**Chapter 13 Summary**

Although we have studied only two financial economic time series, the ideas and techniques discussed in this chapter are applicable to other economic and financial time series, for most economic time series in level form are nonstationary. Such series often exhibit an upward or downward trends over a sustained period of time. But such a trend is often stochastic and not deterministic. This has important implications for regression analysis, for regressing a nonstationary time series on one or more nonstationary time series may often lead to the phenomenon of spurious or meaningless regression. As we will show in the next chapter, only in the case of cointegrated time series may we avoid spurious correlation, even if the underlying series are nonstationary.

We looked at three diagnostic tools to find out if a time series is stationary. The simplest of these is a **time series plot** of the series. Such a plot of a time series is a very valuable tool to get a “feel” about the nature of the time series. More formally, we can examine the correlogram of the time series over several lags. The correlogram will suggest if the correlation of the time series over several lags decays quickly or slowly. If it does decay very slowly, perhaps the time series is nonstationary.

A test that has become popular is the unit root test. If on the basis of the Dickey–Fuller test or the augmented Dickey–Fuller test, we find one or more unit roots in a time series, it may provide yet further evidence of nonstationarity.

Since traditional regression modeling is based on the assumption that the time series used in analysis are stationary, it is critical that we subject a time series to stationarity tests discussed above.

If a time series has deterministic trend, it can be made stationary by regressing it on the time or trend variable. The residuals from his regression will then represent a time series that is trend-free.

However, if a time series has a stochastic trend, it can be made stationary by differencing it one or more times.