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Introduction

The general relationship between stock returns and the Fama French factors has been examined by many papers in the academic literature. While Fama and French (1992) find that "size [market equity] and book-to-market equity…combine to capture the cross-sectional variation in average stock returns…"[1], Lakonishok, Shleifer, and Vishny (1994) fail to find such a relationship between returns and book-to-market equity. More specific study has also been conducted to determine whether stocks exhibit mean reverting tendencies, or "a tendency of asset prices to return to a trend path."[2] Fama and French (1992) document evidence of mean reversion in equal-weighted portfolios in the prewar (i.e., pre-1947) period as well as the entire period over which stock data is available (i.e., 1926 – present). While the latter point has generated considerable opposing arguments (e.g., Lamoureux and Zhou (1996) and Bidarkota and McCulloch (1996)), the former notion of mean reversion in the prewar period is generally accepted. Furthermore, there seems to be a consensus that there is little evidence for mean reversion in the postwar period (i.e., 1947 – present) (sample articles supporting this notion include Kim, Nelson, and Startz (1991), and Bidarkota and McCulloch (1996)).

This paper determines the relationship between a more generalized notion of time dependency (i.e., not necessarily mean reverting tendencies) and the Fama French factors by examining the existence of time dependency in portfolios constructed based on the Fama French factors of market equity and the ratio of book-to-market equity.

[1] Eugene F. Fama and Kenneth R. French, "The Cross-Section of Expected Stock Returns," *The Journal of Finance* Vol. 47, No. 2. (Jun., 1992): 427.
[2] Ronald Balvers, Yangru Wu, and Erik Gilliland. "Mean Reversion across National Stock Markets and Parametric Contrarian Investment Strategies," *The Journal of Finance* Vol. 55, No. 2. (Apr., 2000): 745.

Specifically, it uses portfolios that were constructed based on the aforementioned Fama French factors and calculates autocorrelations of the returns on these portfolios for lags 1 – 12 months. The significance of these autocorrelations is then examined by use of confidence intervals constructed by a simulation method. Finally, the simulations are rerun, and the confidence intervals are reconstructed, for the pre- and post-war periods, in order to determine any difference in the occurrence of significant autocorrelations between pre- and postwar data.

The Fama French Portfolios

The data set used in this paper is entitled "25 Portfolios Formed on Size and Book-to-Market." The portfolios were created by Fama and French and are accessible on the Internet.[3] The portfolios were created using NYSE, AMEX, and NASDAQ stocks for which monthly return data was available during part or all of the period from July 1926 to December 2002. The stocks were partitioned into quintiles by market equity and then into subquintiles by book-to-market equity. The two sets of partitions give 25 portfolios, as illustrated in Figure 1 below. "Small" and "Big" refer to the lowest and highest quintile, respectively, of market equity, and "Low" and "High" refer to the lowest and highest quintile, respectively, of book-to-market equity; these naming conventions will be employed throughout this paper.

[3] Accessible at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/tw_5_ports.html.

Figure 1: The Fama French Portfolios

		Market Equity (ME)				
		Small	40%	60%	80%	Big
Book-to-Market Equity (BE/ME)	Low					
	40%					
	60%					
	80%					
	High					

Fama and French explain the exact assumptions under which the portfolios are created in their article "Multifactor Explanations of Asset Pricing Anomalies" (1996). The relevant information is provided below.

> At the end of June of each year *t*…,NYSE, AMEX, and Nasdaq stocks are allocated to two groups (small or big, S or B) based on whether their June market equity (ME, stock price times shares outstanding) is below or above the median ME for NYSE stocks. NYSE, AMEX, and Nasdaq stocks are allocated in an independent sort to three book-to-market equity (BE/ME) groups (low, medium, or high; L, M, or H) based on the breakpoints for the bottom 30 percent, middle 40 percent, and top 30 percent of the values of BE/ME for NYSE stocks. Six size-BE/ME portfolios (S/L, S/M, S/H, B/L, B/M, B/H) are defined as the intersections of the two ME and the three BE/ME groups. Value-weight monthly returns on the portfolios are calculated from July to the following June….The 25 size-BE/ME portfolios are formed like the six size-BE/ME portfolios…, except that quintile breakpoints for ME and BE/ME for NYSE stocks are used to allocate NYSE, AMEX, and Nasdaq stocks to the portfolios.
>
> BE is the COMPUSTAT book value of stockholders' equity, plus balance sheet deferred taxes and investment tax credit (if available), minus the book value of preferred stock. Depending on availability, we use redemption, liquidation, or par value (in that order) to estimate the book value of preferred stock. The BE/ME ratio used to form portfolios in June of year *t* is then book common equity for the fiscal year ending in calendar year $t - 1$, divided by market equity at the end of December of $t - 1$. We do not use negative BE firms, which are rare prior to 1980, when calculating the breakpoints for BE/ME or when forming the size-BE/ME

portfolios. Also, only firms with ordinary common equity (as classified by CRSP) are included in the tests. This means that ADR's, REIT's, and units of beneficial interest are excluded.[4]

While Fama and French describe their methods only for returns on the portfolios during the 366-month period from July 1963 – December 1993, it is assumed that they used similar methods in creating the portfolios for the entire 912-month period from July 1926 – December 2002. It should also be noted that Fama and French create both equal- and value-weighted portfolios; this paper uses value-weighted portfolios. Lastly, it should be noted that the composition of stocks in an individual portfolio, as well as the number of stocks used in an individual portfolio, can change from year to year.

Autocorrelations for Fama French Portfolios

For each of the 25 portfolios, autocorrelations were calculated for lags 1, 2, …, 12 months. The autocorrelations for each portfolio are presented graphically in Appendix 1. An initial overview of the data reveals a few general patterns. All 25 portfolios have both positive and negative autocorrelations, depending on the lag. Also, each lag 1 – 12 has positive and negative autocorrelations, depending on the portfolio. Lastly, the magnitude of the autocorrelations varies significantly, both within each portfolio and across all the portfolios for a given lag. Whether any of the autocorrelations in a given portfolio is significant was determined by the confidence interval method, based on a simulation described below.

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[4] Eugene F. Fama and Kenneth R. French, "Multifactor Explanations of Asset Pricing Anomalies," *The Journal of Finance* Vol. 51, No. 1. (Mar., 1996): 58.

Construction of Confidence Intervals via Simulation

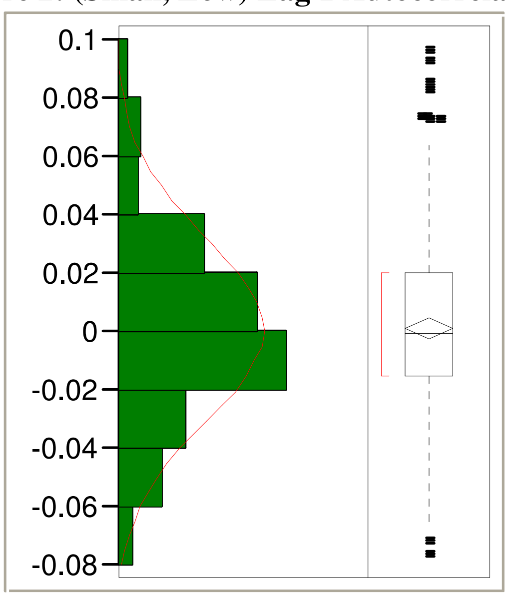
For each of the 25 portfolios, the significance of each of the 12 autocorrelations for the portfolio was tested based on the confidence interval method similar to one used by Dean Fikar, and investment advisor, on his Internet web site, which has short essays on a variety of topics in portfolio management and market theory.[5] To construct these confidence intervals, the monthly returns for each portfolio r_1, r_2, …, r_{918} were permuted, using a random number generator, to yield a new series $r_{\sigma(1)}$, $r_{\sigma(2)}$, …, $r_{\sigma(918)}$. The autocorrelations for lags 1 – 12 were then calculated for the new series. This method of permutation and autocorrelation calculation was repeated 249 more times for each portfolio. Thus, for each portfolio, the simulation yielded 250 autocorrelations for each lag 1 – 12. The autocorrelations for each lag *i* were then put into ascending order; that is, for a given lag, the simulated autocorrelations $\rho_{i,1}$, $\rho_{i,2}$, …, $\rho_{i,250}$ were put into ascending order, $\rho_{i,(1)}$, $\rho_{i,(2)}$, …, $\rho_{i,(250)}$ such that $\rho_{i,(1)} < \rho_{i,(2)} < \ldots < \rho_{i,(250)}$. Then, in order to construct 95% confidence intervals, 2.5% of the autocorrelations were trimmed from the top and the bottom of the ordered distribution of autocorrelations, and the lowest and highest remaining autocorrelations were used as the lower and upper bounds, respectively, of the confidence interval.

These confidence intervals could also have been constructed using the traditional mathematical formula for *t*-confidence interval. In general, these traditional *t*-confidence intervals are much smaller (i.e., have a much smaller range) than the confidence intervals generated by the simulation method. However, unlike this method, the construction of confidence intervals by the method described above is not only more intuitive but also

[5] Accessible at http://nofeeboards.com/raddr/Mean%20Reversion.htm.

makes no assumptions about the normality of the distribution of the simulated autocorrelations. The assumption of normality is an important one for the simulated autocorrelations, and many of the simulated autocorrelations for the 25 portfolios do not significantly fit a normal distribution. For example, Figure 2 shows the distribution of simulated lag 1 autocorrelations for the portfolio corresponding to stocks in the smallest quintile of both market equity and book-to-market equity. As indicated by the results of the output of the Shapiro-Wilks test for normality, one cannot assume that these autocorrelations are drawn from a normal distribution.

Figure 2: (Small, Low) Lag 1 Autocorrelations



Fitted Normal

Parameter Estimates

Type	Parameter	Estimate	Lower 95%	Upper 95%
Location	Mu	0.0007963	-0.003111	0.0047031
Dispersion	Sigma	0.0313638	0.028834	0.0343834

Goodness-of-Fit Test

Shapiro-Wilk W Test

W	Prob<W
0.974157	**0.0391**

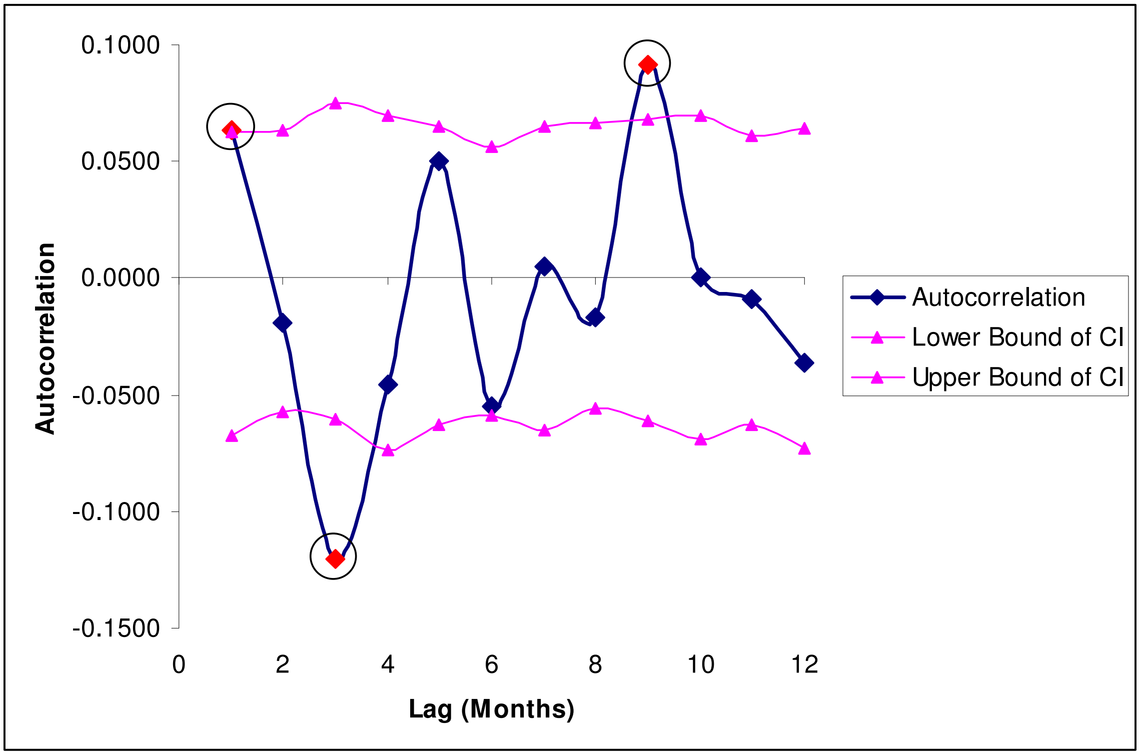
For each lag *i* in a given portfolio, it was then determined whether the lag *i* autocorrelation of the returns when in their historical order fell within the confidence interval constructed using the simulated autocorrelations. If the autocorrelation of the returns when in their historical order did not fall within the confidence interval, it was considered to be significant. For example, the lag 1 autocorrelation for the portfolio corresponding to stocks in the largest quintile of both market equity and book-to-market equity was calculated to be 0.0636. Based on the simulated autocorrelations for this lag on this portfolio, the 95% confidence interval was determined to be [-0.0673, 0.0626]. Since 0.0636 falls outside this confidence interval, it was considered to be a significant (lag 1) autocorrelation. Similarly, Figure 3 shows the autocorrelations and confidence intervals for all 12 lags for this same portfolio. Significant autocorrelations in the above table are bolded. Thus, for this portfolio, the lag 1, 3, and 9 autocorrelations were determined to be significant.

Figure 3: Autocorrelations and Confidence Intervals for (Big, High) Portfolio

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	**0.0636**	-0.0673	0.0626
2	-0.0193	-0.0570	0.0634
3	**-0.1206**	-0.0607	0.0747
4	-0.0458	-0.0735	0.0695
5	0.0498	-0.0628	0.0647
6	-0.0551	-0.0590	0.0564
7	0.0053	-0.0650	0.0650
8	-0.0172	-0.0558	0.0666
9	**0.0911**	-0.0611	0.0681
10	0.0003	-0.0690	0.0697
11	-0.0092	-0.0624	0.0609
12	-0.0363	-0.0733	0.0645

The confidence intervals can also be represented graphically, as in Figure 4. The significant autocorrelations are noted with a red-colored point.

Figure 4: Graph of Autocorrelations and Confidence Intervals for (Big, High) Portfolio



Preliminary Observations about Simulation Results

The graphs for all 25 Fama French portfolios are presented in Appendix 2. Figure 5 summarizes the significant autocorrelations. The blue highlighted boxes indicate a significant positive autocorrelation, and the yellow highlighted boxes indicate a significant negative autocorrelation. The number(s) in each box indicate the lag(s) at which significant autocorrelation occur.

Figure 5: Significant Autocorrelations for Entire Period (1926 – 2002)

Book-to-Market Equity (BE/ME)	Market Equity (ME)				
	Small	40%	60%	80%	Big
Low					12
40%			8		
60%		8	1, 9		
80%			9		9,12
High			1,7	3, 6	1, 9 3

Positive Autocorrelation Negative Autocorrelation

Three major observations seem to emerge from Figure 5. First, significant autocorrelations occur for portfolios in the 60 – 100% quintiles of market equity. Secondly, significant autocorrelations occur for portfolios in the 60 – 100% quintiles of book-to-market equity as well. Lastly, the most common lag for a significant autocorrelation is 9 months. Most of the significant lag 9 autocorrelations are negative, but for the (Big, High) portfolio, it is positive.

Interpretation of Results

At first, one may tend to conclude that, given the multiple occurrences of a significant lag 9 autocorrelation, there is a credible relationship between returns during month t and month $t + 9$. Intuitively, however, it seems unlikely that such a relationship between returns in the current month and returns 9 months prior would credibly exist, and that simulation methods, similar to ones used in this paper, could consistently replicate such a conclusion. Furthermore, given that for each portfolio 12 autocorrelations were calculated, one would expect, at a 95% significance level, that $\frac{1}{20} \cdot 12 = 0.6$ autocorrelations would be significant simply due to chance. In light of this expectation, it is difficult to dismiss chance as a reason for the significant lag 9 autocorrelations.

One must also question the extent to which the significant autocorrelations (lag 9 or otherwise) are due to returns in the prewar period, particularly around the Great Depression. To determine the extent stock return data during the time of the Depression has an impact on the existence of significant autocorrelations, the simulation described above was rerun on the 25 portfolios, once using only prewar returns (i.e., 1926 – 1946) and postwar returns (i.e., 1947 – 2002). Appendices 3a and 3b show the autocorrelations of lags 1 – 12 months for each of the portfolios and the associated 95% confidence interval constructed using the simulated autocorrelations. Correlations that are significant (i.e., correlations that fall outside the simulation-constructed confidence interval) are bolded. The significant autocorrelations are summarized in Figures 5a and 5b below.

Figure 5a: Significant Autocorrelations for Prewar Period (1926 – 1946)

		Market Equity (ME)				
		Small	40%	60%	80%	Big
Book-to-Market Equity (BE/ME)	Low		2		1 10	
	40%	5			2, 3, 4, 6, 7	2
	60%					7
	80%	10	5	10 12	1	
	High	8	12			

Positive Autocorrelation   Negative Autocorrelation

Figure 5b: Significant Autocorrelations for Postwar Period (1947 – 2002)

		Market Equity (ME)				
		Small	40%	60%	80%	Big
Book-to-Market Equity (BE/ME)	Low		5			6, 9
	40%	11 10	2		8	6
	60%		4		3	2
	80%	12		1		4
	High	10		1 4		

Positive Autocorrelation   Negative Autocorrelation

The pattern of significant autocorrelations is considerably different for the prewar period versus the postwar period, and both patterns also differ considerably from the pattern of significant autocorrelations for the 25 portfolios using the returns over the entire 1926 – 2002 period (as shown in Figure 5). More specifically, there does not seem to be a discernable relationship between either market equity or book-to-market equity and the existence of significant autocorrelations. Furthermore, in neither pattern does any given lag appear more than three times (both lag 2 in the prewar pattern and lag 8 in the postwar pattern appear three times).

Perhaps most noticeable is the relatively low frequency of a significant lag 9 autocorrelation. The lag 9 autocorrelation is never significant for the prewar data, and for the postwar data, it only occurs once, in the (Big, Low) portfolio. Not only did this portfolio have a significant lag 9 autocorrelation when data over the entire period were used, but the lag 9 autocorrelation in the postwar data is positive, whereas most of the significant lag 9 autocorrelations for the portfolios that data over the entire period are negative.

Thus, one may doubt whether the consistent significance of the lag 9 autocorrelation persists today or is a phenomenon of the return data during the time of the Depression. While this is doubt is one expressed by many in the past (e.g., Kim, Nelson, and Startz (1991), Daniel (1994), and Bidarkota and McCulloch (1996)), it may be possible that longer lags must be analyzed in order to find a persistently significant autocorrelation; Carmel and Young (1997), for example, found a significantly negative autocorrelation to occur at lag 12 months (though, admittedly, their findings pertained to broader based U.S. stock indices and not portfolios created using the Fama French factors).

Conclusion

While the results of the simulation suggest that a significant lag 9 autocorrelation may exist for portfolios whose stocks fall into certain quintiles or market equity and book-to-market equity, with the lag 9 correlation to be more likely significant for portfolios in the larger quintiles of both market equity and book-to-market equity, one must be careful to accept such a conclusion. On statistical grounds, one would expect 0.6 significant autocorrelations for each portfolio so one cannot dismiss chance as a reason for the significant lag 9 autocorrelations. Furthermore, it seems counterintuitive that returns in the current month have a concrete relationship with returns 9 months prior; intuition suggests that autocorrelations at lags 1 and 2 are more likely to be significant. The pattern of significant autocorrelations for the postwar period (as shown in Figure 5b) supports this intuition (though, again, one must not dismiss chance as a reason for their occurrence, particularly when the lag 1 or 2 autocorrelation is the only significant autocorrelation for a given portfolio).

One question that would be interesting to explore in future research is why there are no significant autocorrelations for small-cap stocks (i.e., stocks having low market equity), as illustrated in Figure 5. In addressing this question, one could investigate the amount of turnover in the small-cap portfolios (i.e., whether the number of securities changes considerably from year to year. Also interesting would be to repeat the analysis conducted in this paper using Fama and French's equal-weighed portfolios. While Fama and French (1988) and Jegadeesh (1991) do not find significant autocorrelations for *value*-weighted portfolios, this paper, as well as one by Daniel and Torous (1995), do find significant autocorrelations over various lags in value-weighed portfolios. It would be interesting to see whether the impact of market equity and book-to-market equity are influenced by the choice of value- versus equal-weighted portfolios that are created based on the quintiles of the Fama French factors.

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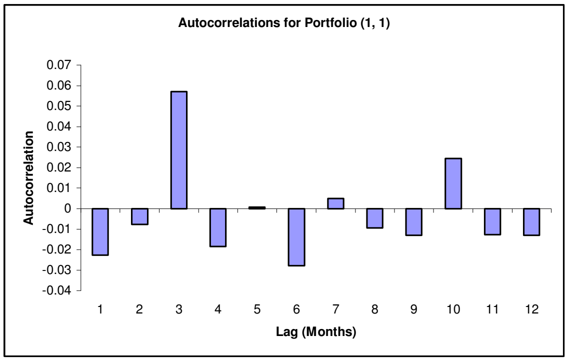
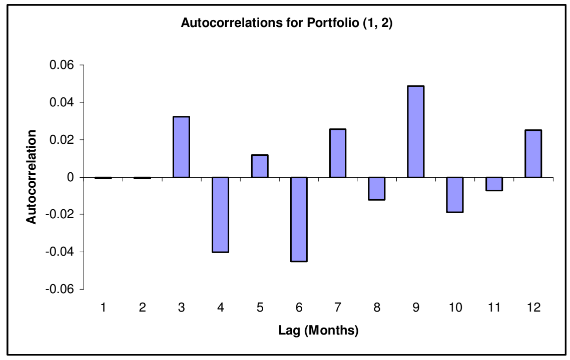
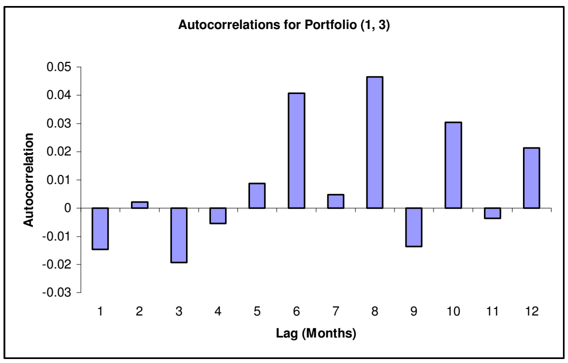
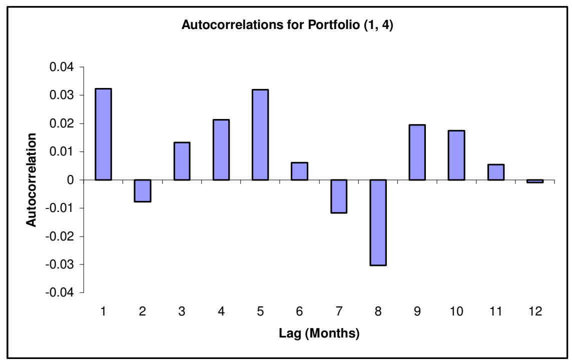
Appendix 1: Autocorrelations for 25 Fama French Portfolios

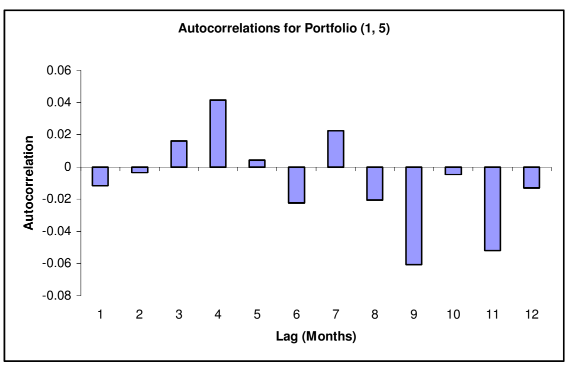
*Portfolio (*i*, *j*) refers to the portfolio of the *i*th quintile of market equity and the *j*th quintile of book-to-market equity.

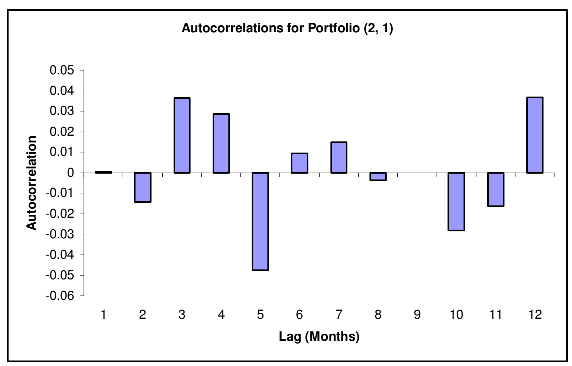


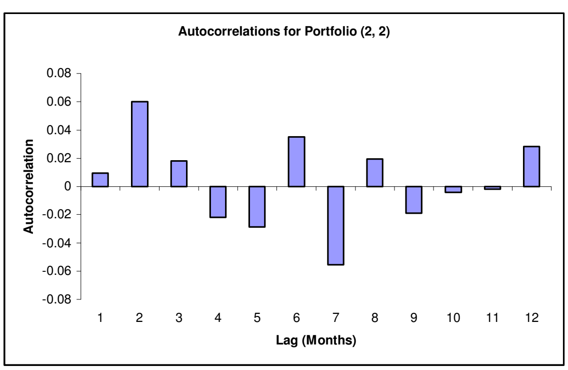


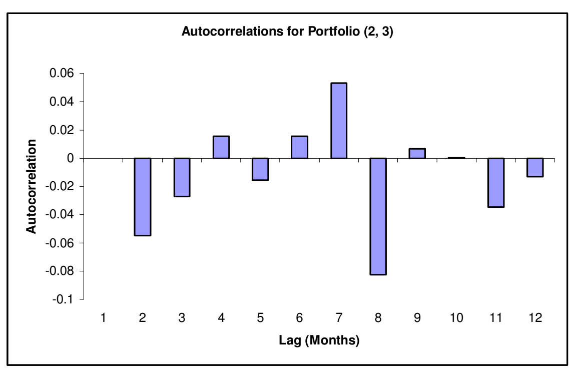












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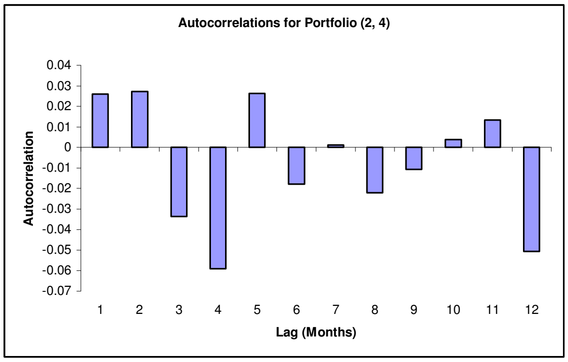

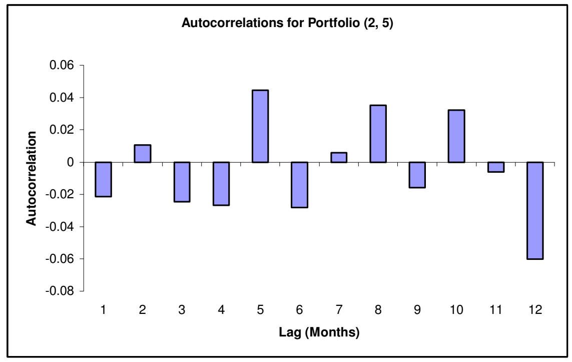

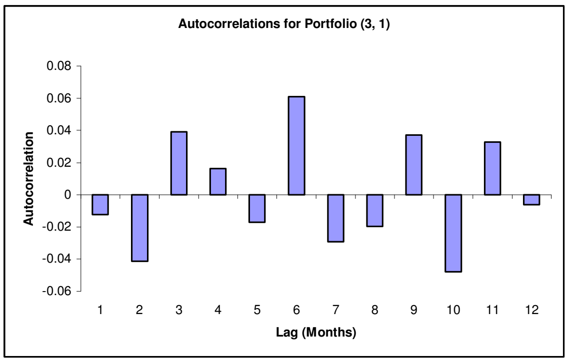

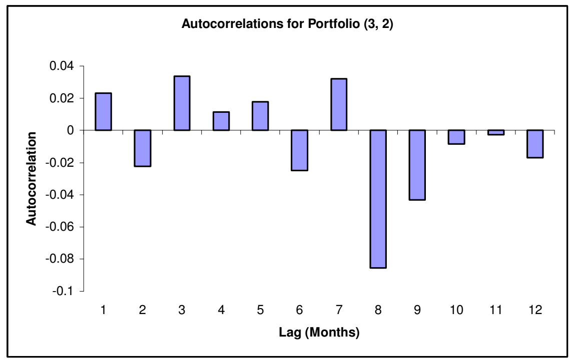

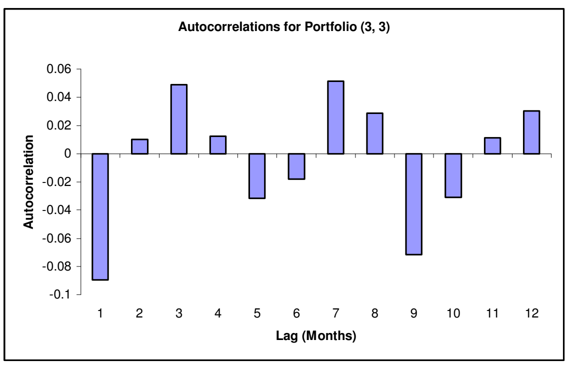

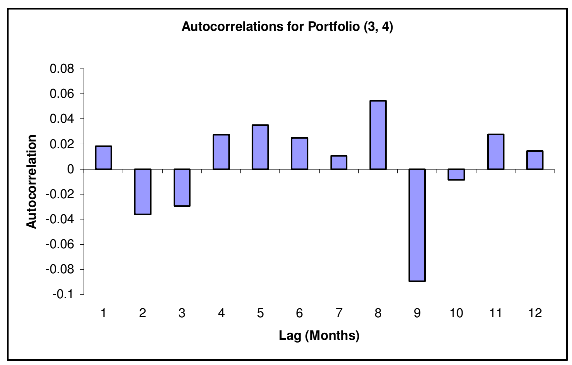

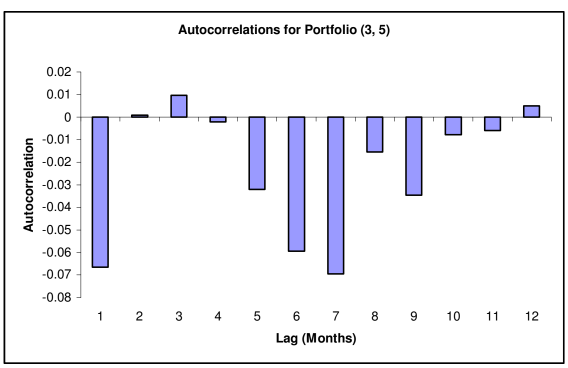

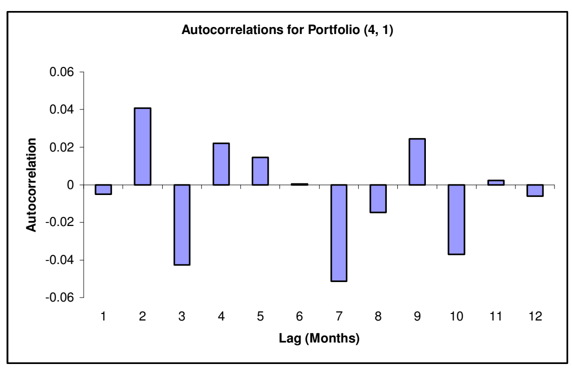

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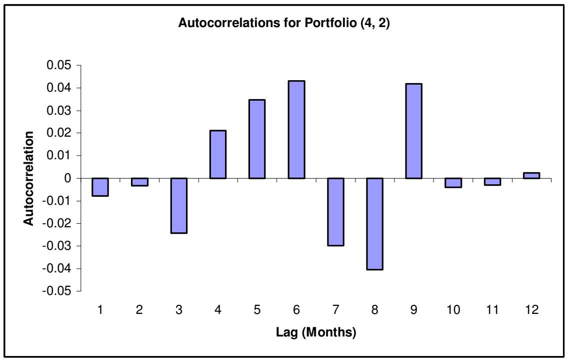

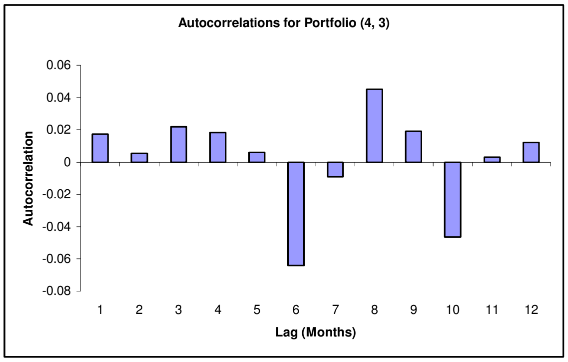

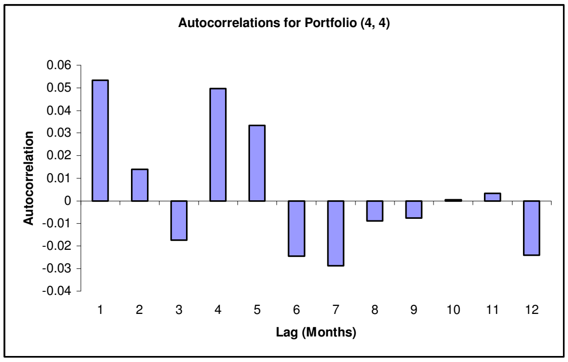

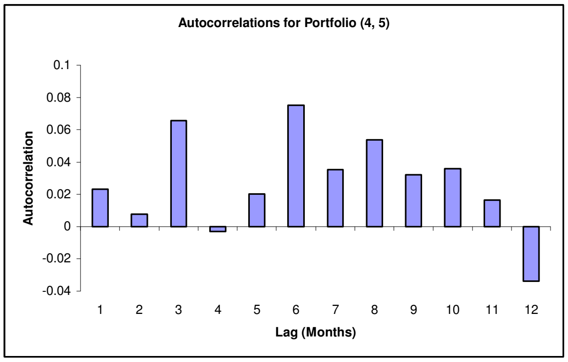

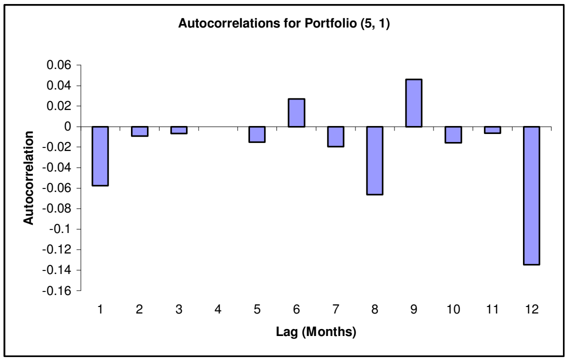

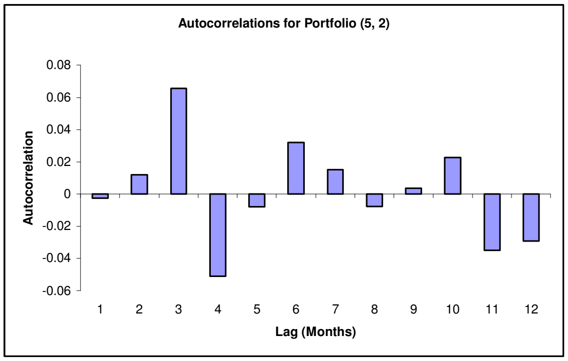

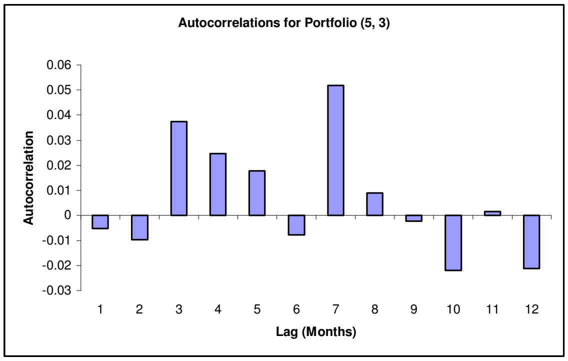

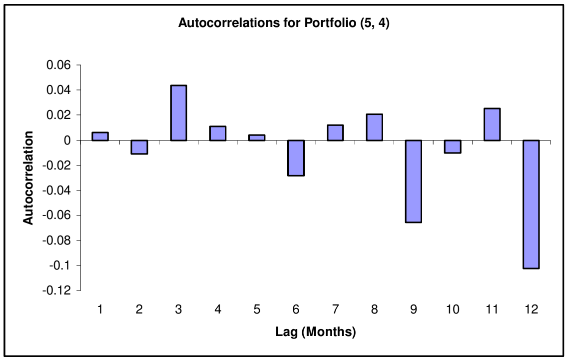

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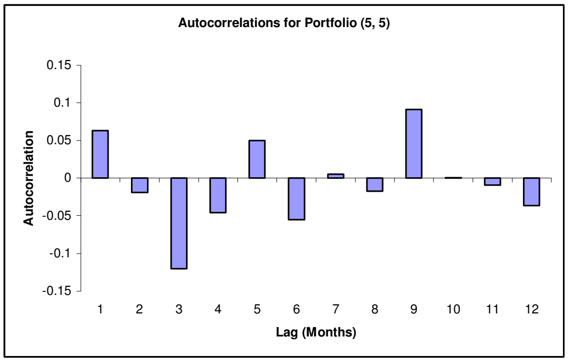
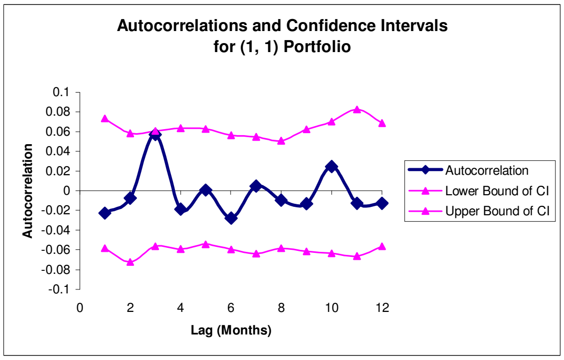
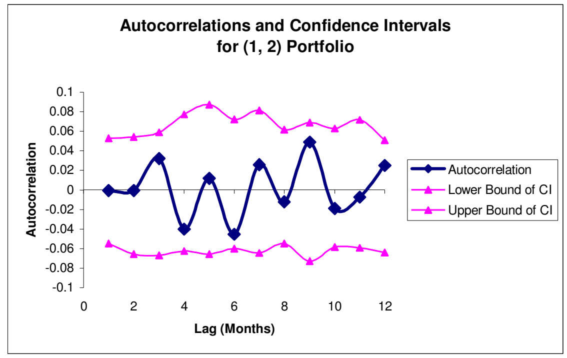
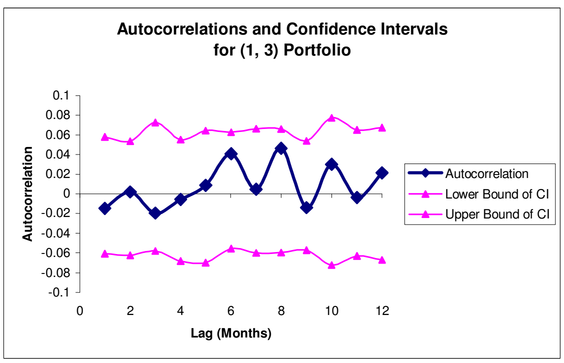


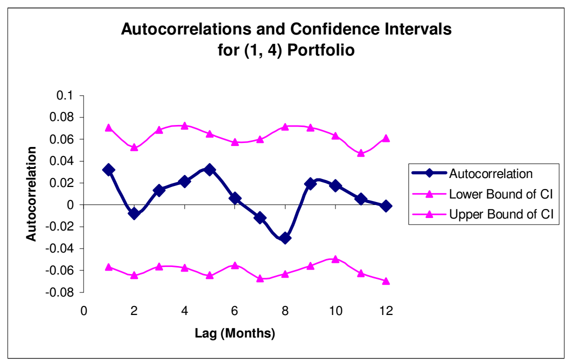
Appendix 2: Autocorrelations and Confidence Intervals for 25 Fama French Portfolios

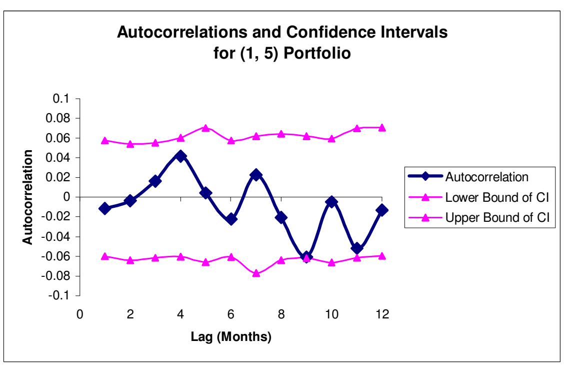
*Portfolio (*i, j*) refers to the portfolio of the *i*th quintile of market equity and the *j*th quintile of book-to-market equity.

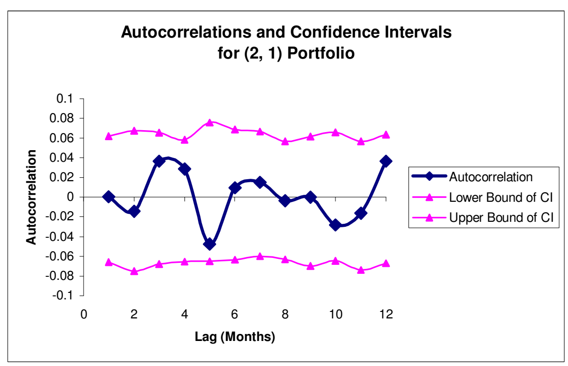


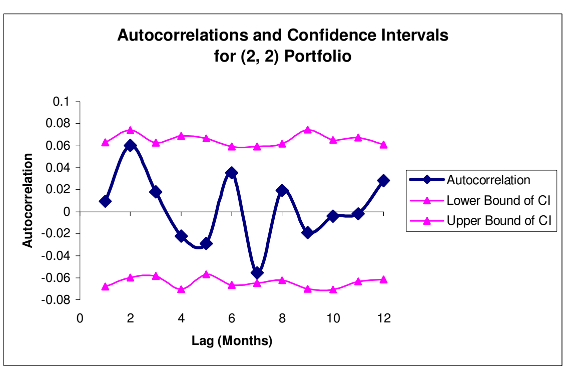


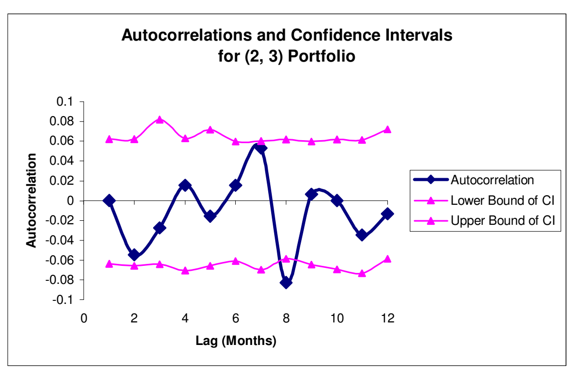




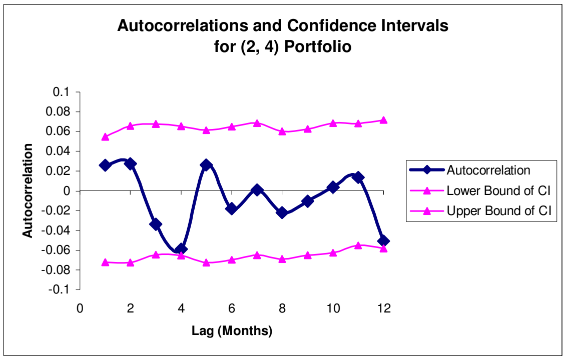


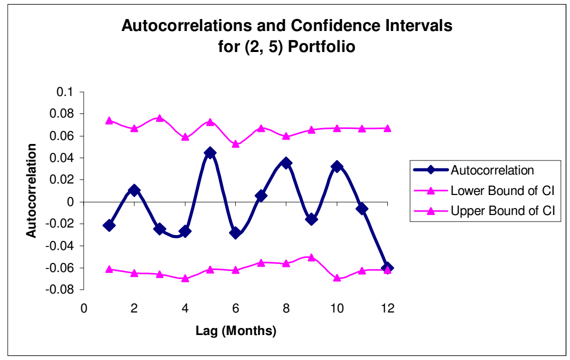


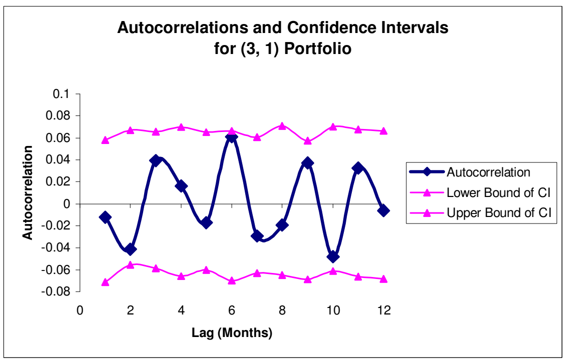


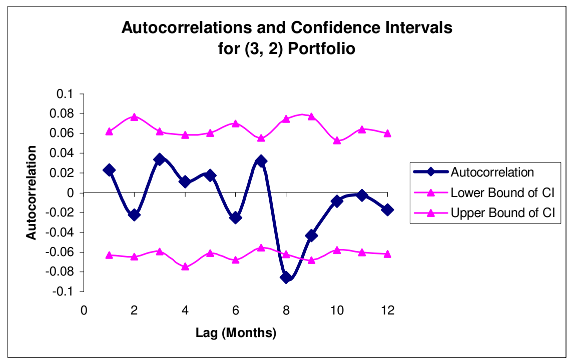


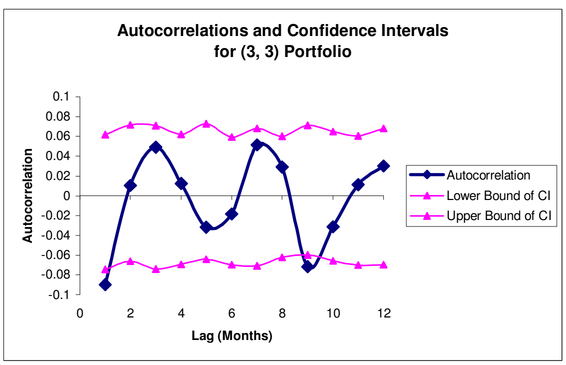
Appendix 2 (continued)

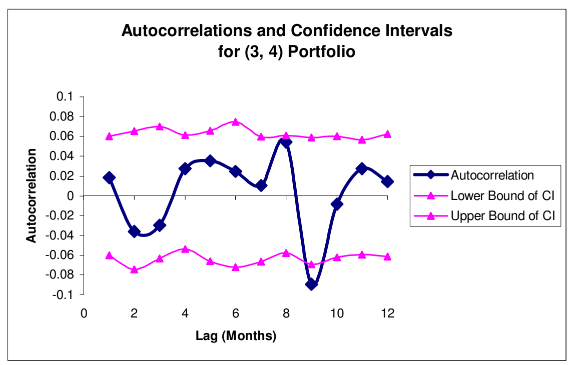


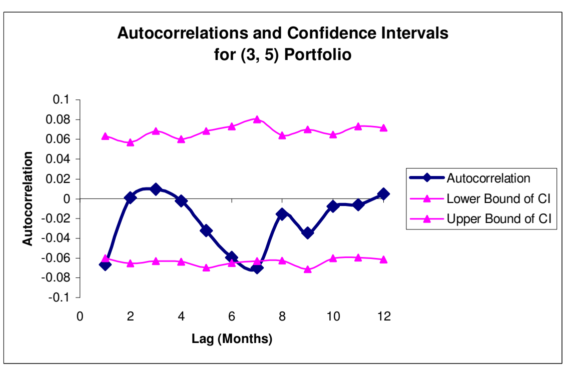


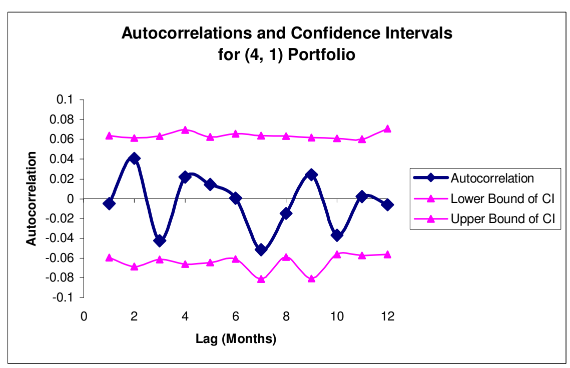




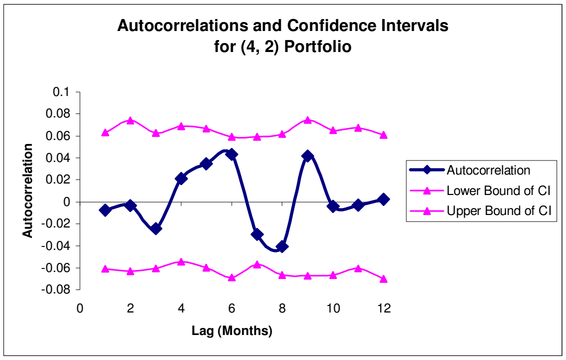


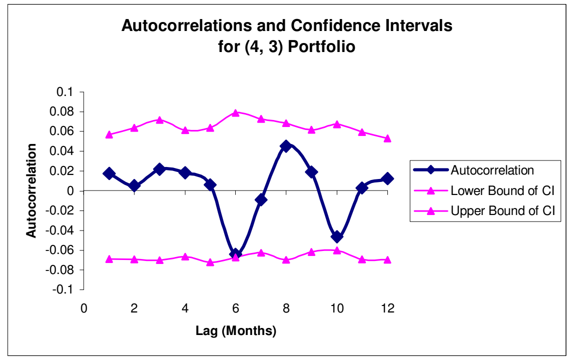


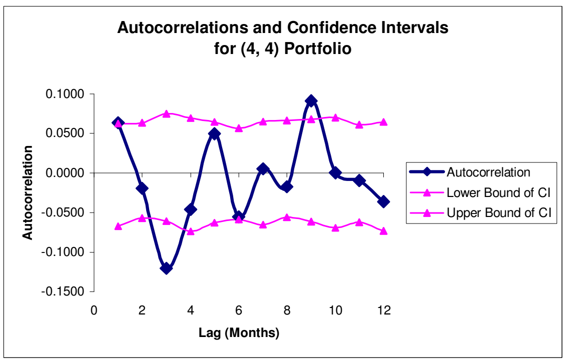


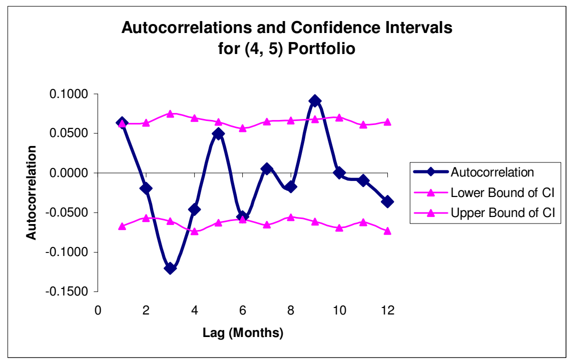


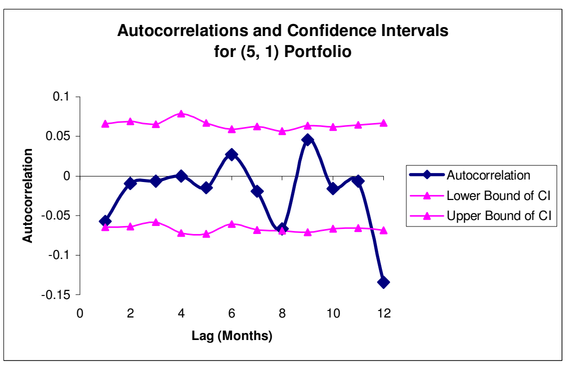
Appendix 2 (continued)

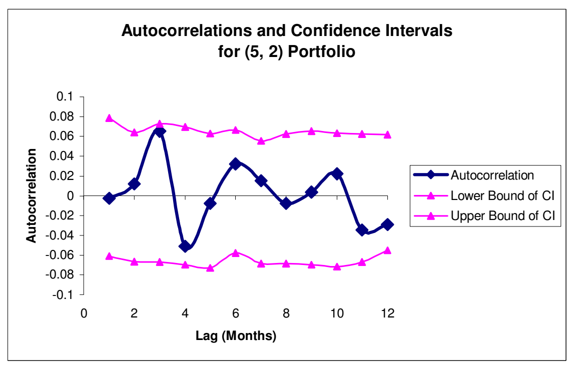


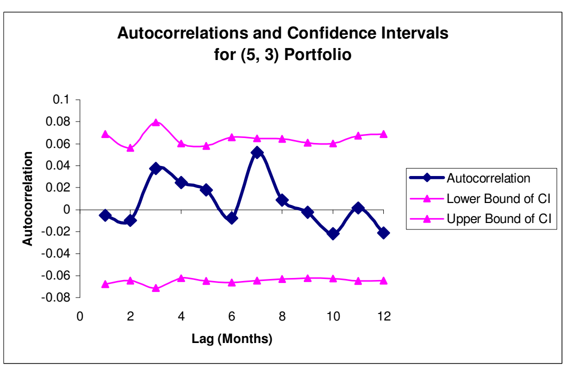


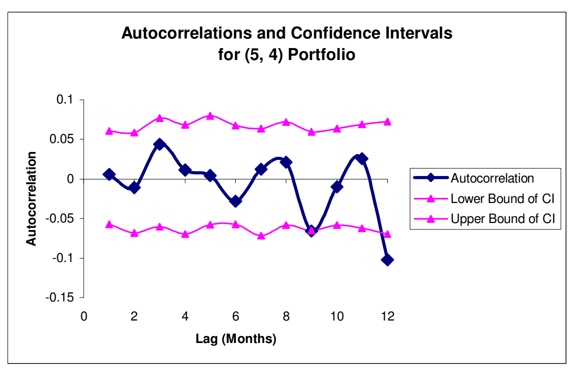




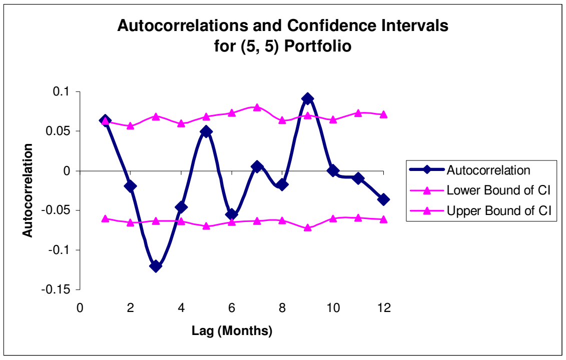








Appendix 2 (continued)



Appendix 3a: Autocorrelations and Confidence Intervals for 25 Fama French Portfolios using Prewar Data

*ME – Market Equity, ME/BE – Market-to-Book Equity. The quintile naming scheme is as discussed on Page 2. Significant autocorrelations are bolded.

ME: Small

BE/ME: Low

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	0.0828	-0.1136	0.1289
2	-0.0511	-0.1187	0.1336
3	-0.1057	-0.1270	0.1217
4	-0.0036	-0.1145	0.1363
5	-0.0078	-0.1202	0.1245
6	-0.0204	-0.1320	0.1284
7	0.0633	-0.1083	0.1132
8	-0.0282	-0.1062	0.1340
9	-0.0106	-0.1268	0.1288
10	-0.0786	-0.1262	0.1224
11	-0.0987	-0.1266	0.1388
12	0.0029	-0.1215	0.1447

BE/ME: 40%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	-0.0983	-0.1155	0.1613
2	0.0217	-0.1148	0.1151
3	0.0410	-0.1260	0.1050
4	-0.0516	-0.1221	0.1393
5	**0.1496**	-0.1205	0.1283
6	0.0412	-0.1082	0.1255
7	-0.0661	-0.1106	0.1249
8	0.0612	-0.1211	0.1317
9	-0.0285	-0.1095	0.1565
10	0.0092	-0.1058	0.1504
11	0.0816	-0.1213	0.1411
12	-0.0847	-0.1126	0.1310

BE/ME: 60%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	-0.0922	-0.1244	0.1099
2	-0.0115	-0.1213	0.1038
3	0.0349	-0.1326	0.1312
4	0.0026	-0.1244	0.1392
5	-0.0277	-0.1318	0.1449
6	0.0998	-0.1228	0.1256
7	0.0213	-0.1073	0.1388
8	0.0343	-0.1266	0.1327
9	-0.0735	-0.1248	0.1545
10	-0.0688	-0.1145	0.1347
11	-0.0524	-0.1292	0.1154
12	-0.0559	-0.1358	0.1212

BE/ME: 80%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	-0.0739	-0.1216	0.1299
2	0.0382	-0.1230	0.1425
3	-0.0094	-0.1157	0.1232
4	0.0307	-0.1179	0.1262
5	-0.0512	-0.1160	0.1406
6	0.0140	-0.1246	0.1268
7	-0.0291	-0.1169	0.1237
8	-0.0444	-0.1333	0.1177
9	-0.1000	-0.1233	0.1768
10	**-0.1721**	-0.1429	0.1395
11	0.0109	-0.1262	0.1177
12	0.0382	-0.1163	0.1150

BE/ME: High

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	0.0730	-0.1334	0.1141
2	-0.1062	-0.1199	0.1372
3	-0.0160	-0.1251	0.1366
4	-0.0042	-0.1240	0.1320
5	0.0529	-0.1165	0.1568
6	-0.0053	-0.1178	0.1475
7	-0.0309	-0.1053	0.1349
8	**0.1767**	-0.1002	0.1618
9	0.0647	-0.1226	0.1328
10	-0.0497	-0.1255	0.1150
11	-0.0080	-0.1230	0.1291
12	0.0024	-0.1170	0.1316

ME: 40%

BE/ME: Low

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	0.0361	-0.1228	0.1327
2	**-0.1312**	-0.1305	0.1133
3	0.0129	-0.1244	0.1294
4	-0.1050	-0.1241	0.1296
5	-0.0130	-0.1266	0.1168
6	-0.0035	-0.1412	0.1179
7	0.0218	-0.1283	0.1233
8	0.0051	-0.1321	0.1028
9	0.0346	-0.1301	0.1182
10	-0.0540	-0.1174	0.1227
11	-0.0832	-0.1131	0.1455
12	0.0662	-0.1179	0.1224

BE/ME: 40%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	0.0781	-0.1157	0.1285
2	0.0121	-0.1085	0.1364
3	0.0452	-0.1176	0.1304
4	0.0035	-0.1115	0.1085
5	-0.0447	-0.1223	0.1393
6	0.0788	-0.1053	0.1399
7	0.0374	-0.1388	0.1582
8	0.0748	-0.1325	0.1378
9	-0.1274	-0.1316	0.1446
10	-0.0093	-0.1267	0.1106
11	-0.0803	-0.1432	0.1218
12	-0.0812	-0.1282	0.1159

BE/ME: 60%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	-0.0663	-0.1159	0.1251
2	-0.0512	-0.1109	0.1340
3	-0.0650	-0.1139	0.1306
4	-0.0295	-0.1202	0.1516
5	-0.0770	-0.1076	0.1234
6	-0.0661	-0.1093	0.1270
7	0.0449	-0.1312	0.1341
8	-0.0204	-0.1088	0.1387
9	-0.0632	-0.1320	0.1675
10	0.0726	-0.1224	0.1213
11	-0.0463	-0.1239	0.1529
12	0.0448	-0.1310	0.1264

BE/ME: 80%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	0.0061	-0.1306	0.1386
2	-0.0122	-0.1190	0.1277
3	0.0561	-0.1206	0.1096
4	0.0211	-0.1227	0.1303
5	**-0.1640**	-0.1173	0.1516
6	-0.0474	-0.1265	0.1253
7	-0.0111	-0.1388	0.1384
8	-0.0118	-0.1177	0.1252
9	-0.0684	-0.1207	0.1220
10	0.0852	-0.1347	0.1195
11	0.0599	-0.1361	0.1158
12	0.0298	-0.1188	0.1248

BE/ME: High

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	-0.1229	-0.1503	0.1384
2	-0.0080	-0.1273	0.1034
3	0.0100	-0.1380	0.1237
4	0.0003	-0.1166	0.1218
5	0.0386	-0.1234	0.1145
6	-0.1211	-0.1211	0.1290
7	0.0582	-0.1135	0.1199
8	-0.1127	-0.1434	0.1215
9	0.0965	-0.1222	0.1551
10	-0.0382	-0.1204	0.1287
11	-0.0578	-0.1308	0.1399
12	**0.1665**	-0.1348	0.1221

ME: 60%

BE/ME: Low

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	-0.1078	-0.1349	0.1234
2	0.0269	-0.1214	0.1287
3	-0.0974	-0.1299	0.1395
4	0.0055	-0.1073	0.1133
5	-0.0863	-0.1129	0.1692
6	0.0951	-0.1116	0.1317
7	-0.0847	-0.1213	0.1233
8	0.0538	-0.1255	0.1251
9	-0.0669	-0.1251	0.1288
10	0.0513	-0.1365	0.1402
11	-0.0012	-0.1265	0.1281
12	-0.0768	-0.1325	0.1321

BE/ME: 40%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	-0.0329	-0.1312	0.1277
2	0.0224	-0.1192	0.1202
3	0.0369	-0.1082	0.1181
4	-0.0054	-0.1287	0.1186
5	-0.0523	-0.1066	0.1215
6	0.1090	-0.1466	0.1125
7	0.0079	-0.1319	0.1310
8	0.0089	-0.1268	0.1293
9	-0.0423	-0.1381	0.1288
10	-0.0626	-0.1150	0.1073
11	-0.0472	-0.1299	0.1160
12	-0.0005	-0.1120	0.1444

BE/ME: 60%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	0.0759	-0.1119	0.1059
2	-0.0558	-0.1222	0.1406
3	0.0891	-0.1282	0.1226
4	0.0277	-0.1192	0.1246
5	-0.0601	-0.1101	0.1208
6	-0.0140	-0.1150	0.1525
7	0.0519	-0.1483	0.1035
8	-0.0238	-0.1200	0.1297
9	-0.0437	-0.1344	0.1230
10	-0.0248	-0.1400	0.1522
11	-0.0174	-0.1337	0.1355
12	-0.0313	-0.1206	0.1458

BE/ME: 80%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	-0.0079	-0.1154	0.1177
2	0.0360	-0.1203	0.1100
3	0.0695	-0.1393	0.1558
4	-0.0182	-0.1407	0.1319
5	0.0994	-0.1103	0.1223
6	-0.0174	-0.1153	0.1332
7	-0.0293	-0.1194	0.1399
8	0.0602	-0.1237	0.1260
9	-0.0006	-0.1257	0.1129
10	**0.1350**	-0.1422	0.1157
11	-0.0164	-0.1308	0.1170
12	**-0.1479**	-0.1328	0.1595

BE/ME: High

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	-0.0175	-0.1162	0.1291
2	-0.0681	-0.1170	0.1075
3	0.0198	-0.1132	0.1381
4	0.0014	-0.1178	0.1397
5	0.0164	-0.1148	0.1446
6	0.0178	-0.1302	0.1607
7	-0.0346	-0.1183	0.1605
8	-0.1018	-0.1231	0.1192
9	0.0111	-0.1227	0.1554
10	-0.0100	-0.1487	0.1374
11	0.0135	-0.1209	0.1341
12	-0.0836	-0.1245	0.1306

ME: 80%

BE/ME: Low

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	**0.1187**	-0.1293	0.1156
2	-0.0952	-0.1057	0.1485
3	-0.0344	-0.1257	0.1050
4	0.0427	-0.1290	0.1318
5	0.0017	-0.1226	0.1147
6	-0.0791	-0.1460	0.1312
7	0.0236	-0.1252	0.1299
8	-0.0775	-0.1380	0.1153
9	-0.1256	-0.1256	0.1212
10	**-0.1482**	-0.1207	0.1220
11	-0.0939	-0.1236	0.1199
12	0.0365	-0.1646	0.1259

BE/ME: 40%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	0.0966	-0.1230	0.1266
2	**0.1344**	-0.1080	0.1171
3	**0.1560**	-0.1090	0.1389
4	**0.1480**	-0.1100	0.1153
5	0.1062	-0.1295	0.1318
6	**0.1156**	-0.1222	0.1084
7	**0.1332**	-0.1233	0.1192
8	0.0899	-0.1402	0.1432
9	-0.0318	-0.1227	0.1118
10	0.1272	-0.1264	0.1274
11	-0.0266	-0.1292	0.1043
12	0.0817	-0.1170	0.1331

BE/ME: 60%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	-0.0450	-0.1287	0.1072
2	0.0236	-0.1216	0.1315
3	0.0518	-0.1198	0.1146
4	-0.0328	-0.1184	0.1183
5	-0.0915	-0.1203	0.1237
6	-0.0372	-0.1366	0.1256
7	-0.0307	-0.1216	0.1253
8	-0.0635	-0.1237	0.1214
9	-0.0220	-0.1399	0.1341
10	-0.0864	-0.1166	0.1183
11	0.0456	-0.1354	0.1107
12	-0.0764	-0.1240	0.1291

BE/ME: 80%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	**-0.1242**	-0.1119	0.1497
2	0.0590	-0.1424	0.1224
3	-0.1122	-0.1287	0.1144
4	0.0748	-0.1234	0.1144
5	-0.0101	-0.1064	0.1219
6	0.0063	-0.1392	0.1349
7	-0.0372	-0.1290	0.1401
8	0.0147	-0.1166	0.1366
9	0.0671	-0.1235	0.1161
10	-0.0477	-0.1242	0.1237
11	0.0399	-0.1142	0.1255
12	-0.0388	-0.1338	0.1158

BE/ME: High

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	-0.0032	-0.1285	0.1337
2	-0.0427	-0.1109	0.1261
3	0.0848	-0.1298	0.1256
4	0.0413	-0.1357	0.1197
5	0.0187	-0.1210	0.1229
6	0.0554	-0.1187	0.1350
7	0.0268	-0.1304	0.1452
8	0.0676	-0.1190	0.1227
9	0.0535	-0.1423	0.1433
10	-0.0687	-0.1266	0.1252
11	-0.0245	-0.1264	0.1313
12	0.0583	-0.1201	0.1476

ME: Big

BE/ME: Low

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	-0.0023	-0.1160	0.1223
2	-0.0636	-0.1303	0.1268
3	0.0046	-0.1373	0.1018
4	0.0857	-0.1152	0.1274
5	-0.0006	-0.1229	0.1424
6	0.0001	-0.1179	0.1324
7	0.0396	-0.1211	0.1039
8	-0.0235	-0.1229	0.1165
9	-0.0695	-0.1139	0.1128
10	0.0651	-0.1395	0.1201
11	0.0351	-0.1182	0.1293
12	0.0372	-0.1325	0.1241

BE/ME: 40%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	0.1043	-0.1220	0.1085
2	**-0.1709**	-0.1348	0.1214
3	-0.0451	-0.1425	0.1179
4	-0.0234	-0.1256	0.1211
5	0.0883	-0.1069	0.1293
6	0.0507	-0.1277	0.1144
7	-0.0054	-0.1263	0.1176
8	-0.1168	-0.1249	0.1254
9	-0.1310	-0.1377	0.1206
10	-0.0246	-0.1392	0.1231
11	0.0508	-0.1559	0.1193
12	0.0808	-0.1190	0.1615

BE/ME: 60%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	-0.0137	-0.1403	0.1213
2	0.0167	-0.1369	0.1336
3	-0.0221	-0.1278	0.1176
4	-0.0131	-0.1139	0.1545
5	-0.1173	-0.1294	0.1206
6	0.0651	-0.1367	0.1446
7	**0.1335**	-0.1116	0.1334
8	-0.0259	-0.1466	0.1118
9	-0.1297	-0.1334	0.1261
10	0.0378	-0.1280	0.1009
11	-0.0610	-0.1545	0.1088
12	-0.0364	-0.1280	0.1099

BE/ME: 80%

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	0.0471	-0.1206	0.1302
2	0.0260	-0.1251	0.1231
3	-0.0554	-0.1130	0.1379
4	-0.0626	-0.1182	0.1400
5	0.0469	-0.1199	0.1106
6	0.0723	-0.1440	0.1258
7	0.0967	-0.1166	0.1335
8	0.0316	-0.1412	0.1106
9	0.0522	-0.1363	0.1226
10	0.0017	-0.1139	0.1232
11	-0.0719	-0.1391	0.1388
12	0.1034	-0.1197	0.1061

BE/ME: High

Lag	Autocorrelation	Confidence Interval Lower Bound	Confidence Interval Upper Bound
1	-0.0022	-0.1359	0.1297
2	-0.0680	-0.1033	0.1489
3	0.0208	-0.1225	0.1512
4	-0.0159	-0.1147	0.1335
5	-0.0535	-0.1065	0.1314
6	0.0036	-0.1246	0.1498
7	-0.0631	-0.1215	0.1380
8	-0.0023	-0.1055	0.1426
9	-0.0266	-0.1128	0.1194
10	0.0057	-0.1270	0.1360
11	0.0078	-0.1074	0.1322
12	-0.0467	-0.1175	0.1542

Appendix 3b: Autocorrelations and Confidence Intervals for 25 Fama French Portfolios using Postwar Data

*ME – Market Equity, ME/BE – Market-to-Book Equity. The quintile naming scheme is as discussed on Page 2. Significant autocorrelations are bolded.

ME: Small

BE/ME: Low

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	0.0001	-0.0762	0.0735
2	0.0419	-0.0713	0.0677
3	-0.0034	-0.0841	0.0723
4	-0.0462	-0.0834	0.0715
5	0.0503	-0.0713	0.0707
6	0.0467	-0.0777	0.0657
7	-0.0218	-0.0742	0.0750
8	-0.0520	-0.0703	0.0837
9	0.0065	-0.0764	0.0726
10	0.0131	-0.0797	0.0736
11	-0.0247	-0.0601	0.0871
12	0.0106	-0.0797	0.0795

BE/ME: 40%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	-0.0023	-0.0747	0.0627
2	-0.0100	-0.0794	0.0818
3	0.0262	-0.0763	0.0736
4	0.0144	-0.0858	0.0734
5	0.0318	-0.0680	0.0780
6	-0.0190	-0.0728	0.0801
7	-0.0259	-0.0741	0.0798
8	-0.0414	-0.0818	0.0814
9	-0.0094	-0.0830	0.0842
10	**-0.1077**	-0.0810	0.0729
11	**0.1616**	-0.0694	0.0749
12	-0.0001	-0.0789	0.0749

BE/ME: 60%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	0.0420	-0.0722	0.0668
2	-0.0382	-0.0721	0.0718
3	-0.0741	-0.0773	0.0772
4	0.0377	-0.0802	0.0798
5	0.0509	-0.0615	0.0819
6	-0.0258	-0.0736	0.0673
7	0.0068	-0.0901	0.0788
8	0.0216	-0.0716	0.0826
9	-0.0370	-0.0834	0.0758
10	0.0177	-0.0739	0.0781
11	-0.0145	-0.0858	0.0841
12	-0.0447	-0.0898	0.0753

BE/ME: 80%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	-0.0366	-0.0735	0.0676
2	-0.0164	-0.0738	0.0971
3	0.0534	-0.0745	0.0733
4	-0.0022	-0.0822	0.0875
5	0.0119	-0.0805	0.0745
6	0.0100	-0.0745	0.0721
7	0.0363	-0.0887	0.0839
8	0.0293	-0.0730	0.0687
9	0.0419	-0.0824	0.0749
10	-0.0626	-0.0748	0.0813
11	0.0302	-0.0854	0.0740
12	**0.1021**	-0.0774	0.0881

BE/ME: High

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	0.0752	-0.0764	0.0752
2	0.0386	-0.0743	0.0809
3	0.0470	-0.0722	0.0727
4	-0.0155	-0.0840	0.0757
5	-0.0464	-0.0804	0.0862
6	0.0445	-0.0802	0.0709
7	0.0259	-0.0710	0.0729
8	-0.0410	-0.0689	0.0845
9	-0.0128	-0.0790	0.0701
10	**0.0844**	-0.0712	0.0764
11	-0.0415	-0.0698	0.0720
12	0.0330	-0.0882	0.0748

ME: 40%

BE/ME: Low

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	0.0574	-0.0753	0.0832
2	-0.0527	-0.0765	0.0727
3	-0.0396	-0.0860	0.0820
4	0.0102	-0.0761	0.0754
5	**0.0749**	-0.0770	0.0645
6	-0.0411	-0.0747	0.0726
7	0.0541	-0.0603	0.0797
8	-0.0217	-0.0750	0.0825
9	-0.0256	-0.0708	0.0654
10	-0.0449	-0.0811	0.0720
11	-0.0173	-0.0696	0.0913
12	0.0308	-0.0845	0.0658

BE/ME: 40%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	0.0034	-0.0751	0.0619
2	**-0.0961**	-0.0789	0.0870
3	-0.0071	-0.0756	0.0700
4	0.0366	-0.0834	0.0720
5	0.0032	-0.0730	0.0856
6	0.0086	-0.0671	0.0946
7	-0.0057	-0.0802	0.0723
8	-0.0088	-0.0888	0.0726
9	-0.0469	-0.0661	0.0703
10	-0.0282	-0.0754	0.0823
11	0.0331	-0.0701	0.0848
12	-0.0116	-0.0667	0.0717

BE/ME: 60%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	0.0129	-0.0838	0.0748
2	0.0136	-0.0735	0.0814
3	0.0025	-0.0717	0.0718
4	**-0.1065**	-0.0699	0.0783
5	-0.0118	-0.0806	0.0680
6	-0.0090	-0.0742	0.0727
7	-0.0003	-0.0787	0.0772
8	0.0070	-0.0743	0.0729
9	0.0687	-0.0724	0.0753
10	-0.0658	-0.0836	0.0776
11	0.0120	-0.0744	0.0682
12	-0.0244	-0.0730	0.0716

BE/ME: 80%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	-0.0559	-0.0744	0.0787
2	-0.0368	-0.0749	0.0682
3	-0.0318	-0.0755	0.0668
4	-0.0271	-0.0731	0.0742
5	-0.0666	-0.0832	0.0850
6	0.0155	-0.0730	0.0873
7	0.0256	-0.0702	0.0770
8	0.0037	-0.0762	0.0775
9	-0.0447	-0.0875	0.0771
10	0.0383	-0.0908	0.0739
11	-0.0337	-0.0794	0.0671
12	0.0070	-0.0789	0.0897

BE/ME: High

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	0.0144	-0.0747	0.0822
2	0.0311	-0.0710	0.0702
3	-0.0163	-0.0713	0.0761
4	0.0415	-0.0745	0.0731
5	-0.0044	-0.0726	0.0797
6	0.0126	-0.0703	0.0722
7	0.0095	-0.0784	0.0766
8	-0.0025	-0.0818	0.0770
9	-0.0052	-0.0718	0.0669
10	-0.0024	-0.0771	0.0798
11	-0.0359	-0.0824	0.0763
12	0.0085	-0.0799	0.0880

ME: 60%

BE/ME: Low

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	-0.0167	-0.0818	0.0770
2	-0.0121	-0.0730	0.0761
3	0.0216	-0.0755	0.0739
4	-0.0225	-0.0639	0.0721
5	-0.0208	-0.0693	0.0671
6	0.0171	-0.0765	0.0766
7	-0.0453	-0.0725	0.0825
8	0.0101	-0.0738	0.0757
9	0.0133	-0.0707	0.0810
10	-0.0500	-0.0736	0.0723
11	0.0121	-0.0786	0.0829
12	0.0534	-0.0720	0.0706

BE/ME: 40%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	-0.0110	-0.0702	0.0887
2	-0.0004	-0.0660	0.0805
3	0.0373	-0.0809	0.0699
4	0.0122	-0.0697	0.0738
5	0.0330	-0.0677	0.0668
6	-0.0782	-0.0808	0.0853
7	-0.0021	-0.0791	0.0675
8	0.0739	-0.0835	0.0786
9	-0.0176	-0.0869	0.0835
10	-0.0127	-0.0784	0.0643
11	-0.0003	-0.0696	0.0592
12	0.0316	-0.0798	0.0785

BE/ME: 60%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	-0.0342	-0.0735	0.0874
2	0.0261	-0.0759	0.0797
3	-0.0180	-0.0872	0.0781
4	-0.0412	-0.0838	0.0817
5	0.0265	-0.0741	0.0724
6	-0.0047	-0.0817	0.0872
7	-0.0100	-0.0730	0.0728
8	0.0358	-0.0750	0.0742
9	-0.0162	-0.0648	0.0804
10	-0.0106	-0.0794	0.0758
11	0.0110	-0.0627	0.0689
12	-0.0216	-0.0758	0.0816

BE/ME: 80%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	**-0.0837**	-0.0706	0.0753
2	-0.0315	-0.0700	0.0709
3	0.0595	-0.0694	0.0739
4	0.0059	-0.0757	0.0677
5	0.0338	-0.0743	0.0655
6	-0.0395	-0.0732	0.0742
7	0.0149	-0.0745	0.0744
8	0.0319	-0.0820	0.0632
9	-0.0402	-0.0671	0.0799
10	0.0480	-0.0694	0.0726
11	-0.0672	-0.0788	0.0773
12	-0.0121	-0.0852	0.0801

BE/ME: High

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	**0.0819**	-0.0813	0.0651
2	-0.0435	-0.0908	0.0875
3	-0.0277	-0.0787	0.0763
4	**-0.0919**	-0.0762	0.0763
5	-0.0381	-0.0745	0.0941
6	-0.0188	-0.0758	0.0803
7	-0.0037	-0.0755	0.0730
8	-0.0271	-0.0857	0.0877
9	0.0290	-0.0839	0.0764
10	0.0121	-0.0759	0.0767
11	-0.0246	-0.0744	0.0573
12	-0.0095	-0.0658	0.0781

ME: 80%

BE/ME: Low

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	0.0327	-0.0841	0.0638
2	0.0318	-0.0718	0.0611
3	0.0007	-0.0692	0.0790
4	-0.0400	-0.0773	0.0696
5	0.0235	-0.0704	0.0757
6	0.0326	-0.0670	0.0838
7	-0.0091	-0.0783	0.0748
8	-0.0127	-0.0857	0.0744
9	0.0209	-0.0682	0.0758
10	0.0728	-0.0767	0.0737
11	-0.0142	-0.0672	0.0808
12	0.0034	-0.0746	0.0852

BE/ME: 40%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	0.0068	-0.0666	0.0664
2	-0.0425	-0.0715	0.0848
3	-0.0154	-0.0801	0.0684
4	-0.0243	-0.0816	0.0602
5	0.0250	-0.0748	0.0797
6	-0.0518	-0.0761	0.0728
7	-0.0130	-0.0896	0.0735
8	**0.0914**	-0.0729	0.0866
9	0.0209	-0.0717	0.0757
10	-0.0230	-0.0816	0.0690
11	-0.0580	-0.0851	0.0732
12	-0.0062	-0.0787	0.0787

BE/ME: 60%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	0.0404	-0.0839	0.0766
2	0.0102	-0.0687	0.0798
3	**0.0759**	-0.0698	0.0632
4	-0.0184	-0.0713	0.0809
5	0.0219	-0.0744	0.0796
6	0.0094	-0.0769	0.0751
7	-0.0511	-0.0749	0.0721
8	0.0082	-0.0729	0.0780
9	0.0543	-0.0753	0.0712
10	0.0582	-0.0775	0.0794
11	0.0012	-0.0718	0.0809
12	-0.0242	-0.0727	0.0879

BE/ME: 80%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	-0.0396	-0.0757	0.0790
2	-0.0586	-0.0840	0.0641
3	-0.0171	-0.0716	0.0697
4	0.0314	-0.0848	0.0772
5	0.0499	-0.0592	0.0747
6	-0.0002	-0.0774	0.0745
7	-0.0146	-0.0771	0.0693
8	0.0117	-0.0728	0.0768
9	-0.0330	-0.0808	0.0763
10	-0.0397	-0.0719	0.0723
11	0.0560	-0.0827	0.0724
12	0.0069	-0.0742	0.0807

BE/ME: High

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	0.0411	-0.0745	0.0632
2	0.0496	-0.0635	0.0718
3	-0.0363	-0.0696	0.0760
4	-0.0196	-0.0746	0.0758
5	-0.0180	-0.0709	0.0662
6	-0.0202	-0.0925	0.0747
7	0.0728	-0.0729	0.0764
8	0.0040	-0.0793	0.0791
9	-0.0208	-0.0715	0.0793
10	0.0301	-0.0689	0.0769
11	-0.0297	-0.0783	0.0644
12	0.0496	-0.0756	0.0696

ME: Big

BE/ME: Low

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	-0.0081	-0.0792	0.0904
2	0.0584	-0.0781	0.0704
3	0.0550	-0.0798	0.0881
4	-0.0346	-0.0668	0.0753
5	-0.0435	-0.0779	0.0771
6	**0.0982**	-0.0783	0.0775
7	0.0748	-0.0790	0.0840
8	0.0165	-0.0689	0.0793
9	**0.1273**	-0.0749	0.0821
10	0.0043	-0.0774	0.0808
11	-0.0199	-0.0697	0.0793
12	-0.0534	-0.0892	0.0813

BE/ME: 40%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	-0.0004	-0.0847	0.0846
2	-0.0402	-0.0708	0.0673
3	-0.0219	-0.0776	0.0828
4	0.0031	-0.0759	0.0797
5	0.0021	-0.0871	0.0746
6	**0.0881**	-0.0858	0.0712
7	-0.0483	-0.0827	0.0745
8	-0.0440	-0.0832	0.0706
9	0.0451	-0.0690	0.0650
10	0.0010	-0.0746	0.0770
11	-0.0130	-0.0748	0.0821
12	-0.0090	-0.0836	0.0732

BE/ME: 60%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	0.0129	-0.0715	0.0815
2	**0.0874**	-0.0723	0.0760
3	-0.0686	-0.0738	0.0792
4	-0.0229	-0.0704	0.0758
5	-0.0509	-0.0675	0.0881
6	-0.0280	-0.0656	0.0714
7	0.0082	-0.0687	0.0776
8	-0.0018	-0.0804	0.0820
9	0.0165	-0.0640	0.0752
10	0.0085	-0.0733	0.0813
11	0.0178	-0.0886	0.0664
12	0.0249	-0.0857	0.0868

BE/ME: 80%

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	-0.0537	-0.0714	0.0798
2	0.0313	-0.0702	0.0703
3	-0.0441	-0.0647	0.0691
4	**0.1148**	-0.0658	0.0712
5	0.0050	-0.0852	0.0890
6	0.0139	-0.0743	0.0704
7	-0.0569	-0.0686	0.0781
8	0.0072	-0.0717	0.0796
9	0.0090	-0.0678	0.0833
10	-0.0541	-0.0811	0.0649
11	-0.0264	-0.0767	0.0773
12	0.0448	-0.0880	0.0861

BE/ME: High

Lag	Autocorrelation	Confidence Interval	
		Lower Bound	Upper Bound
1	0.0228	-0.0721	0.0797
2	0.0201	-0.0737	0.0798
3	0.0057	-0.0670	0.0870
4	-0.0456	-0.0808	0.0811
5	0.0333	-0.0719	0.0762
6	-0.0582	-0.0712	0.0732
7	-0.0486	-0.0652	0.0653
8	-0.0102	-0.0699	0.0688
9	-0.0619	-0.0672	0.0859
10	0.0231	-0.0605	0.0766
11	0.0053	-0.0748	0.0727
12	-0.0056	-0.0803	0.0798