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Chapter 7

Summary

This dissertation shows that there is evidence of the presence of nonlinearities in economic and financial data.

In a time series framework, Chapters (2) and (3) indicate that nonparametric methods are useful in finding dependence arising from deterministic and stochastic nonlinear dynamical systems. By simulations, we show that nonparametric tests have correct size and reasonably high power in detecting the presence of (linear and nonlinear) dependence. The application of the tests to the growth rate of macroeconomic variables (e.g., U.S. GNP and interest rates) rejects the hypothesis of independence and linearity in many cases. This evidence supports the presence of nonlinear dependence in the data.

In Chapter (4) we also investigate the power properties of a nonparametric test for out-of-sample predictability. The power (the frequency of rejection of the hypothesis of no predictability) is found to be very low. The lack of power of the test to detect the dependence/predictability could have influenced the previous conclusions in the literature about the unpredictability of exchange rates returns.

Chapter (4) also proposes a model of exchange rate determination in which investors have different (and time varying) expectations about the future evolution of the rate. The data support the model and the plot of the sentiment of chartists in Figure (4.2) clearly suggests that when the exchange rate deviates from its fundamental value, traders become nervous about the interpretation of the information. In particular, a large change associated with a large deviation is interpreted by chartists as a destabilization of the trend and a signal that it might revert. This indicates that chartists may contribute to the stabilization of the exchange rate when they expect a reversal of the trend.

The presence of nonlinearity emerges also from the application in Chapter (5). In this case, we apply a nonlinear time series model to investigate the dynamics of the deviations of stock prices from the fundamental value. The results show that when the mispricing is large,

the speed at which the stock price revert to its long-run value is faster. This is consistent with the debate on mean reversion in stock prices but it also proves that a nonlinear mechanism is driving the adjustment process. However, the escalation in prices of the late 90s changes the analysis. The faster reversion to the mean that is found until the 90s is significantly weakened, suggesting that a bubble might have occurred in stock prices.

Finally, Chapter (6) examines the evidence of mean reversion for stock prices using an asset pricing model where investors have heterogeneous expectations. The results confirm the findings of Chapter (5) and provide an interpretation of the stock price run-up in the late 90s. A group of investors had explosive beliefs for the deviations and became dominant because their expectations were confirmed by the realized prices. This exacerbated the trend and created a bubble in stock prices. On the other hand, investors expecting the adjustment toward the mean performed very poorly in those years and had too little capital to enforce reversion to the fundamentals. Using the dividends or earnings as cash flow to determine the fundamental value, the results suggest a different interpretation for the stock price run-up. When the dividends are used, the investors types are characterized by mean reverting and explosive beliefs. However, when earnings are used, one group still expects reversion to the mean while the other type expects the deviation to be close to a unit root process.