1. EXTRAPOLATION

Extrapolation is the simplest yet often a useful method of forecasting. In many forecasting situations, the most reasonable expectation is that the variable will follow its already established path. Extrapolation relies on the relative constancy in the pattern of past movements in some time series. Strictly speaking, nothing needs to be known about causation–why the series moves as it does. But in practice, the justification does involve the nature of the growth process being described. Extrapolation is used frequently for sales forecasts and for other estimates when "better" forecasting methods may not be justified.

Since extrapolation assumes that the variable will follow its established pattern of growth, the problem is to determine accurately the appropriate trend curve and the values of its parameters. Many alternative trend curves can be used for the purpose of business forecasting.

Some of the most useful ones are:

a. Arithmetic trend: The straight-line arithmetic trend assumes that growth will be by a constant absolute amount each year.
b. Semi-log trend: The semi-logarithmic trend assumes a constant percentage increase each year. Since the annual increment is constant in logarithms, this line translates into a straight line when drawn on paper within a logarithmic vertical scale.
c. Modified exponential trend: This curve assumes that each increment of growth will be a constant per cent less than 100 of the previous one. The line tends generally to approach, but never quite reach a constant asymptote, which may be thought of as un upper limit.
d. Logistic curve: The logistic curve has both an upper asymptote and a lower asymptote. It assumes a 'law of growth' involving increasing increments from an initial low value and then gradual slowing down of growth as 'maturity' is approached.
e. The Gompertz curve: The Gompertz is a curve with similar properties as described above and is often used to describe growth of industrial output.

Selection of an appropriate growth curve can be done by empirical and theoretical considerations. Empirically, it is a question of selecting the curve that best fits the past movement of the data. Theoretical matters which intervene in that logic may support a particular growth pattern. For example, population growth, when there are no restraints, implies a geometric pattern of growth, as has been known since Malthus. With limited resources, however, population is sometimes thought to grow along a logistic curve. Lest these theoretical notions be taken too seriously, it should be emphasised that empirical consideration may lead us quickly to a more realistic and less restrictive notion of the relevant growth curve.

2. REGRESSION ANALYSIS

The regression approach offers many valuable contributions to the solution of the forecasting problems. It is the means by which we select from among the many possible or theoretically suggestive relationship between variables, in a complex economy those which will be useful for forecasting. With it, one makes the jump from intuitive evaluation on the relationship between two variables to precise quantified knowledge. If two variables are functionally related, then a knowledge of one will make possible an estimate of the other. For example, if we know that advertising expenditure and sales are correlated, then for a given advertising expenditure, we can find out the probable increase in sales or vice versa.

Regression relationship may involve one predicted or dependent and one independent variable–simple regression, or it may involve relationship between the variable to be forecast and several independent variables–multiple regression. Statistical techniques to estimate the regression equations are often fairly complex and time-consuming but there are many computer programmes now available that estimate simple and multiple regressions quickly. Regression analysis is also the econometrician's standard tool in his research.

With the help of regression analysis, the level of industry sales is usually forecasted first and the company forecast is then made on the basis of predicted behaviour of the whole industry. The demand for most commodities often depends upon multiplicity of aggregate economic variables such as GNP, disposable income, prices, population, employment, industrial production. A careful analysis of these factors is made. It may be pointed out that the factors selected for analysis should be kept as low as possible because the danger of seriously imprecise results is multiplied as regressions are made more complex or if curvilinear relationships are used.

There are two dangers in using regression analysis for forecasting:

a. There is possibility of a mechanistic approach accepting with little question the relationship which the calculations reveal–perhaps that with the highest r^2 –and applying it to the forecast. There are many possibilities for spurious correlation among time series as many series move together over time even where there is no conceivable connection between them.
b. There is the risk that the estimated regression is false. Ther forecaster must always use his judgment and knowledge of the facts and of the underlying theory.