The present chapter throws light on the data source and methodology of the study.

3.1 DATA SOURCE

The present study is a time series study using secondary data for a period of 25 years from 1981-2005, further divided into two periods viz. 1981-1990 and 1991-2005. The major sources of data are from the various publications of national agencies, both government and public of the countries concerned and international institutions viz. World Bank, International Monetary Fund (IMF), United Nations Conference on Trade and Development, United Nations Year Book of International Trade Statistics, South Asian Association for Regional Cooperation, World Investment Reports, Trade and Development Reports, Reserve Bank of India Bulletins, Economic and Social Council for Asia and Pacific and Asian Development Bank. Internet has also remained as an important source of secondary data.

3.2 DATA ANALYSIS

The analysis has been carried out by making use of (both simple and advanced) statistical tools including correlation, multiple regression, graphs, percentages, index numbers, etc. The collected data has been arranged in the form of tables so that meaningful inferences could be drawn. Statistical Package in Social Science Research (SPSS) software is applied to process the data pertaining to this study.

3.3 METHODOLOGY

Model –I: The common approach in most of the studies available in the literature relating to the impact of international trade and foreign direct investment on the economic growth of the developing countries has been to specify some sort of single equation models for savings and for growth
rates. We have also made an attempt to estimate the impact of international trade and foreign direct investment on the economic growth of South Asian Economies with the help of single equation models for saving and growth rate, to have a first hand approximation of their relationship, by using Ordinary Least Square (OLS) technique. The specifications of our single equation relationships are more appropriate than those of previous studies in the literature and these estimates allow us to compare our results of previous studies. The following form of regression equations has been estimated:

\[ Y = a_0 + a_1 \frac{FDI}{Y} + a_2 \text{Trade} + \mu_1 \]  
\[ \frac{S}{Y} = b_0 + b_1 \frac{FDI}{Y} + b_2 \text{Trade} + \mu_2 \]  

Where \( Y \) = Real income level (Growth rate of real GDP, used as a proxy for economic development) 
\( \frac{S}{Y} \) = Gross Domestic savings taken as a percentage of GDP 
\( \frac{FDI}{Y} \) = Foreign direct investment as a percentage of GDP 
\( \text{Trade} \) = Total trade used as a proxy for openness of the economy (measured as a sum of ratio of exports and imports to GDP) 
\( \mu_1, \mu_2 \) = Random disturbance terms which are assumed to be normally distributed with zero means and constant variance.

\( a_0 \) and \( b_0 \) are constants and \( a_1, a_2, b_1, b_2 \) are the coefficients to be estimated.

Total trade measures the dependence of the economy with the rest of the world in terms of export dependence and import dependence. Economists of Classical as well as Liberal Schools and other protagonists of free trade concluded that trade promote and accelerate the process of economic development. Though, the primary impact of trade is on the export sector, as exports influence growth and savings in a number of
ways viz. by providing foreign exchange resources, increasing the ability to import the goods required for development, enabling the countries in the production of goods in which they have comparative advantage and therefore, provide more of an incentive to save and invest to attain a self reliant economic growth, the role of imports is as the propeller of economic development.

Consumption imports add to the goods market or add to the supplies in the economy. Likewise the imports of capital goods add to the factor market i.e. inputs of investment. Thus imports facilitate the larger consumption and larger investment to the growth of capital formation, income and output in the economy.

We assume that real income (GDP) and Gross Domestic Savings (GDS) are the functions of foreign direct investment and international trade.

Model - II:

The single equation approach, though useful as a first approximation, yet is deficient. There exists, however, a substantial body of literature, both theoretical and empirical, to suggest that savings and growth rate affect each other. This means that for a proper appreciation of the quantitative magnitudes of FDI and Trade, we must allow for this simultaneity. In other words, trade and foreign investment affect savings and growth rate directly as in single equation and also indirectly because of the interdependence between savings and growth. Savings is a positive function of growth and at the same time growth is also a positive function of savings. Moreover, our simultaneous equation results allow us to compare the results with our own single equation results. Therefore, an attempt has also been made to construct a simultaneous equation model consisting of a growth and a saving function at the Regional level as well.
as for **Indian Economy**, which has been estimated by applying Two Stage Least Square method. The simultaneous equation model is represented by the following equations:

\[
Y = a_0 + a_1 \frac{S}{Y} + a_2 \frac{FDI}{Y} + a_3 \text{Trade} + \mu_3 \quad \text{(iii)}
\]

\[
a_1 > 0 \quad a_2 <> 0 \quad a_3 <> 0
\]

\[
\frac{S}{Y} = b_0 + b_1 Y + b_2 \frac{FDI}{Y} + b_3 \text{Trade} + \mu_4 \quad \text{(iv)}
\]

\[
b_1 > 0 \quad b_2 <> 0 \quad b_3 <> 0
\]

The structural model described above consists of a saving equation and a growth equation, each having an independent meaning and identifying a behavioral relationship in the system. The two equations in the model are expressed in linear form, both in variables and parameters. The equations contained in the model are stochastic in the nature because each equation has, in the right hand side, in addition to the explanatory variables, an error term \(\mu\), to account for omitted variables and other factors affecting the relationship. These error terms assumed to have certain well defined probabilistic properties. The model consists of two endogenous variables \(\frac{S}{Y}\) and \(Y\) and two exogenous variables (\(\frac{FDI}{Y}\) and Trade). The expected signs of the various coefficients are shown immediately below them. Given the controversy among economists, the signs of \(a_2, a_3, b_2, b_3\) could either be positive or negative.

Keeping in view the fact that now-a-days, almost every developing country is in a race to attract more and more FDI, it would be of utmost importance to identify the factors influencing inward flows of FDI in India. The empirical studies have found that this variation can be explained by various factors such as GDP and its growth, R & D intensity, openness of the economy, the level of development of a country's infrastructure, the level of political stability and political risk and availability of skilled manpower etc. To
determine the factors influencing foreign direct investment inflows in India, the following multiple regression model has been specified involving a set of both economic and political variables:

\[ \text{FDI} = a_0 + a_1 G + a_2 T + a_3 \text{INF} + a_4 \text{ED} + a_5 E + \mu \]

Where FDI = foreign direct investment as %age of GDP; G = annual growth rate of GDP; INF = rate of inflation, measured as %age change of GDP deflator; T = total trade (export + import as % of GDP); used as proxy for openness of the economy); ED = Total debt outstanding and disbursed as ratio of exports; E = per capita electricity consumption; \( \mu \) = stochastic error term.

Following economic theory, we test the following hypotheses:

1. A high rate of growth of GDP exerts a positive influence on foreign direct investment from abroad.
2. It is hypothesized that trade (Exports as %age of GDP plus imports as %age of GDP) used as proxy for openness of an economy positively influences the FDI. It is a representative of the level of liberalization in terms of international trade and foreign transactions.
3. A high rate of inflation is a sign of internal economic tension and of the inability of a government and the Central Bank to balance the budget and to restrict the money supply. As a rule the higher, the rate of inflation, the less are foreign direct investment decision makers inclined to engage in the country. A negative relationship is hypothesized.
4. External debt as a ratio of exports is the ratio of the amount of outstanding external debt of a country at the end of the particular year and the exports of that year. It is a variable that represents...
the debt burden of the country. Actually this ratio indicates the extent of pressure on the exchange reserves. Negative relationship is hypothesized.

5. Per capita electricity consumption is a variable considered as an indicator of the level of infrastructure development in the host economy. A positive relationship is hypothesized.

The data for the period 1981-2005 is processed in case of Indian economy by considering foreign direct investment inflows as %age of GDP, as dependent variable.

The export related success stories of some countries viz. China and East Asian countries suggest that foreign direct investment is a powerful tool for export promotion because of the relative superiority of multinational corporations (the major sources of FDI) helps domestic firms, directly or indirectly, in terms of technological advancement and provides market access to export markets, but there is no unanimity among the economists on the positive impact of FDI on exports. Therefore, an attempt has also been made in the present study to examine the role of FDI in the export promotion in India. The following multiple regression model has been specified:

\[
\frac{X}{Y} = a_0 + a_1 \frac{FDI}{Y} + a_2 \frac{GDCF}{Y} + a_3 INF + a_4 G_1 + a_5 ED/X + \mu
\]

Where

\[
\frac{X}{Y} = \text{Exports as a percentage of GDP.}
\]

\[
\frac{FDI}{Y} = \text{Foreign direct investment as a %age of GDP}
\]

\[
\frac{GDCF}{Y} = \text{Gross domestic capital formation as a percentage of GDP.}
\]
Following economic theory, we test the following hypotheses:

i) An increase in foreign direct investment promotes exports as well.

ii) A high rate of gross domestic capital formation is an indicator of good developmental potential in future. This suggests a positive influence on export promotion.

iii) A high rate of inflation is a sign of internal economic tension and the inability of the Government and the Central Bank to balance the budget and to restrict money supply. As a rule, the higher the rate of inflation, lower the exports. A negative relationship is hypothesized.

iv) Per capita GDP shows the level of economic development but as well the purchasing power of the people. A higher purchasing power of the people used as proxy for domestic demand will leave the lesser resources for exports.

v) External debt as a ratio to exports is the ratio of the amount of outstanding external debt of a country at the end of a particular year and the exports of that year. It is a variable that represents the debt burden of the country and hence revealing pressure on foreign exchange reserves.
Besides above, there are other variables which are important determinants of export promotion, such as market size, infrastructure, tariff level, literacy rate, political risks and legal issues etc.

But our prime focus is to examine the impact of Foreign Direct Investment on the growth of exports in Indian Economy.

The study is limited to Trade and Foreign Direct Investment as the main determinants that affect the overall economic development. It does not take into account other forms of external finance such as foreign aid, portfolio investment and foreign debt.