehman Government Bond Index are less than .08 and the GSCI and CRB correlations are negative.

5. Statistical Tests of the Stability of the Correlations

Table 2
Correlations Between Stock, Bond and Futures Indices; Monthly Returns
February, 1980 through January, 1995

Futures Index	S&P TR	LGB
MARFP	.0743	.0770
MARTA	-.0199	.0778
MLMB	-.1265	.0197
GSCI	.0154	-.0692
CRB	.0992	-.1733

Note: S&P TR is the Standard & Poor's 500 Total Return Index, LGB is the Lehman Government Bond Index, MARFP is the Managed Accounts Report Fund/Pool Index, MARTA is the Managed Accounts Report Trading Advisor Index, MLMB is the Mount Lucas Management/BARRA Index, GSCI is the Goldman Sachs Commodity Index, and CRB is the Commodity Research Bureau Index.

The correlations in Table 2 apply only to a position held the full fifteen years. They do not reflect how a managed futures program evaluated over a shorter period of time would have done. Take for example a five year program. Using monthly data, that program could have been evaluated over any of 121 different five-year periods during that fifteen year span. To examine the range of possible correlations, a series of moving correlations over various holding periods over that entire period is calculated.

For example, a correlation coefficient using the first twelve monthly returns is calculated. Then the next available return is added and the oldest return is dropped. This procedure is repeated to obtain a series of rolling one-year correlations until there are no more twelve-month periods left. This produces 161 correlations. The procedure is then duplicated using three-year (145 rolling correlations), five-year (121 rolling correlations) and ten-year (61 rolling correlations) holding periods.

Both Pearson product-moment and Spearman rank correlations are calculated. The Pearson product-moment correlation is the more widely used correlation and measures the linear association between two variables.[viii] Previous studies have all looked at Pearson correlations. The Spearman rank correlation is a non-parametric measure of correlation. It makes no assumptions about the distribution of the data but provides simply a correlation between the ranks of the data. For example, given two series of ten numbers, a Spearman correlation is found by first ranking each set in ascending order, assigning the numbers 1-10 to each and then calculating the correlation between the ranks, using the standard Pearson formula. Whereas the Pearson correlation permits statements about the relationship between the exact numerical values observed, the Spearman correlation permits statements about the relative values. Thus, a high Pearson correlation would mean that knowledge of the value of one observation for one variable would mean that the corresponding value of the other variable would have a high degree of predictability. A high Spearman correlation would mean only that if a large value of one variable were observed, one could say with considerable confidence that a large value of the other variable would also be observed.

The advantage of using the Spearman correlation is that it requires no strong statements about the data being from a specific random sample of independently drawn values. It provides a further check on the validity of the results. Oftentimes the Pearson and Spearman correlations are quite similar, however, and indeed that is the case in this study.

Table 3
Descriptive Statistics on Rolling Correlations between S&P 500 Total Return and Futures Indices
Monthly Returns; February, 1980 through January, 1995

(a) S&P TR vs. MARFP

	Pearson Correlation				Spearman Rank Correlation			
Holding Period	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**
1	.0246	.4042	.7049	-.8049	-.0144	.3839	.7902	-.8182
3	.0842	.1728	.4916	-.2529	.0047	.2138	.4394	-.3466
5	.1005	.1081	.3152	-.1500	.0511	.1643	.3735	-.3701
10	.1163	.0436	.2115	.0530	.0828	.0259	.1342	.0364

(b) S&P TR vs. MARTA

	Pearson Correlation				Spearman Rank Correlation			
Holding Period	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**
1	-.0230	.4226	.7478	-.8049	-.0616	.4255	.6923	-.7902
3	.0189	.1960	.4899	-.2529	-.0440	.2507	.4731	-.3865
5	.0309	.1208	.2844	-.1500	.0054	.1868	.4050	-.3758
10	.0468	.0539	.1572	.0530	.0407	.0429	.1170	-.0333

(c) S&P TR vs. MLMB

	Pearson Correlation				Spearman Rank Correlation			
Holding Period	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**
1	-.1425	.3178	.6786	-.7232	-.1351	.3490	.6993	-.7483
3	-.1350	.1889	.1784	-.5188	-.1303	.2102	.2651	-.5686
5	-.1015	.1428	.1238	-.3813	-.0936	.1514	.1602	-.3984
10	-.0715	.0437	-.0239	-.1460	-.0842	.0506	-.0248	-.1703

(d) S&P TR vs. GSCI

	Pearson Correlation				Spearman Rank Correlation			
Holding Period	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**
1	-.0088	.3250	.7757	-.7407	.0413	.3091	.7063	-.7203
3	-.0588	.2467	.4457	-.5043	-.0210	.1933	.4332	-.4336
5	-.0790	.2100	.3747	-.4114	-.0468	.1400	.3324	-.2670
10	-.0976	.0842	.1753	-.1523	-.0434	.0533	.1142	-.0918

(e) S&P TR vs. CRB

	Pearson Correlation				Spearman Rank Correlation			
Holding Period	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**
1	.0067	.3364	.8215	-.7734	.0206	.3671	.8112	-.7552
3	-.0323	.2231	.5923	-.3362	-.0495	.2612	.6636	-.4430
5	-.0666	.1920	.4513	-.2952	-.0894	.2063	.4501	-.3532
10	-.0659	.0777	.1414	-.1653	-.0794	.0912	.1256	-.1877

Note: Rolling correlations are calculated by using all monthly returns for one, three, five or ten 10 years. As each new month is added, an old one is dropped. The number of returns for each holding period is 169 (one-year), 145 (three-year), 121 (five-year) and 61 (ten-year). S&P TR is the Standard & Poor's 500 Total Return Index, MARFP is the Managed Accounts Report Fund/Pool Index, MARTA is the Managed Accounts Report Trading Advisor Index, MLMB is the Mount Lucas Management/BARRA Index, GSCI is the Goldman Sachs Commodity Index, and CRB is the Commodity Research Bureau Index.

Table 4
Descriptive Statistics on Rolling Correlations between Lehman Government Bond Index and Futures Indices
Monthly Returns; February, 1980 through January, 1995

(a) LGB vs. MARFP

	Pearson Correlation				Spearman Rank Correlation			
Holding Period	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**
1	.0697	.3844	.8635	-.7622	.0447	.3402	.8951	-.6550
3	.1589	.1704	.4979	-.1590	.0882	.1565	.3223	-.2032
5	.1483	.1034	.3244	-.0817	.0879	.1074	.2432	-.1918
10	.1349	.0584	.2157	.0463	.0917	.0576	.1665	-.0025

(b) LGB vs. MARTA

	Pearson Correlation				Spearman Rank Correlation			
Holding Period	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**
1	.0848	.3958	.8601	-.7805	.0860	.3807	.9091	-.8112
3	.1382	.1655	.5051	-.1632	.0817	.1749	.3691	-.2497
5	.1214	.0753	.2472	-.0610	.0730	.0838	.2349	-.0731
10	.1170	.0549	.2064	.0223	.0809	.0554	.1600	-.0025

(c) LGB vs. MLMB

	Pearson Correlation				Spearman Rank Correlation			
Holding Period	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**
1	.0862	.3449	.8876	-.4426	.1043	.3237	.8951	-.4906
3	.1280	.1435	.3595	-.2415	.1329	.1277	.3179	-.2766
5	.1317	.1229	.3164	-.1520	.1301	.1079	.2890	-.1498
10	.1484	.0576	.2122	.0069	.1318	.0410	.1889	.0366

(d) LGB vs. GSCI

	Pearson Correlation				Spearman Rank Correlation			
Holding Period	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**
1	.1303	.3412	.5359	-.7447	-.1375	.3276	.5385	-.6643
3	-.1604	.1548	.2637	-.3990	-.1657	.1771	.2294	-.4748
5	-.1629	.0734	-.0101	-.3150	-.1733	.0966	.0357	-.3791
10	-.1657	.0457	-.0733	-.2383	-.1681	.0573	-.0474	-.2701

(e) LGB vs. CRB

	Pearson Correlation				Spearman Rank Correlation			
Holding Period	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**	$\bar{\rho}$	$\sigma(\rho)$	**Max**	**Min**
1	-.1931	.2560	.3724	-.6996	-.1903	.2650	.4755	-.7063
3	-.2317	.0909	-.0577	-.4043	-.2517	.1099	.0014	-.4509
5	-.2316	.0565	-.1141	-.3442	-.2551	.0925	-.0762	-.4200
10	-.2268	.0295	-.1587	-.2719	-.2373	.0249	-.1825	-.2780

Note: Rolling correlations are calculated by using all monthly returns for one, three, five or ten 10 years. As each new month is added, an old one is dropped. The number of returns for each holding period is 169 (one-year), 145 (three-year), 121 (five-year) and 61 (ten-year). S&P TR is the Standard & Poor's 500 Total Return Index, MARFP is the Managed Accounts Report Fund/Pool Index, MARTA is the Managed Accounts Report Trading Advisor Index, MLMB is the Mount Lucas Management/BARRA Index, GSCI is the Goldman Sachs Commodity Index, and CRB is the Commodity Research Bureau Index.

6. The Results

The results are summarized in Tables 3 and 4 and Figures 1-4.[ix] Table 3 provides the statistics on the correlations of the five indices with the S&P 500 Total Return for the various holding periods. Although we calculated rolling correlations using one year, three years, five years and ten years, we show only the one- and five-year results in the graphs.[x] Consider first the Pearson correlations.

The average correlations rise as the holding period increases but the standard deviation of the correlations falls at a greater rate. This suggestions that the relationship is strengthening and becoming more stable with a longer holding period. This pattern holds for each futures index. Note how for one-year holding periods, the correlations with each index have extremely large maximums. For the MARFP, the MARTA and the GSCI, the maximums are all above .7; for the CRB the maximum is above .8 and for the MLMB the maximum is above .6. Figure 1 shows that these strong positive correlations are not simply a string of consecutive rolling correlations, a result one would expect by dropping one month and adding another. The one-year holding period correlations, the dotted line, are quite large and positive at numerous distinct times over the fifteen-year period. Likewise, they are quite large and negative at several other distinct times.

Moving from a one- to a three-year holding period raises the average correlation considerably but it is still quite low, ranging from -.1350 for the MLMB to .0842 for the MARFP. For some futures contracts, the volatility of the correlation is cut in half and for others, reduced substantially. Note also that each of the maximums shrinks considerably though they are probably still too high to satisfy potential users of managed futures. Moving to a five-year holding period further improves the results. The average correlations are all .1 or below with three being negative and the volatilities of the correlations are all quite low. Note that the maximums, however, are still somewhat high for the CRB Index (.4513) and for the GSCI (.3747). The MLBM Index maximum correlation, however, is only .1238.

Moving to the ten-year holding period provides a further reduction in volatility with only a slight increase in the average correlation. The maximum correlation is .2115 for the MARFP and even the CRB Index has a maximum correlation of only .1414. Although Figure 1 shows only the one- and five-year correlations, note how much more stable the five-year correlations are than the one-year correlations. Were they shown, the ten-year correlations would exhibit even greater stability.

The results for the Spearman rank correlations are quite similar and appear in the right side of Table 3 and in Figure 2. The general agreement of the Pearson and Spearman correlations strengthens the conclusions drawn from this study.

For portfolios that are highly correlated with the S&P 500, the implication is that one- and perhaps even-three year holding periods could lead to disappointing results with respect to the diversification properties of managed futures, resulting from the potential for quite high correlations. It would appear that at least a five-year holding period is necessary to achieve satisfactory correlations. The MLMB Index, however, if representative of the futures program used by the equity manager, is somewhat of an exception. The MLMB index shows a more stable correlation for shorter holding periods. Note that the maximum correlation for the MLMB was only .1784 for a three-year holding period and this maximum reduces only to .1238 for a five-year holding period. The average is less than zero for all holding periods. Though the GSCI has a negative correlation for all holding periods, the maximum correlation is quite high at .4457 for a three-year holding period and even .3757 for a five-year holding period. The CRB Index correlation is negative for holding periods of three or more years, but the maximum is quite high even for a five-year holding period.

Table 4 and Figures 3 and 4 present the results for the correlations between futures and the Lehman Government Bond Index. For the MARFP, MARTA and MLMB indices, the average correlations are all somewhat higher than those with the stock index though the average is still relatively low. The volatilities are similar as are the maximums and minimums. For one-year holding periods, correlations over .8 are observed and from Figure 3 note that these are not isolated runs of correlations. There are several distinct periods of rather large positive corre-

lations. For the GSCI and CRB indices, however, the correlations are noticeably lower and the maximums are not as high. In fact the CRB rolling one-year correlation is often negative. When positive it rarely gets above .3. The GSCI index fares only slightly worse, it being negative most of the time and sharply positive at only two distinct periods of time though it does peak at over .5.

Most importantly, the gains from moving beyond a three-year holding period are fairly minimal for the CRB index as a three-year holding period never produced a positive correlation. For the GSCI a three-year holding period might also be sufficient since there was only on episode of a strong positive correlation.

For the MARFP, MARTA and MLMB indices, a five-year holding period still produces an average correlation of .12-.14 and maximums of .24 to .32. It would appear that a holding period of at least five years is necessary. In short, managed futures programs with these indices probably are not appropriate for diversifying bond returns.

7. Conclusions

Managed futures programs are nearly always justified on the basis of low correlations with stocks and bonds. Those correlations are widely documented, and yet little has been said about their stability. A pension fund could begin a managed futures program at virtually any time. If that program is evaluated at the end of twelve months, the results could be quite surprising. Although it is unlikely that a managed futures program would be dropped after only a single year, the program might be judged as having not performed well if it showed a high correlation with the equity or debt component and those markets performed poorly. Even a three-year period could show a surprisingly strong positive correlation with the equity and debt components. Of course, it is not possible to subjectively impute a maximum tolerable correlation. Such a judgement should be done by the individual manager. It does appear, however, that for equities, a holding period of five years is probably necessary to minimize the chance of a strong positive correlation. For bond portfolios, shorter holding periods might be acceptable, depending on how the managed futures program is structured.

As a note of caution, however, these returns are from indices and not the returns from a program of specifically chosen CTAs, which is the typical way in which a managed futures program operates. The MARTA Index would be more similar to such a program than any other index, since it measures the returns of a large sample of CTAs; however, most managed futures programs operate with less than forty CTAs so the MARTA Index does not fully capture the effects of a more limited program. The MARFP Index likewise would reflect the returns of a large number of funds and not the more limited number likely to be used in such a program. The MLMB Index returns are actually available by taking a position in a fund based on the MLMB Index. Mount Lucas Management has heavily marketed this index as a way to achieve managed futures returns at low cost, so the results obtained here with the MLMB Index appear within reach. The GSCI and CRB Index performance could theoretically be achieved by trading either the nearby contracts in these indices, abstracting from any liquidity concerns from their relatively thin markets, or by holding futures contracts in the same proportions as they appear in the index.

In short these results, like most empirical findings, do not state the definitive truth but provide a reasonable range of expectations on the association between stocks, bonds and futures. That the widely publicized low correlations do not necessarily hold over certain holding periods should be a consideration in the evaluation of managed futures programs. Institutional investors should be as patient with managed futures as they are with their more traditional asset classes. More importantly, however, researchers and market participants should look warily upon findings that the correlations between managed futures and stock and bond asset classes are low.

8. Suggestions for Future Research

In recent years, financial crises have given rise to an increase in the correlations among asset classes around the world. Accordingly, the benefits of diversification among asset classes are becoming less certain. An interesting topic for future research would be to examine the periods when correlations among managed futures and stock and bond classes increase and/or become less stable with the goal of determining, if not predicting, periods when

managed futures are less beneficial in providing diversification. Relationships between the correlations and macroeconomic and financial variables could reveal useful insights for money managers who use managed futures. 🕮

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Support from the Virginia Tech Center for the Study of Futures and Options Markets and its former director, Robert Mackay, is gratefully acknowledged. Data were generously provided by Mount Lucas Management, the Chicago Mercantile Exchange, Managed Account Reports, Inc. and LaPorte Asset Allocation System. I especially acknowledge the assistance and comments of Lois Peltz of MAR, Dick Oberuc, Sr. and Dick Oberuc, Jr., both of LaPorte, Tim Rudderow of Mount Lucas, Bret Vietmeier of the CME, John Rowsell of Credit Agricole, Richard Spurgin of Clark University, and my colleague, Randy Billingsley. Research assistance was provided by Hillary Fredericks. Portions of this research were presented at the Chicago Mercantile Exchanges's Risk Management Symposium in October, 1995.

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Endnotes

i. See Chance (1994) for a review of the managed futures industry, the research on managed futures, and other issues and concerns related to managed futures programs.
ii. These funds were previously and occasionally still are referred to as commodity funds though, owing to the growth in financial futures, the term "commodity fund" is used less often today.
iii. For example, the Virginia Retirement System terminated their program in 1994 and Eastman Kodak ended its program in 1995.
iv. See for example, Gibson and Boyer (1998).

v. The information provided in the descriptions of the futures indices is accurate as of the end of the period of data used in this study. Since that time, some changes have occurred. Specifically, BARRA is no longer associated with the Mount Lucas Indices and the CRB Index is now affiliated with Bridge Data and called the CRB/Bridge Index. We shall, however, continue to refer to them under the names in place at the end of the data period.

vi. As noted above, the actual time period is from February, 1980 through January, 1995 but this will be referred to as 1980-1994 since that more accurately reflects the actual period.

vii. Interestingly during that infamous month, the returns on the other indices are 3.89 % for the Lehman Government Bond Index, 1.92 % for the MAR Fund/Pool Index, 2.65 % for the MAR Trading Advisor Index, -0.52 % for the Mount Lucas Management/BARRA Index, 1.05 % for the Goldman Sachs Commodity Index, and -0.18 % for the Commodity Research Bureau Index.

viii. It is important to remember that correlation, i.e., linear association, does not mean causality nor does the absence of correlation imply there is no relationship. For example, a sine wave shows little correlation with a series of consecutive integers, but the non-linear sine function provides a perfect fit. Nonetheless, we focus on correlation as a measure of association rather than attempt to uncover complex non-linear patterns.

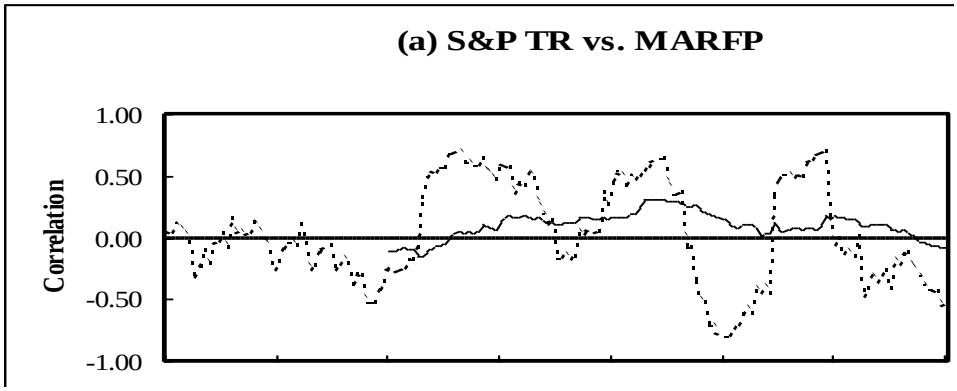
ix. In the graphs the point is plotted at the last month used to calculate the rolling correlation. For example, the first twelve-month rolling correlation uses the twelve monthly returns for February, 1980 through January, 1981. That correlation is then plotted at January 1981. The first three-year rolling correlation uses the 36 months starting with February, 1981 and ending with January, 1983 and is plotted at January, 1983.

x. The graphs are quite congested when more than two lines of rolling correlations are shown.

Notes

Appendix

Figure 1
Rolling Pearson Correlations of Futures Indices vs. S&P 500 Total Return;
February, 1980 through January, 1995



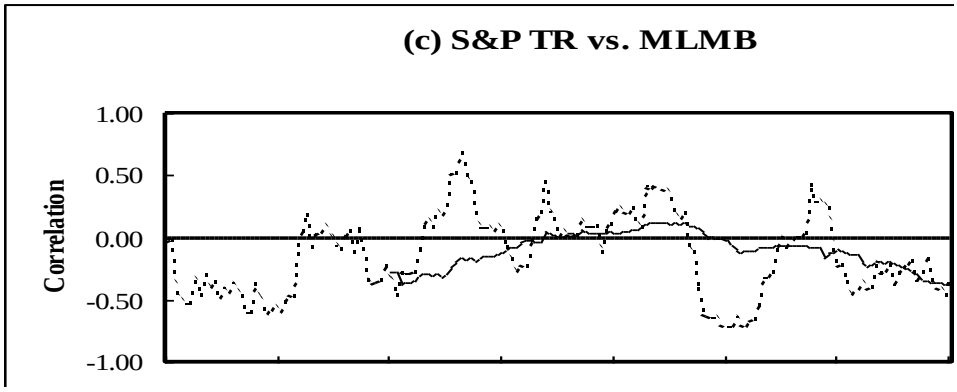
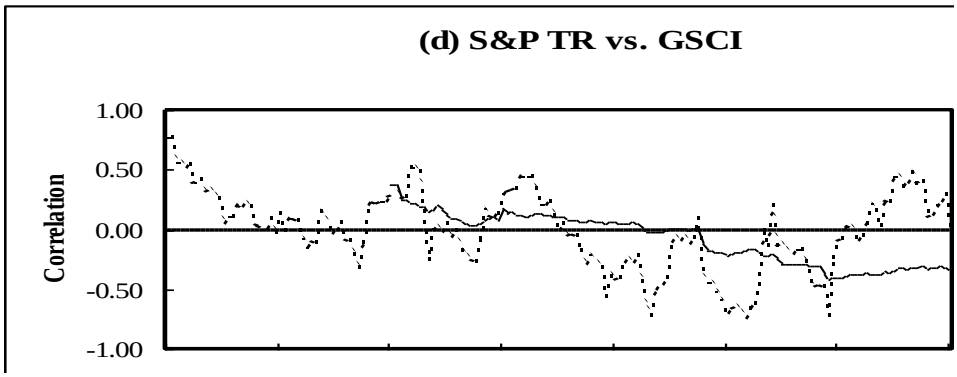
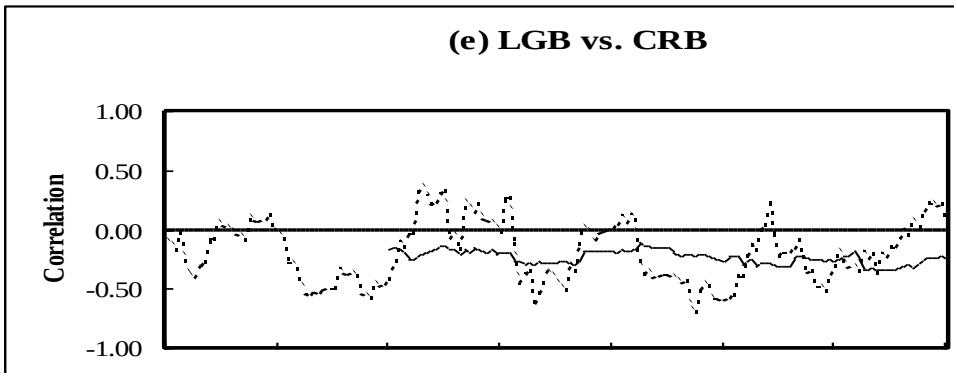


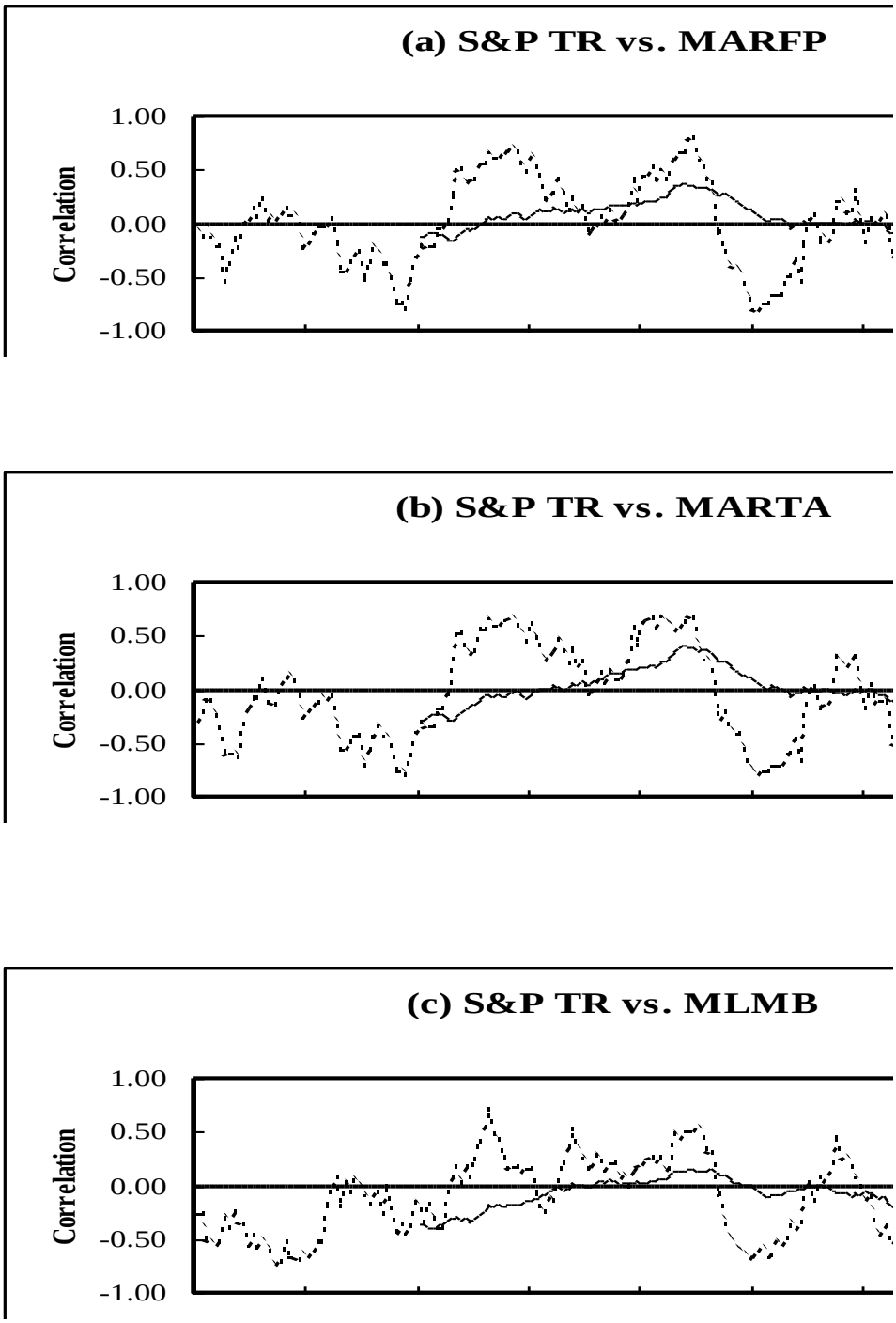
Figure 1 (Cont'd)





Note: Rolling correlations are calculated by using all monthly returns for one or five years. As each new month is added, an old one is dropped. The number of returns for each holding period is 169 (one-year) and 121 (five-year). Graphs for three- and ten-year rolling correlations are available upon request. The point is plotted at the last data point used to calculate the correlation. S&P TR is the Standard & Poor's 500 Total Return Index, MARFP is the Managed Accounts Report Fund/Pool Index, MARTA is the Managed Accounts Report Trading Advisor Index, MLMB is the Mount Lucas Management/BARRA Index, GSCI is the Goldman Sachs Commodity Index, and CRB is the Commodity Research Bureau Index.

Figure 2
Rolling Spearman Correlations of Futures Indices vs. S&P 500 Total Return
February, 1980 through January, 1995



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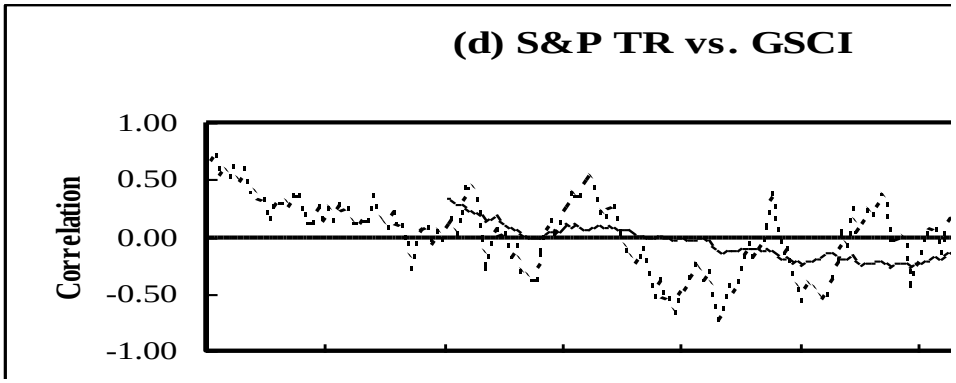

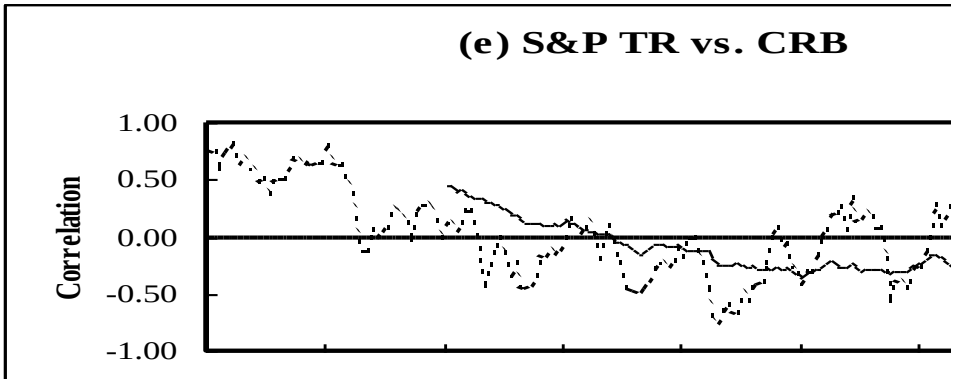

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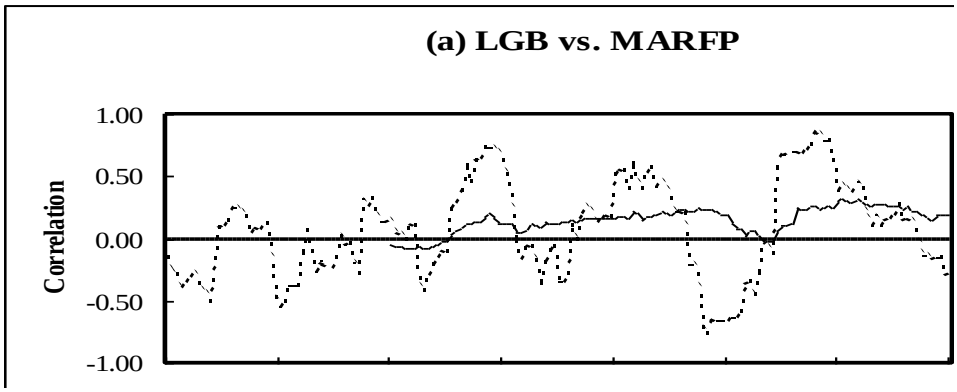
Figure 3
Rolling Pearson Correlations of Futures Indices vs. Lehman Government Bond Index
February, 1980 through January, 1995



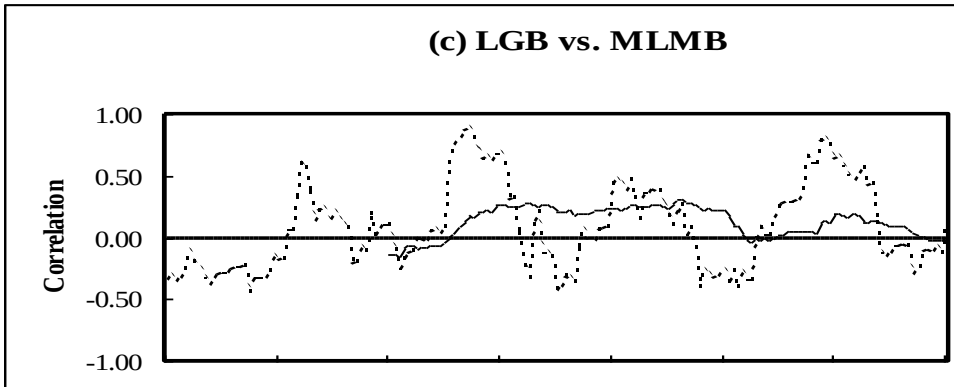
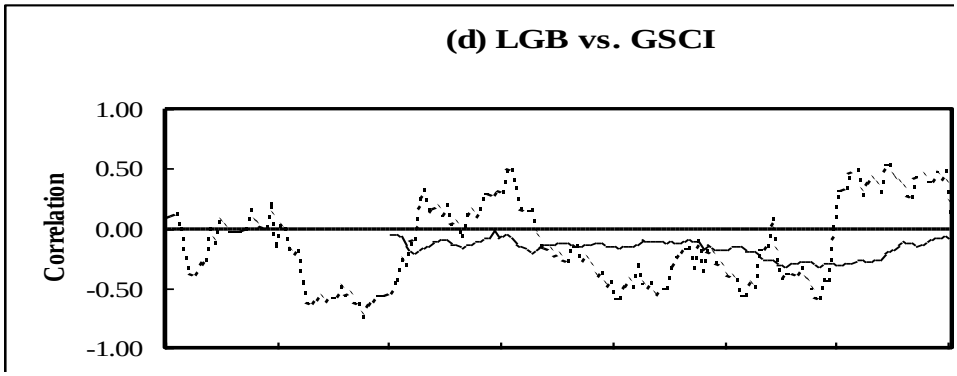
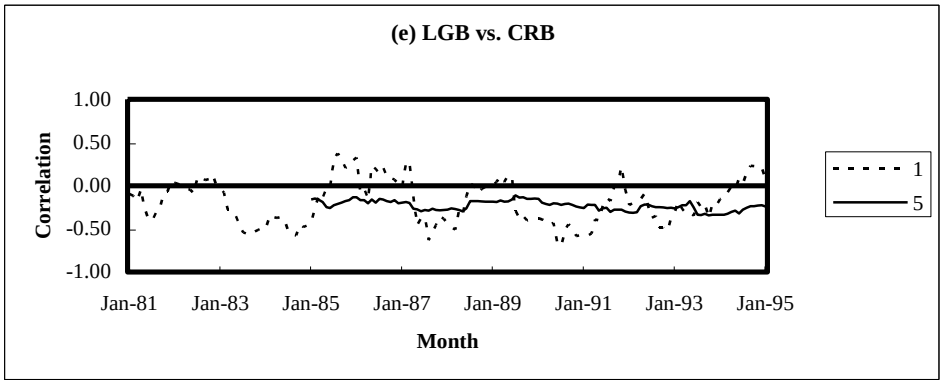


Figure 3 (Cont'd)





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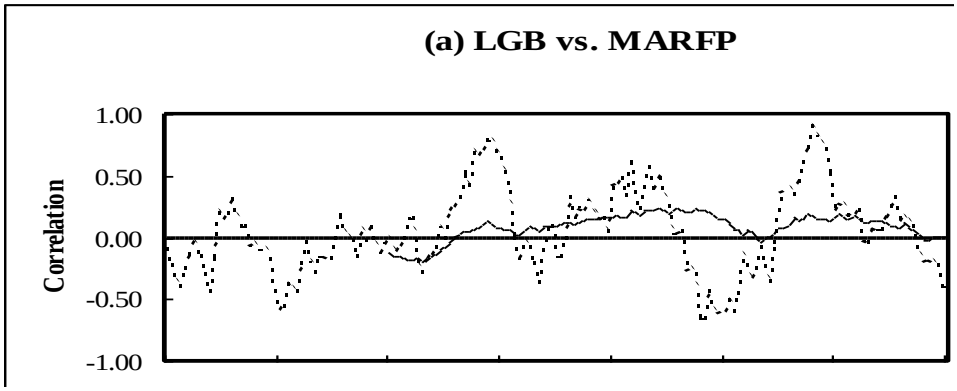
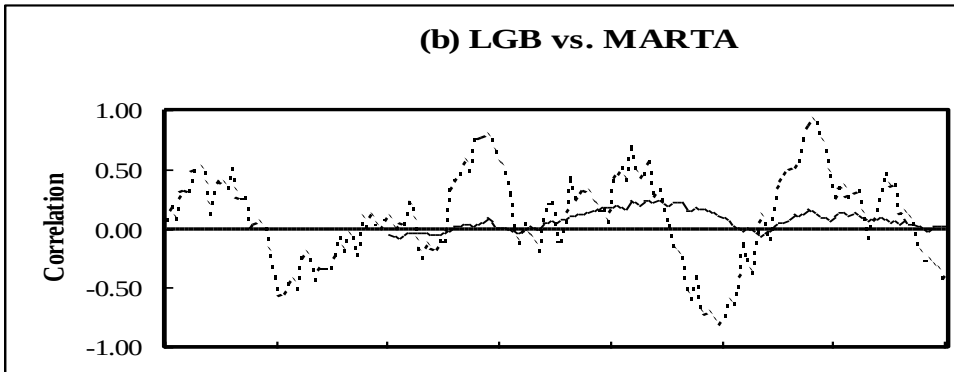
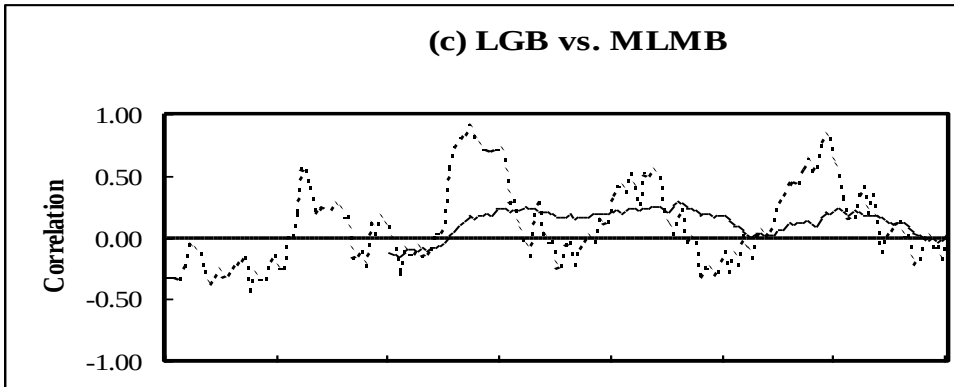
February, 1980 through January, 1995







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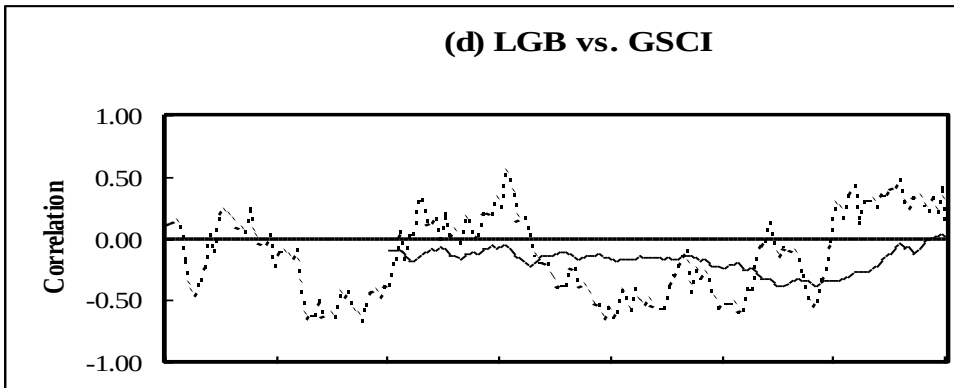

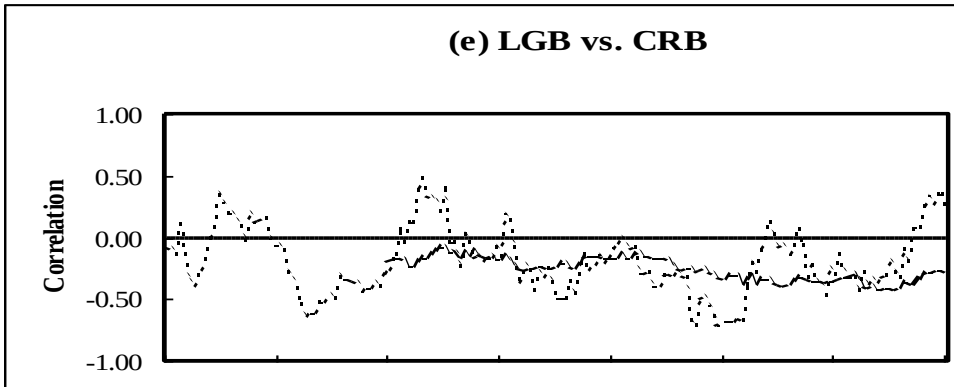

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