Chapter 8

Concluding Remarks

The primary subject of the preceding chapters has been the Taiwan stock market, a relatively isolated and little-studied market. Thus, one of the contributions of this research has been simply to provide additional information about this market. As the primary stock market for a developing economy, the Taiwan stock market shares a number of features with other developing stock markets, including extremely high volatility. But one of the key findings of the preceding chapters has been that, despite its relative financial isolation, the Taiwan stock market also shares many similarities with the markets of most developed countries, including exhibiting similar types of departures from the paradigm of a normal random walk. One of these similar departures is in terms of normality. As with most other financial time series, the returns for the Taiex are leptokurtic. However, the daily price limits imposed by the Taiwan Stock Exchange truncate the returns for individual stocks and limit the degree of kurtosis exhibited by the Taiex returns. As the price limits have been widened over recent years, the extent of truncation has been lessened, and kurtosis levels have risen commensurately.

Another departure from normal random walk behavior that is shared by both the Taiex returns and the returns of most financial time series and that can generate leptokurtic return distributions was the focus of Chapter Four. This departure is nonlinearity, or nonlinear serial dependence. And the results of Chapter Four provide an indication of just how pervasive and important a feature of financial time series such dependencies are. Despite its relative financial isolation for the period studied, including, on a macro scale, currency controls on foreign exchange with the island and, on a micro scale, a lack of any futures or options markets to generate any inter-market feedback effects, virtually all of the stocks trading on the Taiwan Stock Exchange exhibit nonlinearity of some form. This finding suggests that nonlinearity is an inherent feature of financial time series.

The results of Chapter Five, however, suggest an even more complicated picture. The serial dependencies for the Taiex returns, as well as for the returns of most of the individual Taiwanese stocks, do not seem to be stable. Rather, they appear to change in structure over time, displaying numerous brief episodes of very strong but transient dependencies. The effects of the TSE's price limits can explain some of the changes in the autocorrelation structure, but the changes in the nonlinear serial dependency structures do not seem to fit any ready explanations. But until such explanations are forthcoming, this nonstationarity would render futile most attempts to utilize or take advantage of the nonlinear serial dependency structure as it exists at any point in time.

Chapters Six and Seven explore the effects of trying to impose a meaningful empirical structure on the returns of a subsample of individual Taiwanese stocks and on the returns for the Taiex, along with the returns of five other stock indices included for comparison. While these results suggest that there are some empirical regularities within some of these sets of returns, for many of these series, including index return series as well as individual stock return series, the results obtained are completely dependent upon the model used to examine the returns. These results indicate the importance for inferential purposes of properly accounting for the statistical features of the data sets being examined, especially the nonlinearity exhibited by such data sets. In general, the popular GARCH models seem to be effective as a sort of "generic nonlinear deconvolver" to capture and eliminate the nonlinearity within many of these data sets. However, even within the narrower range of this class of models, the specific inferences obtained depend of the exact specification used, such as Normal GARCH versus Student's t GARCH. Furthermore, the results obtained for each of these models appear to reflect nonstationarities within the data, which could be driving the extremely high levels of volatility persistence that are found in most cases.

Of course, the results already presented are not the end of the story, but only provide an introduction to new lines of research. The results from Chapter Seven illustrate the need to continue examining the effects of alternative model specifications on empirical results. One readily applicable model that has not yet been examined but that has been found useful for other sets of stock returns is the EGARCH, or Exponential GARCH, model of Nelson (1990). Furthermore, additional data sets should be examined to determine the extent to which they also exhibit changes in inferences with changes in model specification.

Additional models applied to additional data sets should also be examined in the context of the results from Chapter Five. This chapter examined only one type of model, a simple quadratic model, applied only to Taiwan stock return data. This begs the question of whether the recursive estimation results for the quadratic model would exhibit such apparent instabilities when fitted to other data sets, such as the Nikkei returns. Furthermore, the apparent instabilities demonstrated by the recursive estimates could simply be a consequence of fitting a poorly specified model to the data. Consequently, the recursive estimation results for the parameters of alternative nonlinear models would also need to be examined. Conversely, alternative nonlinear processes should be simulated to examine the effects of specific types of nonlinear dependencies on the given test statistics and their recursive estimates.

To a certain extent, these questions and issues may seem to be purely statistical issues rather than financial ones. However, they drive at the heart of empirical finance, at the issue of what information can be obtained from the study of financial data.

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