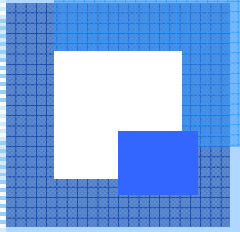


Chapter 6

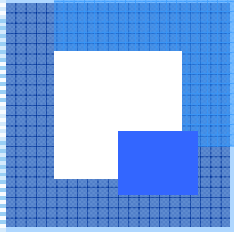
Forecasting

*Managerial Economics: Economic
Tools for Today's Decision Makers, 4/e
By Paul Keat and Philip Young*



Forecasting

- Introduction
- Subjects of Forecasts
- Prerequisites for a Good Forecast
- Forecasting Techniques
 - Expert Opinion
 - Surveys and market research
 - Surveys of spending plans
 - Economic indicators
 - Projections
 - Econometric models

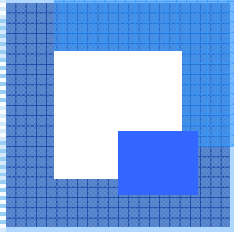


Introduction

All organizations conduct their activities in an uncertain environment. The major role of forecasting is to reduce this uncertainty.

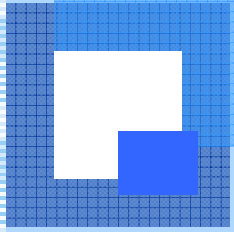
In order that corporate management can set reasonable targets for its objectives, it must have available the relevant forecasts, both for the short and long terms.

Corporate planners in all areas will utilize an array of forecasts in constructing the various portions of the business plan.



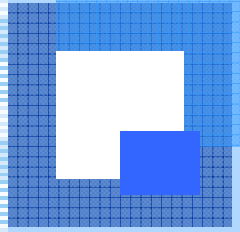
Subjects of Forecasts

- Macro forecasts
 - Gross domestic product
 - Consumption expenditure
 - Producer durable equipment expenditure
 - Residential construction
- Industry forecasts
 - Sales of an industry as a whole
 - Sales of a particular product within an industry



Subjects of Forecasts

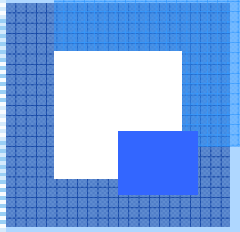
- Firm-level forecasts
 - Sales
 - Costs and expenses
 - Employment requirements
 - Square feet of facilities utilized



Prerequisites of a Good Forecast

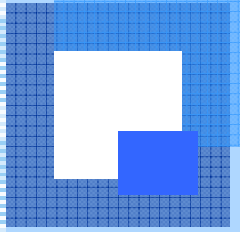
A good forecast should

- be consistent with other parts of the business.
- be based on adequate knowledge of the relevant past.
- take into consideration the economic and political environment.
- be timely.



Forecasting Techniques

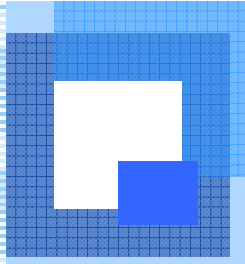
1. Expert opinion
2. Opinion polls and market research
3. Surveys of spending plans
4. Economic indicators
5. Projections
6. Econometric models



Forecasting Techniques

Qualitative forecasting is based on judgments of individuals or groups.

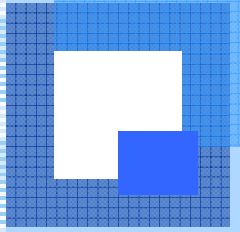
Quantitative forecasting utilizes significant amounts of prior data as a basis for prediction.



Forecasting Techniques

Naïve methods project past data without explaining future trends.

Causal (or explanatory) forecasting attempts to explain the functional relationships between the dependent variable and the independent variables.



Forecasting Techniques

Choosing the right technique depends on various factors.

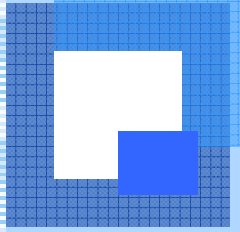
1. the item to be forecast
2. the relation between value and cost
3. the quantity of historical data available
4. the time allowed to prepare the forecast



Expert opinion

Jury of executive opinion: A forecast generated by experts (e.g, corporate executives) in meetings.

The major drawback is that persons with strong personalities may exercise disproportionate influence.

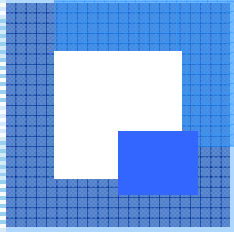


Expert opinion

Opinions of Sales Representatives

A drawback is that salespeople may be overly optimistic or pessimistic.

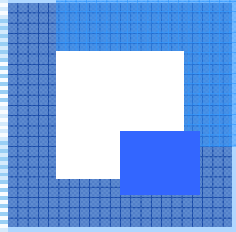
Further, they may be unaware of the broad economic patterns that may affect demand.



Expert opinion

Delphi Method: A form of expert opinion forecasting that uses a series of written questions and answers to obtain a consensus forecast.

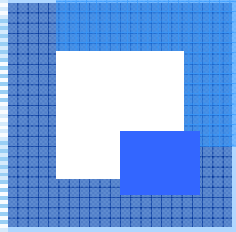
- Experts do not meet to discuss and agree on a forecast, eliminating the potential pitfall resulting from using a jury of executive opinion.
- There is no need for unanimity of opinion; the forecast can include a range of opinions.



Opinion polls and market research

Opinion polls: A forecasting method in which sample populations are surveyed to determine consumption trends.

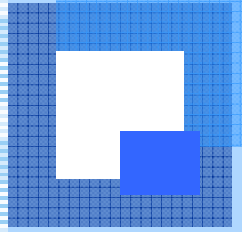
- may identify changes in trends
- choice of sample is important
- questions must be simple and clear



Opinion polls and market research

Market research is closely related to opinion polling.

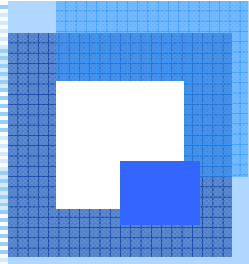
Market research will indicate “not only why the consumer is or is not buying, but also who the consumer is, how he or she is using the product, and what characteristics the consumer thinks are most important in the purchasing decision.”



Surveys of Spending Plans

Surveys of spending plans seek information about “macro-type” data relating to the economy.

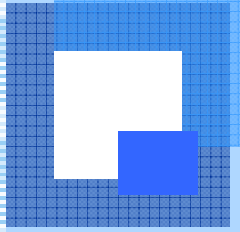
- Consumer intentions
 - Survey of Consumers, Survey Research Center, University of Michigan
 - Consumer Confidence Survey, The Conference Board



Surveys of Spending Plans

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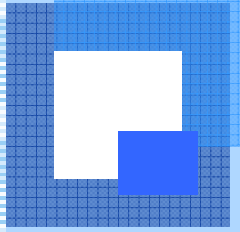
- Inventories and sales expectations
- Capital expenditure surveys



Economic Indicators

Economic Indicators: A barometric method of forecasting in which economic data are formed into indexes to reflect the state of the economy.

Indexes of leading, coincident, and lagging indicators are used to forecast changes in economic activity.



Economic Indicators

Leading indicators predict changes in future economic activity.

Coincident indicators identify peaks and troughs in economic activity.

Lagging indicators confirm upturns and downturns in economic activity.

Economic Indicators

Table 6.3
Economic Indicators

Leading indicators

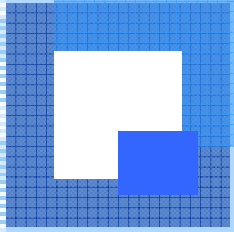
1. Average hours, manufacturing
2. Average weekly initial claims for unemployment insurance
3. Manufacturers' new orders consumer goods, and materials
4. Vendor performance, slower deliveries diffusion index
5. Manufacturers' new orders, nondefense capital goods
6. Building permits, new private housing units
7. Stock prices, 500 common stocks
8. Money supply, M2
9. Interest rate spread, 10-year Treasury bonds minus federal funds (%)
10. Index of consumer expectations

Coincident indicators

1. Employees on nonagricultural payrolls
2. Personal income less transfer payments
3. Index of industrial production
4. Manufacturing and trade sales

Lagging indicators

1. Average duration of unemployment
2. Inventories to sales ratio, manufacturing and trade
3. Change in labor cost per unit of output, manufacturing (%)
4. Average prime rate (%)
5. Commercial and industrial loans outstanding
6. Consumer installment credit outstanding to personal income ratio
7. Change in consumer price index for services (%)

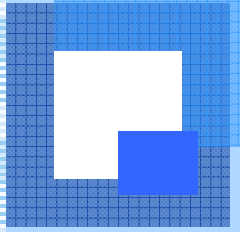


Economic Indicators

General rule of thumb

If, after a period of increases, the leading indicator index sustains three consecutive declines, a recession (or a slowing) will follow.

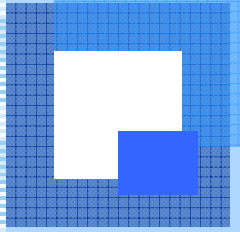
(Economic indicators have predicted each recession since 1948.)



Economic Indicators

Drawbacks

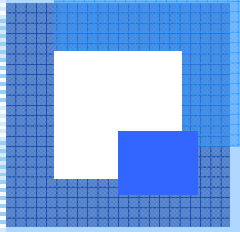
- Leading indicators occasionally forecast recessions that do not occur.
- A change in the index does not indicate the precise size of the decline or increase.
- The data are subject to revision in the ensuing months.



Projections

Trend projections: A form of naïve forecasting that projects trends from past data.

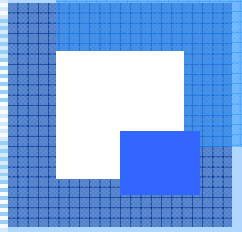
1. Compound growth rate
2. Visual time series projections
3. Least squares time series projection



Projections

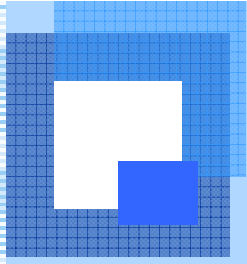
Compound growth rate: Forecasting by projecting the average growth rate of the past into the future.

- First, calculate the constant growth rate using available data.
- Then project this constant growth rate into the future.



Compound Growth Rate

- Provides a relatively simple and timely forecast
- Appropriate when the variable to be predicted increases at a constant percentage



Compound Growth Rate

General formula:

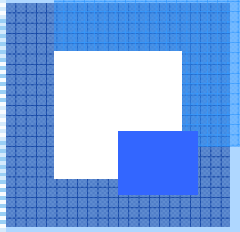
$$E = B(1+i)^n$$

E = final value

n = years in the series

B = beginning value

i = constant growth rate



Compound Growth Rate

Solve the general formula for the constant growth rate, i .

$$i = (E/B)^{1/n} - 1$$



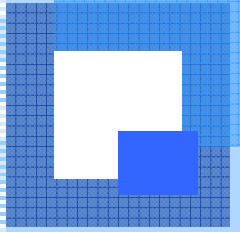
Compound Growth Rate

Then project this constant growth rate forward.

$$E = B(1+i)^n$$

E = projection n = years (series +
projection)

B = beginning value



Projections

Time series forecasting: A naïve method of forecasting from past data by using least squares statistical methods.

A time series analysis usually examines

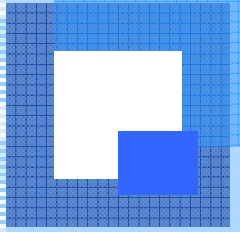
- Trends
- Cyclical fluctuations
- Seasonal fluctuations
- Irregular movements.



Time Series Projections

Advantages

1. easy to calculate
2. does not require much judgment or analytical skill
3. describes the best possible fit for past data
4. usually reasonably reliable in the short run



Time Series Projections

$$Y_t = f(T_t, C_t, S_t, R_t)$$

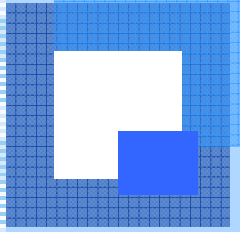
Y_t = Actual value of the data at time t

T_t = Trend component at t

C_t = Cyclical component at t

S_t = Seasonal component at t

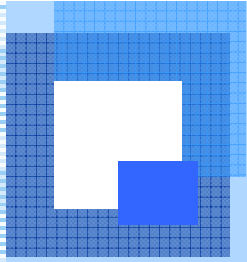
R_t = Random component at t



Time Series Projections

The task of the analyst is to decompose the time series of Y into its four components.

The method of **moving averages** is used to isolate seasonal fluctuations.

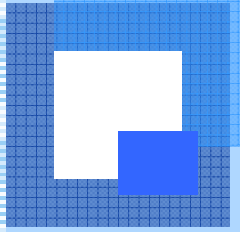


Time Series Projections

Computation of the trend utilizes the least squares method.

The dependent variable is the deseasonalized series.

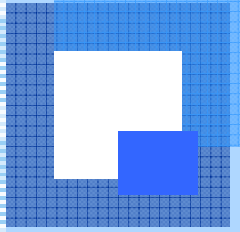
The independent variable is time, starting with period 1.



Time Series Projections

Possible forms of the estimated equation include:

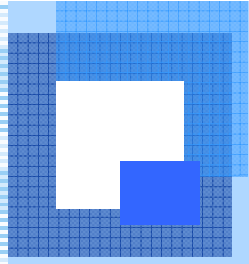
- Straight line: $Y = a + b(t)$
- Exponential: $Y = ab^t$
- Quadratic: $Y = a + b(t) + c(t)^2$



Time Series Projections

To the isolate cyclical component another smoothing operation can be preformed with a moving average.

The length of the moving-average period is determined individually for each case.



Time Series Projections

The remaining fluctuation is considered the random component of the series.

The random factors cannot be predicted and therefore should be ignored for projection purposes.