A STATISTICAL MODEL TO FORECAST FOREIGN DIRECT INVESTMENT OF A COUNTRY: A CROSS COUNTRY ANALYSIS

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DECLARATION

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ABSTRACT

In this research it is aimed to study the effects of variety of different socio economic factors for foreign direct investment. The multiple linear regression model is developed to forecast the foreign direct investment. The dependent variable of the model is foreign direct investment of the country in calendar year 2015. (in USD) and the independent variables are the gross domestic product in USD, adult literacy rate, gross national income, gross domestic products annual growth and gross national income. Hypothesis tested was all socio economic factors affect equally to the attracting foreign direct investment. Further the extent of which various socio economic indexes affect a country's economic well-being was evaluated to determine which indexes have stronger effect on the foreign direct investment of a country when compared with the others. Having identified the stronger and more impact socio economic indexes, it was tried to improve the econometric model by using variable selection methods and possibly multiple regression methods to further understand the relationship between foreign direct investment and the socio economic factors that affected. Finally exploratory factor analysis was carried out to examine the common factors among socio-economic variables. For this study a pool of forty five countries were selected and ten models were developed using thirty five countries from the pool and the ten models illustrated that there is no equal influence from eight macro-economic variables to FDI amount of the country at 95% significant level. The result emphasis that the macro-economic variables differently affect in attracting foreign direct investment. Moreover the factor analysis asserts that there are similar patterns among macro-economic variables.

Keywords: Foreign Direct Investment, Macro-economic Indicators, Multiple Regression Analysis, Factor Analysis

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ANOVA Table: Analysis of Variance Table.

BOP: Balance of Payment.

BRICS- Brazil, Russia, India, China and South Africa.

CGE: Computable General Equilibrium

DW Statistics: Durbin Watson Statistics.

ECOWAS: Economic Community of West African States

EU: European Union Countries

FA: Factor Analysis

FDI: Foreign Direct Investments.

GLS: Generalized least squares

GNI: Gross National Income.

KMO Test: Kaiser-Meyer-Olkin Test.

MANOVA: Multivariate analysis of variance.

MENA: Middle East and North African Countries

MNE: Multinational Enterprises.

MR: Multiple Regression.

OECD: The Organization for Economic Co-operation and Development.

OLS: Ordinary least squares

PCA: Principle Component Analysis.

SSR: Residual Sum of Squares.

SST: Total Sum of Squares.

UK: United Kingdom.

US: United States.

USD: United States Dollar.

VIF: Variance Inflation Factor.

CHAPTER 1

INTRODUCTION

1.1 Introduction of Foreign Direct Investments (FDI)

Foreign Direct Investment is an investment made by a company or an individual in one country in business interest within another country. Foreign direct investments are in the form of establishing business operation or acquiring business assets in another country. In recent years, due to fast growth and change in global investment patterns, the definition has been expanded to include all the acquisitions activities to be outside the investing firm's home country. After the colonial era, main method of capital transfer from one country to the other country is FDI, which is considerably focused and grown after World War II.

1.2 History of FDI and Trade across Boundaries

During the early era there was no structured method or organization which invested across the boundaries. But in 2500 BC Sumerian merchants found in their foreign commerce that they needed men stationed abroad to receive, to store, and to sell their goods. Buddhist folk stories stated that the merchants who visited from ancient India to Sri Lanka called Thapassu Balluka and sailors who sailed across the countries. The folk stories like Sinbad the sailor provides evidence for trading across countries. In the mid-seventeenth century, English, French, Dutch and several other European mercantile families sent relatives to America and to the West Indies to represent their firms. There by gradually the American colonists found their own foreign trade that was desirable to have correspondents, agents, and on occasion, branch houses in important trading centers as warehouses and to sell American exports. During this period international trade linked with colonist. The Portuguese East India Company followed by the Dutch and the English are examples for trading and colonial organizations. Vasco da Gama, Ferdinand Magellan and Columbus were some well-known traders in this era.

During the first half of the nineteenth century considerably underestimated the role of Multi National Enterprises (MNEs) both as an entrepreneur

as well as the transfer of intangible assets. By the first decade of the twentieth century at least fourteen billion US dollars had been invested in enterprises or branch plants. Foreign direct investment during this period was served as a channel for the transferring of resources between different countries and as a means of controlling the use of these resources and complementary local inputs. The First World War and the years followed thereafter illustrate several changes in the level, form and structure of international production. The war itself caused several European belligerents to sell some of their pre-war investments. Subsequent political upheaval and changes in boundary further reduced the intra-continental European corporate activity and eliminated it altogether from Russia (Buckley, 1990).

The effect of the Second World War was similar to that of the First, in that each of the main European belligerents was forced to divest many of its foreign assets. However, unlike the First World War, the Second World War generated major technological advances while its aftermath produced an international economic and political climate, which was particularly favorable for foreign business activities. The rate of growth of the international capital stake reached its peak in the late 1960s, decelerated in the early and mid-1970s, but picked up again in the last few years of the decade. But the continued fall in the UK and US share and the increase in the share of the West German, Japanese and Swiss made it the most striking feature of this period; those countries focused more on technological advancement through research and development. In current contest China, Canada and Gulf countries are also dominant to transfer capital to other countries. Moreover, Buckley, (1990) argued that several fast developing countries (Hong Kong, Singapore, Brazil, Korea and India) also began to export capital to some extent. Collapse of communism and emerging national economies countries (BRICS) positively make impact on this trend.

1.3 Foreign Direct Investment and Trades in Sri Lanka

In early ages, Sri Lanka was the popular trade destination in silk rout, which was linking the Eastern and Western countries of the world. In the colonial ages the major country that invested in Sri Lanka was Britain. All those investments were linked with Plantation industry and infrastructure development. Stated by Kelegama, (2006) after achieving independence in 1948, Sri Lankan governments followed different strategies

with changes in government until 1977. But there was no significant growth shown during that period. The main reason for this was the closed economic policy. After 1977 Sri Lanka followed the open economic policy and there had been a recorded boost in FDI until mid1980.

However, the impressive upward trend in FDI flow was disrupted by the escalation of terrorism problems which turned it to a war in 1983. Sri Lanka lost its investment potential due to the uncertainty created by the war. But after the end of the war economy boosted and it made more focus on infrastructure development and tourism industry. The countries like China, India and Arabic countries plays a major role in Sri Lankan economy by involving in the development projects in Sri Lanka (Thilakaweera, 2013).

1.4 Definitions for FDI

Because of the impotence of this subject, numbers of theoretical studies were conducted on variance aspects and areas of FDI. Simultaneously several definitions were introduced to define the FDI by several researchers and multinational governing and controlling organizations. Some of the definitions for FDI were given below,

FDI refers to an investment made to acquire lasting interest in enterprises operating outside the economy of the investor. Further, in cases of FDI, the investor´s purpose is to gain an effective voice in the management of the enterprise. The foreign entity or group of associated entities that makes the investment is termed as the "direct investor". The unincorporated or incorporated enterprise-a branch or subsidiary, respectively, in which direct investment is made-is referred to as a "direct investment enterprise". Some degree of equity ownership is almost always considered to be associated with an effective voice in the management of an enterprise; moreover threshold of 10 per cent of equity ownership to qualify an investor as a foreign direct investor Balance of Payments Manual, (1993).

A direct investment enterprise is an incorporated or unincorporated enterprise in which a single foreign investor either owns ten per cent or more of the ordinary shares or voting power of an enterprise (unless it can be proven that the 10 per cent ownership does not allow the investor an effective voice in the management) or owns less than

10 per cent of the ordinary shares or voting power of an enterprise, yet still maintains an effective voice in management. An effective voice in management only implies that direct investors are able to influence the management of an enterprise and does not imply that they have absolute control. The most important characteristic of FDI, which distinguishes it from foreign portfolio investment, is that it is undertaken with the intention of exercising control over an enterprise. Benchmark Definition of Foreign Direct Investment, (1996)

FDI is the investment made by a company outside its home country. It is the flow of long-term capital based on long term profit consideration involved in international production Caves, (1996).

Investment that involves some degree of control of the acquired or created firm which is in any other country apart from the investors' country. This involvement in the control of the investment is the main feature that distinguishes FDI from portfolio investment Lipsey, (1999).

In the classic definition FDI is termed as a company of one nation putting up a physical investment into building a facility in another country. The investment made to create buildings, machinery and equipment's is not in sync with that of making a portfolio investment an indirect investment (www.investopedia.com).

1.5 Forms of FDI

During the past three decades FDI has been act as the major form of international capital transfer method, which has been dramatically grown. There are several types of foreign direct investments currently employed in the world. Many researchers (Markusen, 2002, Hanson et al., 2003 and Barkema and Vermeulen, 1998) define and categorized FDI into several sub categories based on the strategies used and those are,

Horizontal - The Company or country does all the same activities abroad as at origin country. For example, Toyota assembles motor cars in Thailand and the United Kingdom (Markusen, 2002).

Vertical – In the vertical assignments, different types of activities are carried out abroad. In case of forward vertical FDI, the FDI brings the company nearer to a market

(for example, Toyota buying a car distributorship in America). In case of backward Vertical FDI, the international integration goes back towards raw materials such as, Toyota getting majority stake in a tire manufacturer or a rubber plantation (Hanson et al., 2003).

Conglomerate – In the conglomerate investment, the investment is made to acquire an unrelated business abroad. It is the most surprising form of FDI, as it requires overcoming of the two barriers simultaneously (i) entering a foreign country and (ii) working in a new industry.

Green field entry- Activities or assembling all the elements.

Foreign take over- Acquiring an existing foreign company/ assets. This is often called as "mergers and acquisitions". The forms of entry into a market and its mode interact with the ownership strategy. The variation is wholly owned subsidiaries against joint ventures (Barkema and Vermeulen, 1998).

1.6 Importance of FDI to a Country

Foreign Direct Investment provides an inflow of foreign resources such as capital, technology and processes. In addition to that enhancements in the transfer skills, technology knowhow, and job opportunities through new ventures are the benefits to the receiving country. FDI can serve as a source of technology and know-how to the host developing countries by fostering linkages with local firms. These technological innovations by MNE's play a central role in the economy and they are some of the most important areas where MNE's serve as catalyst to growth in developing countries. Alfaro et al. (2003) suggested two types of benefit through FDI. Those are,

- Benefits to Home Country.
- Benefits to Host Country.

As stated in those authors' benefits to home country and host country can be described as follows,

1.6.1 Benefits to Home Country

Create New Employment: FDI benefits the home country for creating new employment through the new venture developed from FDI. It also ensures better

payments and benefits for the employees. A new employment opportunity allows them to have an access to an improved lifestyle and also enjoy more facilities. **Acquire New Technology**: Foreign direct investment benefits the host country through introducing advanced skills and technology. New research will be conducted in that home country as the international organization looks for methods of enhancing its services. The new technology acquiring leads to a better process know-how, which can be applied in other parts of the nation for further development.

Improves the International Trade through Exports: The main advantage of FDI to the home country is that it enables these nations to enhance their export resources.

Develop the Economy: Through the FDI, government of the home country can increase the Tax income of its own. The improved income helps for them by economy growth and improves the living standards of the country.

1.6.2 Benefits to Host Country

Discover new markets: The country can discover new and less competitive markets through FDI.

Limitation of Entry Barriers: Most of the developing countries provide special facilities such as duty waving off for FDI.

Cheap Resources: The resources such as human capital and raw material are less expensive in developing countries compared to developed countries. Hence starting a venture in developing countries is much profitable than starting ventures in developed countries.

Legal Frameworks: In developing countries the legal frame works is such that, the labor law and environmental regulation are not strong. This will ease the management of the businesses.

1.7 Advantages of Foreign Direct Investments

In the event of FDI, the firms which invest in aboard rather than investing in domestic company as long as the income it expects to earn would be greater. This will be possible only when the investing company possesses some advantages over its foreign

competitor and sufficient to compensate for the disadvantage of operating a subsidiary at a distance. The advantages of FDI were described in brief by Kindleberger, (1968).

Economic Development Stimulation: Foreign direct investment can stimulate economic development of the target country by creating a more conducive environment for you as the investor and benefits for the local industry.

Easy International Trade: Commonly, a country has its own import tariff, and this is one of the reasons why trading with it is quite difficult. Also, there are industries that usually require their presence in the international markets to ensure their sales and goals will be completely met. With FDI, all these will be made easier.

Employment and Economic Boost: Foreign direct investment creates new jobs, as investors build new companies in the target country, create new opportunities. This leads to an increase in income and more buying power to the people, which in turn leads to an economic boost.

Development of Human Capital Resources: One big advantage brought about by FDI is the development of human capital resources, which is also often understated as it is not immediately apparent. Human capital is the competence and knowledge of those able to perform labor, more known to us as the workforce. The attributes gained by training and sharing experience would increase the education and overall human capital of a country. Its resource is not a tangible asset that is owned by companies, but instead something that is on loan. With this in mind, a country with FDI can benefit greatly by developing its human resources while maintaining ownership.

Tax Incentives: Parent enterprises would also provide foreign direct investment to get additional expertise, technology and products. As the foreign investor, you can receive tax incentives that will be highly useful in your selected field of business.

Resource Transfer: Foreign direct investment will allow resource transfer and other exchanges of knowledge, where various countries are given access to new technologies and skills.

Reduced Disparity between Revenues and Costs: Foreign direct investment can reduce the disparity between revenues and costs. As such, countries will be able to make sure that production costs will be the same and the products can be sold easily.

Increased Productivity: The facilities and equipment provided by foreign investors can increase the productivity of the workforce in the target country.

Increment in Income: Another big advantage of foreign direct investment is the increase of the target country's income. With more jobs and higher wages, the national income normally increases. As a result, economic growth is spurred.

1.8 Disadvantages of Foreign Direct Investments

As stated in the web site (www.connectusfund.org) and few other authors Wan, (2010) and Kasuga, (2007), there were some disadvantages of FDI. They were argued that some of the disadvantages of FDI as follow,

Hindrance to Domestic Investments: Entering a big firm is a hindrance to local industries because they are lack of capital, technologies and market acquisitions.

Risk of Political Changes: The political status of developing countries change dramatically. Also the policies get changed by government to government. This is very risky for investments.

Negative Influence on Exchange Rates: Foreign direct investment can occasionally affect exchange rates to the advantage of one country and to the disadvantage of another.

Higher Costs: After the several years of operation it is notice that operation in the particular country is more expensive than exporting.

Economic Non-Viability: Considering that foreign direct investment may be capital-intensive from the point of view of the investor, it can sometimes be very risky or economically non-viable.

Expropriation: political changes can also lead to expropriation, which is a scenario where the government will have control over property and assets.

Negative Impact on the Investing Country's Investment: The rules that govern foreign exchange rates and direct investments might negatively have an impact on the investing country. Investment may be banned in some foreign markets, which means that it is impossible to pursue an inviting opportunity.

Economic Colonialism: Many third-world countries, or at least those with history of colonialism, worry that foreign direct investment would result in some kind of modern day economic colonialism, which exposes host countries and leave them vulnerable to foreign companies' exploitations.

1.9 Role of FDI for the Economic Development of a Country

FDI is considered as an economic growth stimulus tool in many developing countries. During the age of post-world war II, the world economies were of three types. Those were closed economies, open economies and mixed economies. But after 1990 the closed economy was no more acceptable model. Except for few countries all the economies are now open or mixed type. Closed economy operates without access to foreign savings; investment is financed from domestic savings. However, in an open economy, investment may be financed through domestic savings and foreign capital flows, including foreign direct investments Adewumi, (2006). The major problem faced in developing countries is lack of capital and technology. At the same time the developed countries are suffering from lack of raw material and human resource. The FDI is the one of the best solution to overcome those problems. Therefore FDI enables host countries to achieve investment levels beyond their capacity to save noted that the transfer of capital by MNE can supplement domestic savings and contribute to domestic capital formation for countries that are capital constrained and this can increase domestic investment Alfaro et al., (2003). Due to those factors FDI plays vital role in current economic system and support for economic development in developing countries. Hence there is extensive number of studies carried out based on FDI. The secretary general of United Nations (Mr. Koffi A Annan) summarized the importance of FDI to the developing economies as follows ‘‘With the enormous potential to create jobs, raise productivity, enhance exports and transfer technology, foreign direct investment is a vital factor in the long-term economic development of the developing countries’’ (United Nations, 2003).

Also many authors (Rodan, 1961 and Chenery and Strout 1966) developed an argument that foreign capital inflows had a favorable effect on the economic growth towards developing countries. Moreover they explained that FDI can have a favorable short-term effect on growth as it expands the economic activity. However, Chang and Zhang (1995) argued, in the long run it reduces the growth rate due to the dependence of the developing countries there is a positive relationship between FDI and GNP. Johnson, (2006) argued that the FDI inflows enhance economic growth in developing countries but not in developed economies.

Choe, (2003) analyzed causal relationships between economic growth and FDI in eighty countries over the period 1971-1995, by using a panel VAR model. The results show that FDI Granger-causes economic growth. Loungani and Razin, (2001) argued that of the three sources of capital flow to the developing countries (FDI, portfolio investment and primary bank loans), FDI was discovered to be the most resilient during the global financial crises from 1997-1998 and also during the Latin American financial crises in the 1980s. In addition to that Chowdhury and Mavrotas, (2003) stated that FDI contribution to growth depends on factors such as human capital base in the host country and the degree of openness in the economy, and even when FDI is contributing to the economy, its impact might not be easily noticed in the short run.

1.10 Factors Affecting Foreign Direct Investments

Many authors (Dinh, 2009 and Le, 2013) have mentioned there are many different factors that determine foreign direct investment (FDI) and it is hard to isolate individual factors, given there are many different variables. It also depends on the type of industry. As an example for service sector FDI, macro-economic stability and political openness tend to be more important.

To understand the factors affecting to FDI, it is recommended to understand why MNE diversifying their businesses across the borders. Mainly an investing firm is interested in sharing benefits in the contribution. Also the profit earned from investing aboard is high and the firms tend to move capital across the boundaries. Modern economic conditions positively affect the growth of the multinational company and today most companies of any size have to look beyond their national boundaries for growth. Also developments in capital intensive technology and the increasing cost of research and development programs have reinforced the need for companies to seek new markets to spread costs economically. (www.economicshelp.org)

With the attractive benefits mentioned above and fully focused efforts of the host countries, most of the host countries have failed to attract FDI as the way they have planned. In current political scenarios the FDI is one of the key performance indicators of the government. But most of the countries have failed to achieve the objective. The main reason for this is that most of mentioned countries not

fulfill the basic requirements which attract foreign direct investments. Moreover Witkowska, (2011) argued that there are twelve factors affecting for FDI of a country. Those factors are,

Economic Stability of the Country- This is the main factor that a firm look when deciding to enter into country for FDI. Macroeconomic stability is very important because it make investment easier when the inflation is stable. So governments need to foster a stable environment for business investments.

Skilled Workforce- skilled workforce is very important to any industry and firm work whiting. Because if a country's labor is unskilled, firms who want to invest will have to spend time and capitol on training and education of their workforce which costs a lot and will outweigh the likely benefit of moving their production plant/capital to a new country. Also, their costs will also rise due to low productivity which at the end affects their profitability.

Cost of Wages- Cost of wages acting a vital role on FDI. Firms look at labour as a cost and a production unit. When the government imposes a minimum wage, they simply interfere in the labor market and mass unemployment will be the result. Not only minimum wage hurts workers because firms have to lay workers off, but it also leads to a rise in cost which lowers the firms profitability and the firms have to pay workers the minimum wage regardless of their productivity which leads to lower productivity in general because whatever the worker produces in one hour, he will get the minimum wage.

Corporate Taxes- Level of taxation is very important. If taxes are high in a country, firm will not invest because a large proportion of their profits will be confiscated by the state so this is a very strong disincentive for an investment. Also, to corporations, corporate taxes are a cost so they will pass it on to consumers through higher prices which lead to a general rise in price levels so lower corporate taxes will make a country more attractive for investment.

Rules and Regulations- Some regulations are good and need to be in place but most of the regulations are very costly and often seen as unnecessary to firms. Small

businesses will get hit the hardest and often due to these heavy regulations, businesses won't start in the first place. In the case of big firms, they might not get hit that hard but adds operational costs and these costs are passed on to consumers since corporations do not lower their profit margins so regulations in some cases won't be helpful to the consumer but in fact, it hurts them. Employment regulations will actually lead firms not to employing workers in the first place because it costs a lot for firms and the fact that firms won't be able to get rid of workers easily scares them away from the beginning so they just won't hire from the beginning. Some employment regulations are good such as anti-discrimination act which stops employers from discriminating on the basis of gender, race and disability. Another good regulation is basic health and safety, not the one we currently have.

National Debt- If a country has high levels of national debt, this means that the real interest rates are high and if the government doesn't deal with its debts, the investor confidence will fall. Also high levels of taxation will soon follow because the debts will have to be paid eventually. High taxes are a disincentive to investment and high interest rates will mean lower borrowing which again puts investment off because it costs a lot to borrow so firms will not invest.

Trade Policies- Free trade allows firms to move capital around freely and export their products to wherever they want and also import whatever they want. For the sake of this topic, free trade allows firms to trade freely with no restrictions.

The above factors can be identified as controllable factors, because host country can control the mentioned factors. But some factors those affecting FDI but cannot be controlled host country itself. Those are,

Availability of Raw Materials and Trade Facilitation Instruments- Raw materials attract more investors into the country. This is because a country endowed with raw materials helps investors as it reduces the production cost. This is the major reason that many investors have recently attracted to African countries.

Demographic Factors- The countries which are in major sea and air routes attract more FDI, because the transportation of goods and services are cost effective and also is less time consuming.

Exchange Rate Stability- Commercial viability of any FDI is based on exchange rate stability. This means that the value of domestic currency should not drop abnormally by which while repatriating the funds, the foreign investor will lose heavily. Exchange rate should be more or less the same as prevailing at the time of investment.

Scope of the Market- FDI must be in a position to exploit the market and expand both in the domestic as well as the foreign market. This will reduce their cost of production and will give them ample scope for diversification.

Return on Investment- One of the major attractions for FDI is the profit or the return they get for the investments made. Unless the return is substantially higher than what they could have obtained in other countries, they will not venture for investment. The return should also be consistent and it should be increasing over a period. These factors are closely looked into while undertaking investment. The financier of the FDI will also ensure that they get their money back as it is a safe investment. Thus, return on investment is a major deciding factor for FDI while undertaking investment in foreign countries. They also would like to ensure that the payback period is also less so that the return is ensured within a short period. Weightage is given to each of these factors and decisions are finalized.

Since above mentioned factors are critical and difficult to fulfill at once government of the country needs to balance the above factors in an optimum way to gain maximum benefit of them.

1.11 Objective of the Research

On explaining the above in detail the objectives of this study are,

i) To identify macro-economic factors that influences the amount of FDI of a country.

ii) To develop a statistical model to identify the relationship among those factors.

iii) Validate the model to suggest the best model.

iv) Identify the extent of the macro-economic factors affect to the FDI of a particular country in selected year.

1.12 Hypothesis Tested on the Research

Null Hypothesis: All the factors contribute equally to the amount of foreign direct investment of the country.

Alternate Hypothesis: All the factors contribute differently (contribution is not equal) to the amount of foreign direct investment of the country.

1.13 Significant of the Research

After the model generated and tested for validity, the model can be used to identify the factors influence to which extent to the foreign direct investment amount of the country. Considering the factors affecting to the foreign direct investment of the country, it is difficult to adjust all factors to maximize the foreign direct investment amount. Hence particular country must decide to optimize the selected few factors which can be feasible at its level of capacity.

By using the statistical model derived, a country can optimize the influence factors to maximize the attraction of FDI. Once the model is built and validated successfully, by using this model the government of a particular country can identify the list of factors that they can effectively target to improve their FDI. Because adjusting all of the above mentioned factors to maximize FDI is not possible.

1.14 Summary of the Chapter

FDI is one of the key factor among the critical determinant factors in economic growth of a country. The FDI is not an isolated process and there are many subjective factors linked with the FDI. And there are key macro-economic factors affecting the FDI amount of a country. Countries need to optimize those factors to increase the FDI of that particular country.

1.15 Outline of the Dissertation

The rest of the chapters in this dissertation are organized as follows. Chapter 2 presents a literature review on FDI and multiple regression. Chapter 3 provides the research methodology and Chapter 4 represent the results and discussion. Chapter 5 discusses the conclusion, recommendation and suggestions for future researches and developments.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The main objective of this research is to examine the relationship among major factors that are influence to the annual FDI amount of a country. After 1970's the importance of FDI to the economic development were highlighted and the various studies have been carried out by different authors/ researches in different countries. In this chapter past work related to this study and subject was reviewed.

2.2 Theoretical Framework of FDI

Most of the theoretical works with respect to FDI is based on multinational enterprises (MNE's) and capital flows were carried out by many researchers. Caves, (1971) argued that the investment brings about the shift of an industry in home country to the same industry in host country. This theory generated clear results that headquarter activities should be placed in capital-abundant countries with subsidiaries in capital-scarce countries. Thus, there was no motive for FDI to occur between identical countries. Dunning, (1977) stated that the factors driving global capital flows in general are analyzed on the eclectic paradigm, which is a framework for analyzing the decision to engage in FDI, based on three kinds of advantages that FDI may provide in comparison to exports: Ownership, Location, and Internalization. Markusen, (1995) further developed the theory and stated that the ownership could be a product or a production process to which other companies do not have access, such as a patent, blueprint, or trade secret or something intangible, like a trademark or reputation for quality. Helpman, (1984 and 1985) and followed by Helpman and Krugman, (1985) assumed that countries differ with respect to relative factor prices; and vertical multinationals use differences in factor prices between countries to minimize production costs. Zhang and Markusen, (1999) explained that the host market size has a negative impact on vertical FDI because the fixed costs for the new plant can be sooner covered in a larger market. Grossman et al., (2003) developed a model presents that companies have

headquarter in a Northern country supply differentiated final goods to one Northern and another Southern markets. Similar companies must produce final goods through using intermediate goods and conducting assembly activities, these activities take place in either the home or the host countries.

2.3 Empirical Works Based on the Foreign Direct Investment

Ying, (2013) examined the co-integration Analysis of Industrial Economy and Foreign Direct Investment of China and indicate that there is long-term stable one-way Granger causality relationship between the growth of gross domestic production of industry and direct foreign investments. Further conclude that the growth of direct foreign investments affect the growth of gross domestic production of industry, but industrial economic growth is not the reasons of the direct foreign investments. Efiong, (2013) investigated FDI in developing African countries and their effects on the economic growth based on Cameroon in year 2006 and proposed that increased inflow of FDI into Cameroon had failed to lead to higher economic growth in the country. Malick, (2016) scrutinized the determinants of Foreign Direct Investment Inflows to economic community of West African States (ECOWAS) member countries using panel data modeling and estimation and implied that stabilization of the macroeconomic environment, government consumption expenditures, domestic credit to the private sector, interest rate, gross fixed capital formation, exchange rate, economic freedom index, as well as natural resources and market size are the main FDI driving factors in ECOWAS. Ibrahim et al, 2011 reviewed the determinants of Turkish outward Foreign Direct Investment and investigated the entry mode and location choice determinants of Turkish firms' outward direct investments, which are operating in Central Asia, Russia and Balkan Countries. Suggested that those investments are associated with high levels of economic and political risks, cultural proximity and lack of ownership advantages. Eskandar et al, (2016) studied the impact to the environment when trade and investment openness increase and suggested that Foreign Direct Investment (FDI) has detrimental effects on CO_2 emissions in Africa, the Middle East and North Africa, the former United Socialist Soviet Republic and Eastern Europe, and South America, but not in Asia. FDI raises SO_2 emissions in South America, although it does lower than in Africa. Amarath, (2016) studied the impact of Foreign Direct Investment on

unemployment based on Jordan and suggested that the low levels of these investments are attributed to the lack of regulating legislations that encourage foreign investments further recommended the development of services and infrastructures besides, the Jordanian concerned departments should prepare and disseminate the information on investment opportunities.

Zhiqiang et al, (2016) researched the relationship between unified tax rate and foreign direct investments based on china using Computable General Equilibrium (CGE) Analysis moreover implied that when the unified tax rate is lower than 25.493%, the foreign direct investment will decline. When the unified tax rate is more than 25.493%, the foreign direct investment will increase and when the unified tax rate is at the position of 25% where the tangent slope between foreign direct investment and the unified tax rate is relatively steeper, the 25% unified tax rate can effectively avoid foreign enterprises from serious impact. Jung and Li-Yu, (2012) studied that contribution to the growing literatures on the importance of board expertise to their provision of counsel for management using the Foreign Direct Investment and suggested that director experience particular to an entry mode (host country) significantly enhances a firm's FDI performance in that specific mode. Alex and Meine, (2015) examined the factors determining a preference for investing based on china Western and Eastern provinces. The study focus on five factors that could influence the decision of multinational corporations: 1) Economic growth; 2) Labor costs; 3) Domestic investments; 4) Agglomeration advantages; and 5) Innovation. The results have policy implications and confirm the importance of certain location factors as suggested in the Dunning model.

Further Jose and Antonio, (2009) examined about the relationship among economic freedom and Foreign Direct Investments using European Union Countries (EU) and Middle East and North African Countries (MENA). The result of the study emphasized that economic freedom and inward FDI are positively associated, in particular in the cluster of countries that present a higher economic freedom. Further suggested that particular interest is the result that some MENA countries belong to the same cluster of most of the EU-countries. Bhavish et al., (2016) conducted an empirical study of Foreign Direct Investment and Economic Growth based on Sub Saharan Africa. The result showed that aggregated FDI does have a positive and

significant impact on economic growth and is thus consistent with the literature, especially with respect to developing countries. Krainer, (1967) applied multiple regression analysis to study the effect of resource endowment in FDI inputs and the influence of the industry's structure on private capital flows and domestic economic activity. The study covered the FDI in the United Kingdom for the period 1952 - 1962 and in the USA for the period 1950 – 1963. The countries' portfolio, the FDI, the index of capacity utilization and the ratio of the British to American long term bond yields were used as variables. It is concluded that the private FDI of both countries reacts differently to the capacity utilization changes. D'Arge, (1969) employed multiple regression analysis to investigate the effect of the establishment of trade associations in the international allocation of resource and capitals. The study regarded the European Economic Community (EEC) countries and the European Free Trade Association (EFTA) countries during 1951 – 1965 and the annual rate of the US FDI in the EEC countries and the profit rates of the FDI were taken into consideration. The research concluded that the EFTA foundation had a significant positive impact on the US FDI in the region. On the contrary, no significant impact observed for the EEC countries. Christian and Pagoulatoes, (1973) analyzed the cross section data to investigate the role of the domestic stock markets in attracting foreign capitals in sixty countries during 1962 – 1966. The variables used were GDP, gross fixed capital formation, time and demand deposits, the overall financial resources and the net inflows of funds. The study concludes that low level of domestic financial development is considered a major barrier of capital formation and production growth. Healet, (1973) applied multiple regression analysis to investigate the impact of foreign capital inflow in eight countries during 1950 to 1969. The variables studied were the GDP growth rate, the exports and the trade liberalization. The result argued that there is low correlation between exports and economic growth, except for Malaysia and Sri Lanka. Fung et al., (2003) used GLS to study the FDI in China during 1990 to 2000 taking into account the FDI, the GDP, the average wage, the literacy ratio, the infrastructures, the Special Economic Zones, the coastal cities, the Economic and Technological Development Zones the distance between the trading countries. The study concludes that labor cost in China mostly affects FDI from Hong Kong and local demands affect FDI from Japan. Moreover, FDI from Japan are mostly attracted by

the Economic and Technological Development Zones, while FDI from Hong Kong are attracted by the coastal cities and the Special Economic Zones. Finally, distance is not considered a determinant factor of FDI deriving from Japan.

Adams, (2009) used ordinary least square method (OLS) to fixes effects to study the interaction among FDI, private investment and economic growth in forty two Sub-Saharan and African region for the period of 1990 to 2003. FDI, the human capital stock, the gross domestic investment, the G.D.P., the location, the political danger, the inflation, the openness of the economy and the government consumption were used as variables. It is concluded that FDI have a negatively influence on domestic investment. Moreover Kouri, (1975) applied OLS to investigate the interaction between monetary policy and FDI in Germany during the period of 1960 to 1970. The variables used for the study were the net capital inflow, the domestic stock of wealth, the domestic interest rate, the exchange rate, foreign income, the domestic assets and the current account balance. The study concluded that the German monetary policies offset substantially FDI. Also Kouri and Porter, (1974) applied OLS to investigate the international capital flow and the balance of payments in four countries during the period of 1960 to 1970. The variables used were the total inflow of private capitals, the foreign income, the exchange rate, the domestic assets, the domestic stock of wealth and the account balance. The study concluded that income changes contribute to capital flows changes, while capital flows adapt to the host countries' monetary policies. Feldstein, (1983) applied OLS to investigate the relation between domestic savings and international capital movement in seventeen countries during 1960 to 1979. Net FDI, GDP and domestic savings were taken as variables. The result showed that the constant increase in domestic savings causes corresponding increases in domestic investment rates. Blomstrom, (1986) applied OLS to investigate the influence of multinational enterprises on the Mexican market structure for the period of 1965 to 1970. The variables studied were the market concentration, the market size, the market growth, the average gross production, and the total assets of the domestic enterprises, the advertising intensity and the foreign presence. It is argued that multinational enterprises are an independent source of concentration in the Mexican market since they raise the entry barriers for local enterprises and intense competition.

Culem, (1988) used OLS and GLS to investigate the location determinants of FDI in six European countries during 1969 to 1982. The variables taken into account were the FDI, the annual rate of GDP growth, tariff barriers, labor costs and the nominal interest rate differential. The study reached to the conclusion that the market size, the growth rate and the tariff barriers are the most important location determinants in attracting FDI.

Weisskopf (1972) used pooled OLS to investigate the impact of foreign capitals inflow on domestic savings in 44 countries during 1953 to 1966. The variables used were domestic savings, GDP, net capital inflows and total exports. It is observed that foreign capital inflows affect negatively domestic savings, while in most of the countries it is observed that foreign capitals replace domestic savings. Moreover, Weisskopf (1972) applied multiple regression analysis to study the impact of foreign capitals inflow on the economic growth of 44 countries during 1953 to 1966. The variables used were the total investment, GDP, the net inflow of foreign capital and total exports. The study concluded that trade restrictions do not constitute an obstacle in the countries' economic growth. Kim (1972) used OLS to investigate foreign capitals inflow and their effect on the Korean economic growth during 1957 to 1966. Gross domestic capital formation, private and government capital formation and increase in stock were examined. The study implied that it is essential for the Korean economy to sustain high growth rates of tax revenue and exports so as to achieve sustaining growth.

Rothgeb, (1984) applied multiple regression analysis to investigate the impact of FDI on mining and constructions in sixty two countries during 1967 to 1978. The variables considered were the FDI stock in constructions, FDI, real gross fixed capital formation, total population, per capita GDP and FDI stock in the mining industry. According to the findings FDI stock in the construction sector is positively associated to borrowing only in the USA, while only the African countries are affected by the FDI. Scaperlanda, (1967) applied multiple regression analysis to investigate whether the establishment of the EEC1 influenced the international capital allocation. The variables used are the FDI realized by the U.S.A. and the FDI in the Western European countries for the period 1951 to 1964. The researcher concluded that the establishment of the E.E.C. did not influence the international capital allocation. Erbe, (1970) applied multiple

regression analysis to investigate the causes and effects of the private capitals movement in Germany during 1955 to 1969. The variables used were the net flow of private capital, trade balance and the German and European interest rates. It is observed that the capital flow doesn't affect significantly the trade balance. Moreover, the balance of the private capitals flow affected adversely the trade valance and positively the difference between the German and the European interest rates.

Pesmazoglou, (1972) applied multiple regression analysis to investigate the interdependence among economic growth, investment and savings in forty three countries during 1957 to 1968. The variables examined were the growth rates of real GDP, gross fixed capital formation, gross domestic savings and balance of payments. In the long term, there has been observed high correlation between the growth rates of GDP and real gross fixed capital formation. Noorbakhsk et al., (2001) applied weighted least squares to investigate the impact of FDI on human capital in 36 countries during 1980 to 1994. The variables considered were the FDI, the human capital and the FDI determinant factors except for the human capital. The study concluded that human capital is a key determinant of FDI since it could influence their geographical distribution. Furthermore, FDI are positively associated to the development of the domestic markets, the stable macroeconomic environment, the trade linearization, the sufficiency in natural resources and the investment environment. Farrell et al., (2004) performed pooled regression to investigate the determinants factors of FDI deriving from Japan towards fifteen countries during 1984 to 1998. The factors studied were the FDI, the market size, the Japanese exports and imports, the labor costs, the exchange rate, the Japanese real interest rate and the antidumping measures. The study concluded that the market size is a key factor in attracting FDI. Moreover, FDI flows from Japan are mostly influenced by the macroeconomic conditions and the antidumping measures and there is a positive correlation between imports and FDI. Finally, both trade flows and F.D.I. depend on the industry of the host country.

Bevan and Estrin, (2004) used RE15 to study the determinant factors of F.D.I. in European transition countries during 1994 to 2000. The variables used were the F.D.I.,

the trading countries' size, the distance, the trade openness, the labor cost, the interest rate differential, the institutional, legal and political conditions in the host country and the prospect of EU16 membership. The study concluded that the labor cost, the market size and the distance between the trading countries are determinant factors of F.D.I., contrary to the institutional, legal and political conditions. Moreover, the prospect of E.U. membership attracts more future FDI. In another study of Bevan et al., (2004) the impact of FDI on institutional development in twelve transition countries during 1994 to 1998 was studied, using cross - section analysis. The variables used were the FDI, trading countries' size, the distance, the trade openness, the relative labor cost, the common borders, the aggregate institutional index and Russia as a dummy variable. It is argued that there is a positive correlation between F.D.I. and institutional development. In addition, FDI contribute to the development of the private enterprises, the banking sector, the trade openness and the legal development.

2.4 Summary of the Chapter

Number of researches based on this subject area was carried out by many researchers and developed models and arguments. The models developed were focused on regression method, ordinary least square method as well as time series models which incorporate with macro-economic variables.

CHAPTER 3

MATERIAL AND METHODS

3.1. Introduction

Work in the research investigates the relationship between FDI amount of a country and other influential factors. Since there were variations in FDI amount for the particular year between different countries a cross country analysis was carried out to find the relationship. In this research it is focused on developing multiple linear models to identify the factors effecting for FDI amount and conducted a FA to identify the relationship among the variables. The secondary data used and the statistical method used for this study are briefly discussed in this chapter.

3.2 Conceptualization of Framework Followed in the Research

The process followed in the research is illustrated in the Figure 3.1 and can be named as waterfall model.

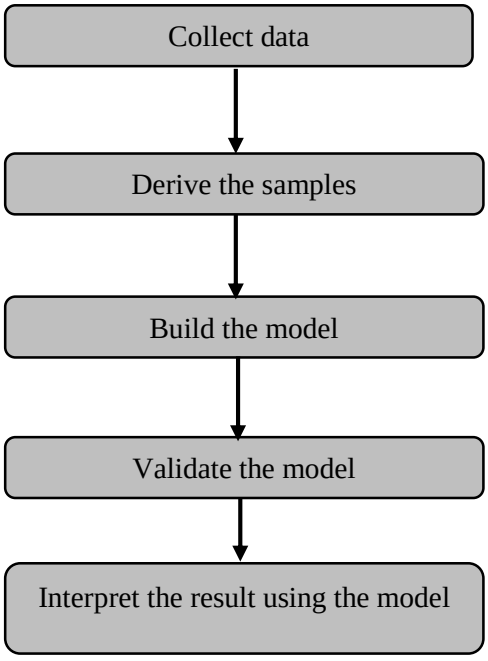

Figure 3.1 Conceptual framework of the study

3.3 Secondary Data

Data used for the research is derived from the openly available databases in the data bank of the World Bank (databank.worldbank.org). The required raw data are available for public and academic use and open access to global development and socio-economic data. The macro-economic variable and the selected indicator to quantify the macro-economic variable were described Table 3.1.

Table: 3.1 Indices for identifying influential factors.

Macro-economic variable	Selected Indicator
Economic Stability / Growth of the economy	1. GNI growth (annual %) 2. GNI per capita, Atlas method (current US$)
Skilled work force	Labor force with tertiary education (% of total)
Wages	Minimum wage for a 19-year old worker or an apprentice (US$/month)
Corporate Taxes	Total TAX rate (% of profit)
Rules and Regulations	Procedures required to start a Business (number)
National Debt	Central Government Debt, Total (% of GDP)
Business Policies	Time required to start a business (days)

All the data in the database include the collection of secondary data cover the selected subject area with the definitions for the indices. The sources of the selected indices were given in the Table 3.2.

Table: 3.2 Sources for the Data.

Indicator	Source
Foreign direct investment, net inflows (BoP, current US$)	International Monetary Fund, Balance of Payments database, supplemented by data from the United Nations Conference on Trade and Development and official national sources.

GNI growth (annual %)	World Bank national accounts data, and OECD National Accounts data files.
GNI per capita, (current US$)	World Bank national accounts data, and OECD National Accounts data files.
Labor force with tertiary education (% of total)	International Labour Organization, Key Indicators of the Labour Market database.
Wage and salaried workers,	International Labour Organization, Key Indicators of the Labour Market database.
Total tax rate (% of profit)	World Bank, Doing Business Project http://www.doingbusiness.org/ExploreTopics/PayingTaxes
Central government debt, total (% of GDP)	International Monetary Fund, Government Finance Statistics Yearbook and data files, and World Bank and OECD GDP estimates.
Procedures required to start a business (number)	World Bank, Doing Business Project (www.doingbusiness.org/ExploreTopics/StartingBusiness)
Time required to start a business (days)	World Bank, Doing Business Project (www.doingbusiness.org/ExploreTopics/StartingBusiness)

3.4 Definition of the Indices

Detailed definitions for the indices given in the Table 3.2 were given in the Section 3.4.1 to 3.4.9.

3.4.1 Foreign direct investment, net inflows (BOP, current US$) - Foreign direct investment refers to direct investment equity flows in the reporting economy. It is the sum of equity capital, reinvestment of earnings, and other capital. Direct investment is a category of cross-border investment associated with a resident in one economy having control or a significant degree of influence on the management of an enterprise that is resident in another economy. Ownership of 10 percent or more of the ordinary

shares of voting stock is the criterion for determining the existence of a direct investment relationship. Data are in current US dollars.

3.4.2 GNI Growth (Annual %) - GNI (formerly GNP) is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad.

3.4.3 GNI per capita, Atlas method (current US$)- GNI per capita (formerly GNP per capita) is the gross national income, converted to US dollars using the World Bank Atlas method, divided by the midyear population. GNI is the sum of value added by all resident producers plus any product taxes (less subsidies) not included in the valuation of output plus net receipts of primary income (compensation of employees and property income) from abroad. GNI, calculated in national currency, is usually converted to US dollars at official exchange rates for comparisons across economies, although an alternative rate is used when the official exchange rate is judged to diverge by an exceptionally large margin from the rate actually applied in international transactions. To smooth fluctuations in prices and exchange rates, a special Atlas method of conversion is used by the World Bank. This applies a conversion factor that averages the exchange rate for a given year and the two preceding years, adjusted for differences in rates of inflation between the country, and through 2000, the G-5 countries (France, Germany, Japan, the United Kingdom, and the United States). From 2001, these countries include the Euro area, Japan, the United Kingdom, and the United States.

3.4.4 Labor force with tertiary education (% of total) - Labor force with tertiary education is the share of the total labor force that attained or completed tertiary education as the highest level of education.

3.4.5 Wage and salaried workers, total (% of total employed) - Wage and salaried workers (employees) are those workers who hold the type of jobs defined as "paid employment jobs," where the incumbents hold explicit (written or oral) or implicit employment contracts that give them a basic remuneration that is not directly dependent upon the revenue of the unit for which they work.

3.4.6 Total tax rate (% of profit) - The total tax rate measures the amount of taxes payable by medium-size businesses after accounting for deductions and exemptions, expressed as a share of commercial profits. The taxes withheld (such as sales or value added tax or personal income tax) but not paid by the company are excluded. The total tax rate is designed to provide a comprehensive measure of the cost of all the taxes a business bears. This methodology is consistent with the Total Tax Contribution framework developed by PricewaterhouseCoopers.

3.4.7 Central government debt, total (% of GDP) - Debt is the entire stock of direct government fixed-term contractual obligations to others outstanding on a particular date. It includes domestic and foreign liabilities such as currency and money deposits, securities other than shares, and loans. It is the gross amount of government liabilities reduced by the amount of equity and financial derivatives held by the government. Because debt is a stock rather than a flow, it is measured as of a given date, usually the last day of the fiscal year.

3.4.8 Procedures required to start a business (number) - The number of procedures required to legally operate a commercial or industrial firm are recorded, including interactions to obtain necessary permits and licenses and to complete all inscriptions, verifications, and notifications for starting operations. Data are for limited liability companies with certain standardized characteristics in order to facilitate comparisons between economies.

3.4.9 Time required to start a business (days)- The number of calendar days needed to complete all required procedures to legally operate a commercial or industrial firm are recorded by this indicator. Requirements may include obtaining necessary licenses and permits as well as completing any required notifications, verifications, and inscriptions for the company and its employees with relevant authorities. The measure captures the median duration that incorporation lawyers indicate is necessary to complete each procedure. If a procedure can be speeded up at additional cost, the fastest procedure, independent of cost, is chosen.

3.5 Statistical Methodology Used

Objective of this research is to identify the relationship between FDI and macro-economic variables. The multiple linear regression method was used to build the model. And factor analysis method were used to identify relationship among macro-economic variables. There are hundred and ninety nine countries in the database. The populations of hundred and ninety nine countries was reduced to forty five countries during the sampling and data validation stages. Proportionate stratified sampling method was used to derive the sample from the population of hundred and ninety nine countries and ten MR models were developed using randomly selected thirty five countries. In addition the factor analysis methodology were used to identify relationship among factors.

3.5.1 Modeling via Multiple Regression

Multiple regression is an extension of simple linear regression. It is used when researchers want to predict the value of a response variable based on the value of two or more other explanatory variables. And multiple regressions separate causal factors, analyzing each one's influence on what trying to explain (Baker, 2006). The common multiple regression model is given by,

$$Y = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \ldots + \beta p X_{pi} + \varepsilon_i \quad \text{--------} \quad (3.1)$$

Where Y represent the dependent variable;

$X_1, \cdots, X_m$ represent the several independent variables;

$\beta_0, \cdots, \beta_m$ represent the regression coefficient and;

ε represent the random error and is assumed $\varepsilon_i \sim N(0,\sigma)$

Interpretation of β_0 is the expected value of Y when $X_1, X_2 \ldots X_K$ are all equal to zero. Interpretation of partial regression coefficient β_i (i=1,2,3, … P) is for every unit (increase/decrease) in the value of X_1 we predict a β_1 change in Y, controlling for the effect of the other explanatory variables. Three dimensional interpretation for multiple linear regression can be seen as is given in Figure 3.2 (www.sjsu.edu)

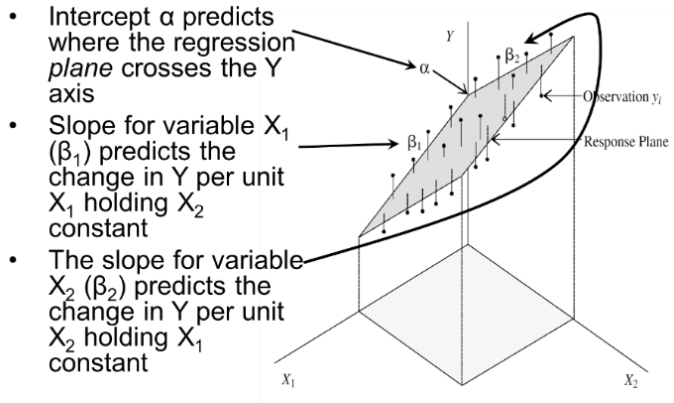

Figure 3.2 three dimensional interpretations for multiple linear regressions

The equation 3.1 be written in the matrix form is as follows

$$\mathbf{y} = \mathbf{X}\boldsymbol{\beta} + \boldsymbol{\epsilon} \quad \text{---------- (3.2)}$$

where

$$\mathbf{y} = \begin{bmatrix} y_1 \\ y_2 \\ \vdots \\ y_n \end{bmatrix}, \quad \mathbf{X} = \begin{bmatrix} x_{10} & x_{11} & \cdots & x_{1k} \\ x_{20} & x_{21} & \cdots & x_{2k} \\ \vdots & \vdots & \vdots & \vdots \\ x_{n0} & x_{n1} & \cdots & x_{nk} \end{bmatrix}$$

$$\boldsymbol{\beta} = \begin{bmatrix} \beta_0 \\ \beta_1 \\ \vdots \\ \beta_k \end{bmatrix}, \quad \boldsymbol{\epsilon} = \begin{bmatrix} \epsilon_1 \\ \epsilon_2 \\ \vdots \\ \epsilon_n \end{bmatrix}$$

The parameters can be estimated using the estimator values of Y is given by,

$$\hat{\beta} = (X^T X)^{-1} X^T Y \quad \text{----------} \ (3.3)$$

Where $X(X^T X)^{-1} X^T$ is Hat matrix (Cohen, 1983).

The hat matrix, H, is an idempotent matrix and is a symmetric matrix. i.e. $H^2 = H$.

3.5.2 Hypothesis testing in multiple linear regression

The significance of the model is tested from the following hypothesis,

H_0: Fitted model is not significant.

H_1: Fitted model is significant.

Under the H_0 the test statistics F is given by,

$$F_0 = \frac{SS_R / k}{SS_{\text{Res}} /(n-k-1)} = \frac{MS_R}{MS_{\text{Res}}} \sim F_{k,n-k-1}$$ ---------- (3.4)

Where SSR and SS_{Res} are the regression sum of squares and residual sum of squares respectively. The significant of each parameter in the model is tested by the following hypothesis,

H_0: $\beta_i = 0$ Vs. H_1: $\beta_i \neq 0$ (i= 1, 2, 3 … p)

Under the H_0 the test statistics is,

$$t = \frac{\beta^\wedge}{SE(\beta^\wedge)} \sim t_{\text{ n-k-1}}$$ ---------- (3.5)

However it should be noted that the significance of the overall model does not mean that the all variables in the model are significant.

3.5.3 Problems in multiple regression models

a) **Outliers:** These can have considerable impact upon the regression solution and their inclusion needs to be carefully considered. Checking for extreme values should form part of the initial data screening process and should be performed on both the response and explanatory variables. Univariate outliers can simply be identified by considering the distributions of individual variables say by using boxplots. Multivariate outliers can be detected from residual scatterplots.

b) **Multicollinearity and singularity:** Multicollinearity exists when there are high correlations among the explanatory variables. Singularity exists when there is perfect correlation between explanatory variables. The presences of either affect the interpretation of the explanatory variables effect on the response variable. Also it can lead to numerical problems in finding the regression solution. The presence of multicollinearity can be detected by examining the correlation matrix (say r= 0.9 and above). If there is a pair of variables that appear to be highly multicollinear then only one should be used in the regression. Note; some context dependent thought has to be given as to which one is to retain.

c) **Normality, linearity, homoscedasticity and independence of residuals:** The first three of these assumptions are checked using residual diagnostic plots after having fitted a multiple regression model. The independence of residuals is usually

assumed to be true if we have indeed collected a random sample from the relevant population.

3.5.4 Model Selection Process

Four selection procedures were used to yield the most appropriate regression equation: forward selection, backward elimination, stepwise selection, and block-wise selection. The first three of these four procedures were considered as statistical regression methods. Many times researchers used sequential regression (hierarchical or block-wise) entry methods that do not rely upon statistical results for selecting predictors. Sequential entry allows the researcher greater control of the regression process. Items are entered in a given order based on theory, logic or practicality, and are appropriate when the researcher has an idea as to which predictors may impact the dependent variables (Mallows, 1973).

a.) Forward selection method: Forward selection begins with an empty equation. Predictors are added one at a time beginning with the predictor with the highest correlation with the dependent variable. Variables of greater theoretical importance are entered first. Once in the equation, the variable remains there.

b.) Backward elimination method: Backward elimination is the reverse process. All the independent variables are entered in the equation first and each one is deleted one at a time if they do not contribute to the regression equation.

c.) Stepwise selection method: Stepwise selection is considered a variation of the previous two methods. Stepwise selection involves analysis at each step to determine the contribution of the predictor variable entered previously in the equation. In this way it is possible to understand the contribution of the previous variables now that another variable has been added. Variables can be retained or deleted based on their statistical contribution.

d.) Sequential Regression Method of Entry: Block-wise selection is a version of forward selection that is achieved in blocks or sets. The predictors are grouped into blocks based on psychometric consideration or theoretical reasons and a stepwise selection is applied. Each block is applied separately while the other predictor

variables are ignored. Variables can be removed when they do not contribute to the prediction. In general, the predictors included in the blocks will be inter-correlated. Also, the order of entry has an impact on which variables will be selected; those that are entered in the earlier stages have a better chance of being retained than those entered at later stages.

3.5.5 Model Diagnostics methods

In the model development process the most demanding stage is validation of the model or checking the adequacy of the developed model. Diagnostic procedures are intended to check how well the assumptions of multiple linear regression were satisfied. Infringement of those assumptions caused, doubt on the validity of the conclusions drawn on the basis of the results. The model diagnostics and validating methods used in this research were expressed in point (a) to (h).

a.) Residual plots: Residual plots are the best single check for violation of assumptions, such as: variance not being constant across the explanatory variables, fitted relationships being non-linear, Random variation not having a normal distribution. Residual are the difference between the calculated mean value of Y (this is also the fitted value as determined by the regression line) and the actual observed value of Y for a given value of the explanatory variable. Thus the residuals illustrate how well the model fits the data. One problem with using residuals is that their values depend on the scale and units used.

b.) Leverage: Data points which are a long distance away from the rest of the data, can exercise undue influence on the regression line. A long distance away means an extreme value (either too low or too high compared to the rest). A point with a large residual is called an outlier. Such data points are of interest because they have an influence on the parameter estimates. Leverage is a way of checking on extreme values. Data points with high leverage have the potential of moving the regression line up or down as the case may be. High leverage points make estimation of β coefficients inaccurate. Any conclusions drawn about which explanatory variables are related to the response variable could be misleading. Similarly any predictions made on the basis of the regression model could be wrong.

c.) **Standardized residuals:** It is calculated by dividing the residual by its standard error. The standardized residual greater than 2 requires close scrutiny since it indicates that an observation is unusual in the Y value.

d.) **Cook's Distance:** If leverage gives a signal about data points that have the potential of influencing the regression line then Cook's Distance indicates how much actual influence each case has on the slope of the regression line. Cook's Distance is a measure of the distance between coefficients calculated with and without the particular data points. It takes into account both leverage and residuals. Cook's D can be interpreted as a measure of how different the regression coefficients (including the intercept) would be if the particular observation is left out of the analysis altogether. Cook's D is thus a way of identifying data points that actually do exert too big an influence. Large values for Cook's Distance signify unusual observations. Values >1 require careful checking; those >4 are potentially serious outliers. Values of Cook's Distance in the analysis of the current data set are listed next.

Cook (1977, 1979) suggested to use a measure of the squared distance between the least-square estimate based on the estimate of the n points and the estimate obtained by deleting the i^{th} point.

Points with large values of Di have considerable influence on the least-square estimate. The magnitude of Di is usually assessed by comparing it to F, p, n-p.

If Di = F0.5, p, n-p, then deleting point *I* would move to the boundary an approximate 50% confidence region for based on the complete data set.

e.) **Studentized residual:** Studentized residual is the quotient resulting from the division of a residual by an estimate of its standard deviation. Typically the standard deviations of residuals in a sample vary greatly from one data point to another even when the errors all have the same standard deviation, particularly in regression analysis; thus it does not make sense to compare residuals at different data points without first studentizing. It is a form of a Student's t-statistic, with the estimate of error varying between points.

f.) **DFFITS**: The DFFITS (sometimes written as DFITS) measure the influence of an observation on the fitted value for that observation. Values of DFFITS are considered large if they exceed 1, or for large sample sizes if they exceed.

DFFITS is the number of standard deviation that the fitted value changes if observation i is removed. DFFITS is also affected by both leverage and prediction error. Cutoff value: $2(p_n)$ 1/2

g.) **PRESS Residuals:** Because unusual observations can have a large effect on the fitted model, pulling it towards them, they in effect hide themselves: their effect on the model causes their residuals to be small. This can be prevented by the same process underlying the PRESS cross-validation measure: the fitted value used to calculate a given residual can be gotten by predicting that observation using the model fit obtained by excluding that observation. Hence the "deleted" part of the name refers to the observation (in effect) having been deleted from the dataset when the model was fit; the "Studentized" part of the name again refers to dividing the deleted residual by its standard error. As was noted for PRESS, the model doesn't actually have to be re-fit with each observation deleted in turn: the deleted residuals can be calculated from the regular residuals and the hat matrix.

h.) **Multicollinearity:** Multicollinearity is the condition of two or more of the independent variables being highly correlated. This includes the situation in which one variable is correlated with some linear combination of two or more other variables, while not particularly correlated with any of the other variables alone. Because of this latter possibility, simple bivariate correlations or scatterplots of the independent variables may not be adequate for detecting collinearity. The most straightforward measure of collinearity which is adequate to address this situation is what is called the Variance Inflation Factor (VIF). There is a VIF for each term in the model. An individual VIF is considered large indicative of a problem if it is larger than 10. In addition, if the average of the VIFs is considerably larger than 1, this too is considered to indicate a problem. VIFs do not tell how many collinearities there are, or which variables are included in them. There are other more sophisticated measures, based on eigenvalues and eigenvectors of the matrix of X_s, which provide more detailed information about collinearity, if this ever seems like it would be useful. Interpretation of VIF is as follows,

Table 3.3: Interpretation of VIF.

VIF	Status of predictors
VIF = 1	Not correlated
1 < VIF < 5	Moderately correlated
VIF > 5 to 10	Highly correlated

3.6 Sampling Methods

Sampling method refers to the rules and procedures by which some elements of the population are included in the sample. Some common sampling methods are simple random sampling, stratified sampling, and cluster sampling. In this research the Proportionate stratified sampling technique were used.

3.6.1 Stratified sampling method

In stratified sampling the population of N units is first divided into subpopulations of N_1, N_2, . . . ,N_l units, respectively. These subpopulations are non-overlapping, and together they comprise the whole of the population, so that,

$$N_1, N_2, \ldots, N_l = N$$

The subpopulations are called strata. To obtain the full benefit from stratification, the values of the N_i must be known. When the strata have been determined, a sample is drawn from each, the drawings being made independently in different strata. The sample sizes within the strata are denoted by n_1 n_2,..., n_L, respectively. If a simple random sample is taken in each stratum, the whole procedure is described as stratified random sampling. If a simple random sample is taken in each stratum, the whole procedure is described as stratified random sampling. And (Cochran, 1974) described the principle reasons for using the stratifies sampling technique,

a) If data of known precision are wanted for certain subdivisions of the population, it is advisable to treat each subdivision as a "population" in its own right.
b) Administrative convenience may dictate the use of stratification; for example, the agency conducting the survey may have field offices, each of which can supervise the survey for a part of the population.

c) Sampling problems may differ markedly in different parts of the population. With human populations, people living in institutions (e.g., hotels, hospitals, prisons) are often placed in a different stratum from people living in ordinary homes because a different approach to the sampling is appropriate for the two situations. In sampling businesses we may possess a list of the large firms, which are placed in a separate stratum. Some type of area sampling may have to be used for the smaller firms.

d) Stratification may produce a gain in precision in the estimates of characteristics of the whole population. It may possible to divide a heterogeneous population. Figure 3.3 describe the basic structure for stratified sampling.

$$\leftarrow - - - - - - - - - - - STRATA - - - - - - - - - - - \rightarrow$$

$$N_1 \quad N_2 \quad N_3 \ldots\ldots\ldots\ldots N_i \ldots\ldots\ldots\ldots N_k \Rightarrow \sum_{i=1}^{k} N_i = N \quad Population$$

$$n_1 \quad n_2 \quad n_3 \ldots\ldots\ldots\ldots n_i \ldots\ldots\ldots\ldots n_k \Rightarrow \sum_{i=1}^{k} n_i = n \quad Sample$$

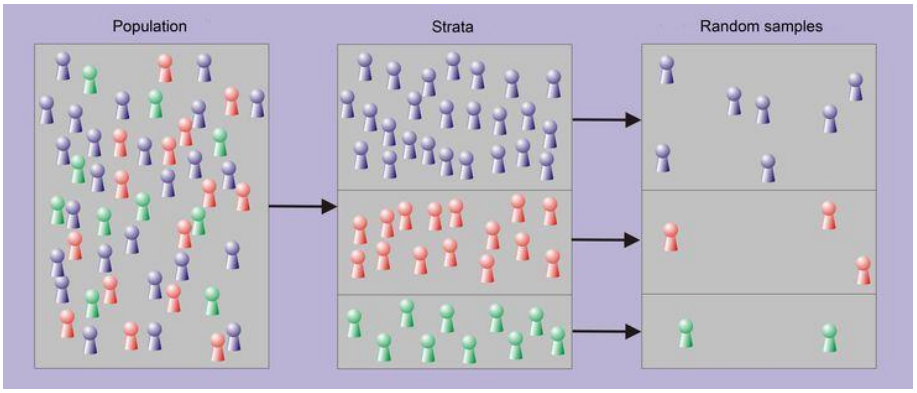

Figure 3.3 Stratified sampling methodology

3.6.2 Mean and the Variance of the Estimator

The mean and variance are given by equation (3.4) and (3.5) respectively (Cochran, 1974).

k = Total Number of strata

N_i = Number of Elements (or population) in the i^{th} stratum in the population

n_i = Number of Elements Selected in the i^{th} stratum

x_{ij} = Value of the $x-$Characteristic of j^{th} unit in the i^{th} stratum in the sample

N = Number of Elements in the population

$$\text{Estimator of } \bar{X} = \bar{x}_{st} = \frac{\sum_{i=1}^{k}(N_i \bar{x}_i)}{N} = \sum_{i=1}^{k}\left(N_i/N\right)\bar{x}_i = \sum_{i=1}^{k} W_i \bar{x}_i \quad -------(3.6)$$

$$\text{where } W_i = N_i/N \quad \Rightarrow \text{Sratum Weight (i.e. the weight for the } i^{th} \text{ stratum)}$$

$$\text{Variance Estimator of } \bar{x}_{st} = Var(\bar{x}_{st}) = Var\left[\sum_{i=1}^{k} W_i \bar{x}_i\right]$$

$$Var(\bar{x}_{st}) = \sum_{i=1}^{k} W_i^{\,2} Var(\bar{x}_i) = \sum_{i=1}^{k} W_i^{\,2}(1-f_i)\left(s_i^{\,2}/n_i\right)$$

$$= \sum_{i=1}^{k} W_i^{\,2}\left[1-\frac{n_i}{N_i}\right].\frac{s_i^{\,2}}{n_i} = \sum_{i=1}^{k} W_i^{\,2}\left[\frac{1}{n_i}-\frac{1}{N_i}\right].s_i^{\,2}$$

$$= \sum_{i=1}^{k}\left\{\left[\frac{W_i^{\,2}}{n_i}-\frac{W_i}{N}\right].s_i^{\,2}\right\} \quad ----------(3.7)$$

$$\text{where } s_i^{\,2} = \frac{1}{(n_i-1)}\sum_{j=1}^{n_i}\left(x_{ij}-\bar{x}_i\right)^2$$

The Estimator for the total ($\hat{X}$) is given by equation (3.8)

$$\hat{X} = x_{st} = \sum_{i=1}^{k} N_i \bar{x}_i = N\sum_{i=1}^{k}\frac{N_i}{N}\bar{x}_i = N\sum_{i=1}^{k} W_i \bar{x}_i = N\bar{x}_{st} \quad ----------(3.8)$$

$$Var(x_{st}) = N^2 \sum_{i=1}^{k}\left\{\left[\frac{W_i^{\,2}}{n_i}-\frac{W_i}{N}\right].s_i^{\,2}\right\}$$

$$SE(x_{st}) = \sqrt{Var(x_{st})} = N\sqrt{\sum_{i=1}^{k}\left\{\left[\frac{W_i^{\,2}}{n_i}-\frac{W_i}{N}\right].s_i^{\,2}\right\}}$$

$$100(1-\alpha)\%\ \text{Confidence Interval} \Rightarrow x_{st} \pm z_\alpha . SE(x_{st})$$

3.6.3 Proportionate stratified random sample

In proportional stratified random sampling, the size of each stratum is proportionate to the population size of the strata when examined across the entire population. This means that each stratum has the same sampling fraction.

$$\frac{n_i}{N_i} = \frac{n}{N}; \qquad \therefore n_i = \left(\frac{N_i}{N}\right)n = W_i n \qquad \Rightarrow W_i = \frac{N_i}{N} = \frac{n_i}{n}$$

$$\bar{x}_{st(prop)} = \sum_{i=1}^{k}\left(\frac{N_i}{N}\right)\bar{x}_i = \left(\frac{n_i}{n}\right)\bar{x}_i = \sum_{i=1}^{k}\frac{n_i}{n}\sum_{i=1}^{n_i}\frac{x_{ij}}{n_i} = \sum_{i=1}^{k}\sum_{j=1}^{n_i}\left(\frac{x_{ij}}{n}\right) ----(3.9)$$

$$SE(\bar{x}_{st})_{prop} = \sqrt{Var(\bar{x}_{st})_{prop}} = \sqrt{\sum_{i=1}^{k}\left\{W_i\left[\frac{1}{n} - \frac{1}{N}\right].s_i^{\,2}\right\}}$$

3.7 Factor Analysis

FA has been classified in to two types' namely exploratory factor analysis and confirmatory factor analysis. Exploratory factor analysis is a statistical method used to uncover the underlying structure of a relatively large set of correlated variables. Confirmatory factor analysis is a special form of FA, most commonly used in social research. It is a statistical test to test whether the data fit a hypothesized measurement model based on exploratory factor analysis (EFA). In most application EFA is commonly used and it is generally refer as factor analysis (FA).

FA detects relationships between correlated variables by examining variances and covariance of the system consist of several variables. The objective of FA is to discover simple pattern in the pattern of relationship among the variables (Peiris, 2016). In particular FA seeks to discover if the observed covariance or correlation structure of the set of responsible variables can be explained largely or entirely in terms of smaller number unobserved able variables are called factors. FA can be considered as a statistical data mining (reduction) method. It attempts to find unobservable (latent) variables that are reflected in the observed variables (manifest variables). A typical FA finds solutions for,

I) How many different factors are required to explain the pattern of relationship among the variables?

II) What is the nature of such factors?

III) How well do the hypothesized factors explain the observed data?

3.7.1 Basic Theory of FA

Let us assume that one observes p response variables: $X=X_i$ (i=1, 2…p) of n subjects from a population with mean vector μ and variance-covariance matrix ∑. The FA model assumes that there are m (<p) underlying common factors (say, F_i: i=1, 2…m) and the FA model for m-factors is written as,

$$X_i = \mu_i + \lambda_{i1}F_1 + \lambda_{i2}F_1 + \cdots . + \lambda_{im}F_m + \eta_i \quad i = 1,2, \dots p$$

Where λ_{ij} is the factor loading of the j^{th} factor and i^{th} response variable, η_i is known as unique factors for a given X_i. Without loss of generality it can be assumed that $\mu_i=0$ for all i and thus the m-factor model becomes,

$$X\_i = \lambda\_i1\ F\_1 + \ [\![\lambda\_i2\ F\_1 + \cdots . + \lambda\_im\ F\_m + \eta]\!]\_i \quad i = 1,2, \dots p$$

In a matrix form the above FA model can be written as $X=\Lambda F+ \eta$

where, $\mathbf{X} = [X_1, X_2, \dots . . X_P]^T$, $\mathbf{F} = [F_1, F_2, \dots F_M]^T$, $\boldsymbol{\eta} = [\eta_1, \eta_2, \dots, \eta_P]^{\mathbf{T}}$ and $\boldsymbol{\Lambda} = [\lambda_{i,j}]_{pxm}$

In fact, it is a good practice to carry out FA for the standarized data. The following assumptions are made when FA is carried out for standarized data. Means of the original variables, common factors and unique factors, are zeros. Variances of the original variables, common factors and unique factors, are one. The unique factors are not correlated among themselves or with the common factors.

3.7.2 Appropriateness of Data for FA

Once it is decided to carry out FA, the first step is to check whether the data is appropriate for FA. The tests to be carried out prior to FA are:

I. Correlation matrix of the observed variables,

II. Kaiser-Meyer-Olkin (KMO) Statistic,

III. Chronbach's alpha Statistic (mainly for categorical data) and

IV. Normality of the variables (for continuous data if hypothesis tests to be done).

Correlation Matrix: It is required that there is a high significant correlation among variables. This can be tested using Bartlett test under $[\![H]\!]\_0: \Sigma=I$ vs $H\_1: \Sigma \neq I$. The null hypothesis should be rejected to satisfy for FA.

a.) **KMO Statistics:** This is a popular diagnostic measure of sampling adequacy which compares the correlation coefficients and partial correlation coefficients. This statistic can easily be obtained from SPSS. In order to carry out FA, this measure should be greater than 0.6.

b.) **Reliability Test:** Reliability in statistics is the overall consistency of a measure of data when data are acquired using multiple Likert questions in a survey/questionnaire that form a scale. The statistic known as Chronbach's alpha statistic gives an idea about the internal consistency of data. A measure is said to have a high reliability if it produces similar results under consistent conditions. The minimum value of this statistic recommended for data consistency is 0.8.

c.) **Normality:** This condition is necessary when objective criteria are used in FA. The standard Anderson-Darlington test or standard Q-Q plots can be used to check the normality. Normality is usually used when the factors are extracted using maximum likelihood criteria and to test the minimum number of factors to be tested. However, FA is heavily used by social scientists for categorical data. In such case normality assumption is not required.

3.7.3 Extraction of Factors

Many different methods have been proposed for extraction of factors. The most popular techniques are: Principal Component Factoring (PCF), Principal Axis Factoring (PAF) and Maximum Likelihood Factoring (MLF).

3.7.4 Identification of Number of Factors

One of the most important decisions in FA is to decide the number of common factors (m) that are driving the values of the variables actually being measured. The common method is to start with a PCA and determine how many principal components would be required based on the size of eigenvalues. The common rule is to select the factors with an eigenvalue of ≥1. Another option is the scree plot. A scree plot shows downward curve as $\lambda_1>\lambda_(2>\cdots.>\lambda_p$). The point where the slope of the curve is clearly leveling off (the "elbow") indicates the number of common factors for the FA. However, there is no guarantee that the number of common factors for FA is the same

as the number of principal components. Some subjective and objective criteria have been suggested.

a.) Subjective Criteria

(a) The ψ_i' s (i=1,2…p) in the factor model should all be close to zero. That is V (Xi) from the factor model is close to one. In other words all the communalities should close to one. That is, $\sum_{j=1}^{m} \lambda_{ij}^2$ should close to one for all i's (i=1, 2, ….p).

(b) Difference between the correlations among observed variables and those that are reproduced by the FA model should be close to zero. That is, the reproduced correlation matrix based on the factor model to be as close to the values in the original correlation matrix.

Note: The outputs related to above (a) and (b) can be obtained from SPSS.

b.) Objective Criteria

To use this approach it is assumed that data come from multivariate normal. Under this a null hypothesis, H_0: q factors are sufficient vs H1: more factors are needed, can be tested using likelihood ratio test (LRT) statistic. This is a good method to consider when data come from a multivariate normal distribution. To decide the minimum number of factors, it is recommended to carry out LRT test sequentially by adding number of factors one at a time, starting from one. Under H0, the test statistic is distributed chi-square with degrees of freedom of $((p-m)^2-(p-m))/2$.

3.7.5 Rotating Factors

In general, when a set of factors is derived, they are not easy to interpret. In order to make the factors more meaningful and simple, factors are rotated using orthogonal transformation. In other words, rotation procedures try to make some factor loadings close to zero and other factor loadings to be large. Therefore FA can be considered as, "simplification of loading matrix in PCA". The beauty of orthogonal rotation is that the rotation procedures keep the factors uncorrelated as the initial factors are also orthogonal. The popular orthogonal rotations in SPSS are: (i) Varimax, (ii) Quartimax and (iii) Equimax. The major objective of rotation methods is to obtain pattern loadings such that all variables have a high loadings in one factor and each variable

should have a high loading on other factor and near zero loadings on the remaining factors.

The factors derived using oblique rotation are not orthogonal to each other. Thus the interpretation of the factor structure resulted via oblique rotation is more complex and generally not used very often.

3.7.6 Factor Score Coefficients

Once each observed variable is represented by linear functions of common factors and unique factors, it is necessary to define factors also from original (selected) variables. In other words, unlike principal components scores, which are computed, the factor scores have to be estimated in FA. Multiple linear regressions is one of the methods used to estimate factor score coefficients. If $\hat{F}_i$ be the estimated factor score for the i^{th} factor then,

$\hat{F}_i = \hat{\beta}_1 x_{i1} + \hat{\beta}_2 x_{i2} + \hat{\beta}_3 x_{i3} + \cdots \ldots + \hat{\beta}_p x_{ip}$(i=1,2…..m).

Thus $\beta_i's$ are the coefficients of linear combinations to predict values of the selected factors and these coefficients are known as factor score coefficients. The factor score coefficients are functions of the original standardized. Thus factor score can depend on the type of rotation as well as type of extraction. In other words, the factor scores are not unique. As a result some researchers hesitate to use the factor scores for interpretation. However, my personnel experience is that once you decide the type of rotation and type of factor extraction method, get the factor score coefficients under that environment and interpret.

It is recommended to use different rotation methods and the different extraction methods only to check whether the results (that is, number of factors and identified variables for each factor) are invariant.

3.8 Statistical Tools Used in Data Analysis.

Data analysis is a process used to inspect, clean, transform and remodel data with a view to reach to a certain conclusion for a given situation. Data analysis is typically of two kinds: qualitative or quantitative. The type of data dictates the method of analysis. In qualitative research, any non-numerical data like text or individual words are analyzed. Quantitative analysis, on the other hand, focuses on measurement of the data

and can use statistics to help reveal results and conclusions. The results are numerical. In some cases, both forms of analysis are used hand in hand. For example, quantitative analysis can help prove qualitative conclusions.

Since data analysis part plays a vital role in the research it is critical to select correct data analysis methodologies as well as data analysis tools. In this research IBM SPSS version 22 is used to conduct the multiple liner regression analysis. The main benefit of SPSS compared to other statistical data analysis tools are, effective data management, wide range of options and better output organization. And to obtain certain statistics and indices MINITAB version 17 is used.

To conduct stratified sampling Microsoft Excel was used. The benefit of Excel compared to other types of spread sheet software's are user friendly interface, manages and organize massive data, provides better analysis, enjoy powerful and improved table features and Share spreadsheets.

CHAPTER 4

RESULT AND DISCUSSION

4.1 Introduction

This chapter of the thesis is focused on selection of samples, development of statistical model and interpret the results of the developed regression model and use the factor analysis methodology for the in-depth interpretation of the model.

4.1.1 Mapping of Variables.

The selected macro-economic variables were mapped in to short form for the purpose of software use and minimizing the complexity of long names. The abbreviations of the variables given below.

FDI- amount of foreign direct investment of the particular year.

GNI_GRWT- gross national income growth.

GNI_PC- gross national income per capita.

CB_DBT- central government debt rate.

PROC_REQ- procedure required to start new business.

TIME_REQ- time required to start new business.

TOT_TAXRT- total tax rate.

LBRTRT-EDU- labour force territory education.

WGASL_WRK- wages and salaries of workforce.

4.2 Sampling Procedure and Sample Size.

In every research, the critical step is selecting the correct sample. In this research, the random variable was considered as the annual FDI amount in USD. It was noted that annual FDI among countries is highly heteroscedastical and in fact coefficient of variation is greater than 100% (365%). Therefore, simple random sampling cannot be done within the population. In order to divide the total population (countries) into different stratas, basic descriptive statistics of FDI amount such as 25th, 50th and 75th quartile values were used (Table 4.1).

Table 4.1 Descriptive statistics of FDI amount

Statistics		Value (USD)
Mean		10770.81
Median		719.04
Mode		.00
Std. Deviation		39412.59
CV		365%
Variance		1553352475.97
Minimum		-20716.15
Maximum		379434.00
Percentiles	25	105.89
	50	719.04
	75	3712.31

Based on the results in Table 4.1 it is clear that the FDI amount varies from negative 20,716.15 million to 379,434 million USD (The negative amount of FDI entail the outflow of FDI while positive value denote inflow). To choose each and every country from raised range, the percentiles based categorizing method was used to develop stratums. For occupying negative FDI amounts or FDI outflows into one strata, a separate strata was reserved for negative FDI values. Other four starts strata was based on P_{25}, P_{50} and P_{75} values of FDI amount (Table 4.1). The identified five stratas are shown in Table 4.2.

Table 4.2 Range of FDI amount for the selected 5 strata

Strata	Value Range
Strata 1	< 0
Strata 2	0>FDI<105.89
Strata 3	105.89> FDI < 719.04
Strata 4	719.04> FDI < 3712.31
Strata 5	> 3712.31

4.2.1 Sample Size

The sample size (n) was computed using the formula suggested by UNND (2010). The equation used to give the sample size (n) is:

$$n \geq \frac{\alpha^2 N\, p\,(1-p)}{(N-1)\delta^2 \times P^2 + \alpha^2 P(1-p)} \quad ------(4.1)$$

Where

N = Total size of the population

P = Expected proportion (p was takes as 0.5 since as p (1-p) is maximized at p=0.5)

α= Critical value at 95% level under normal distribution

δ= Desired relative precision

By taking α=1.96 and δ=0.01 it was found that the minimum sample size required is 54.

4.2.2 Distribution of Sample Size

The sample size of 54 was allocated among five stratas based proportional sampling (Table 4.3).

Table 4.3 Distribution of sample size

Stratum	Values of FDI Range for stratas			Number of countries	Proportion	Sample Size
Stratum 1	-20716.15	to	0	20	0.10	5
Stratum 2	0	to	105.89	29	0.15	8
Stratum 3	105.89	to	719.04	50	0.25	14
Stratum 4	719.04	to	3712.31	51	0.26	14
Stratum 5	3712.31	to	379434	49	0.25	13
Total				199		54

In the proportionate stratification the Strata 4 has highest proportion, and represents 26% of the total sample size. Further that the proportion of the Stratum 4 acquire 14

units form the sample. Likewise Strata 3 and 5 have 14 and 13 units respectively. Strata 1 has 10% of proportion and allocated 5 units while strata 2 have 15% and allocated 8 units. More details of the stratums are given in the Annexure 1. Since the negative or outflow of the FDI can be due to the fact divestment is greater than investment, those countries were removed from the further analysis. Furthermore, five countries were ignored by since all the variables considered for the analysis were not available for those countries. Hence only forty four (44) countries were finally considered in the model building process.

4.3 Identification of Significant Factors

The basic descriptive statistics of the dependent variables, (FDI) and other eight explanatory variables are given in Table 4.4.

Table 4.4 Descriptive statistics of dependent and explanatory variables

Variable	N	Range (Max-Min)	Mean	Std. Deviation	CV (%)
FDI	44	203444.74	12681.67	34208.42	269%
GNI_GRWT	44	20.30	2.95	3.46	117%
GNI_PC	44	59340.00	16799.32	17275.13	103%
CB_DBT	44	143.95	52.97	34.56	65%
PROC_REQ	44	9	6.34	2.28	36%
TIME_REQ	44	80	17.05	18.41	108%
TOT_TAXRT	44	52.20	35.82	13.45	38%
LBRTRT_EDU	44	54.00	21.69	12.47	57%
WGASL_WRK	44	91.40	71.24	21.17	29%

Based on the results in Table 4.4 it can be seen that FDI, GNI_GRWT, GNI_PC and TIME_REQ has higher standard deviation than the mean and consequently CV is greater than 100%. In order to identify the relationship between macro-economic variables (explanatory variables) and FDI amount, 10 random samples of size 35 were selected with replacement basis. The regression models were developed for each set using stepwise regression method with the probability of entering a variable and removing a variable of a 10% and 11% respectively. In SPPS software the removal probability should be higher than the entry probability and consequently removal probability was taken as 11%.

The necessary information obtained from SPSS in developing each model for the 10 random samples are given below. For all the 10 models, it was found that the errors are random as the DW-Statistics was very close to 2.

The results outputs derived using the pre-described criterions given from the output (1) to (10).

a.) Output for Data Set 1

Table 4.5 Output for Data Set 1

Table 4.5.1 Model Summary

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.450	.202	.174	
2	.528	.279	.226	
3	.594	.353	.278	
4	.681	.464	.378	2.319

Table 4.5.2 ANOVA for the fitted model

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	21049059924.467	4	5262264981.117	5.414	.003
Residual	24297917174.269	30	971916686.971		
Total	45346977098.736	34			

Table 4.5.3 Significance test for the coefficients

	Unstandardized Coefficients		T	Sig.
	B	Std. Error		
(Constant)	-54131.294	17638.088	-3.069	.005
GNI_PC	.639	0.348	1.836	0.076
GNI_GRWT	4002.657	1575.592	2.540	.018
TIME_REQ	899.240	352.790	2.549	.017
LBRTRT_EDU	1410.993	619.239	2.279	.031

Results in the table 4.5.3 confirms that the parameter of GNI-PC (P=0.076) GNI_GRWT (P = 0.018), TIME_REQ (P = 0.017) and LBRTRT_EDU (P= 0.031) are significantly different from zero at 10% level. Thus, the model can be written as,

FDI = -54131.294+0.639*GNI_PC+4002.7*GNI_GRWT+899.2*TIME_REQ+ 1410.9*LBRTRT_EDU-54131.294 (R^2=46.4%, AdjR^2=37.8%) ---------- (4.2)

b.) Output for Data Set 2

Table 4.6 Output for Data Set 2

4.6.1 Model Summary

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.545	.297	.275	
2	.669	.448	.413	1.853

4.6.2 ANOVA for the fitted model

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	20354713664.083	2	10177356832.042	12.975	.000
Residual	25100667235.355	32	784395851.105		
Total	45455380899.438	34			

4.6.3 Significance test for the coefficients

	Unstandardized Coefficients		T	Sig.
	B	Std. Error		
(Constant)	-16172.61	7486.46	-2.160	.038
GNI_PC	.93	.26	3.535	.001
GNI_GRWT	3960.94	1338.92	2.958	.006

The results in Table 4.6.2 confirmed that GNI_PC (P = 0.001) and the TIME_REQ (P = 0.006) are significant at 10% level. Thus the second model is,

FDI = -16172.6+0.93* GNI_PC+ 3960.94* GNI_GRWT-16172.61 (R^2=44.8%, AdjR^2=41.3%) ---------- (4.3)

c.) Output for Data Set 3.

Table 4.7 Output for Data Set 3

4.7.1 Model Summary

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.421	.178	.153	
2	.614	.377	.338	
3	.678	.460	.408	2.168

4.7.2 ANOVA for the fitted model

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	5180196367.621	3	1726732122.540	8.797	.000
Residual	6085019851.605	31	196290962.955		
Total	11265216219.226	34			

4.7.3 Significant test for the coefficients

	Unstandardized Coefficients		T	Sig.
	B	Std. Error		
(Constant)	-5446.570	4990.657	-1.091	.284
GNI_PC	.643	.150	4.298	.000
TIME_REQ	446.512	135.039	3.307	.002
GNI_GRWT	-1679.322	768.646	-2.185	.037

The result in the Table 4.7.3 confirms that GNI_PC (P = 0.000), TIME_REQ (P = 0.002) and GNI_GRWT (P= 0.037) are significant at 10% level. Thus the third model is,

FDI = 0.643 GNI_PC+ 446.5 TIME_REQ- 1679.3 GNI_GRWT-5446.570 (R^2=46.0%, AdjR^2=40.8%) ---------- (4.4)

d.) Output for Data Set 4

Table 4.8 Output for Data Set 4

4.8.1 Model Summary

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.553	.306	.285	
2	.742	.550	.522	
3	.772	.597	.558	2.179

4.8.2 ANOVA for the fitted model.

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	27118432625.696	3	9039477541.899	15.290	.000
Residual	18327148135.897	31	591198326.964		
Total	45445580761.593	34			

4.8.3 Significant test for the coefficients

	Unstandardized Coefficients		T	Sig.
	B	Std. Error		
(Constant)	-33860.609	8575.404	-3.949	.000
GNI_PC	.847	.239	3.547	.001
GNI_GRWT	5590.925	1390.691	4.020	.000
CB_DBT	252.418	132.996	1.898	.067

Results obtained in the Table 4.8.3 confirms that GNI_PC (P = 0.001), CB_DBT (P = 0.067) and GNI_GRWT (P= 0.000) are significant at 10% level. Thus the final model for the set 4 is:

FDI = -33860.6+0.847* GNI_PC+ 5590.925* GNI_GRWT + 252.418* CB_DBT-33860.609 (R^2=59.7%. AdjR^2=55.8%) ---------- (4.5)

e.) Output for Data Set 5

Table 4.9 Output for Data Set 5

4.9.1 Model Summary

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.466	.217	.193	
2	.552	.305	.262	2.189

4.9.2 ANOVA for the fitted model

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	14187942125.895	2	7093971062.947	7.024	.003
Residual	32316502285.315	32	1009890696.416		
Total	46504444411.210	34			

4.9.3 Significant test for coefficients

	Unstandardized Coefficients		T	Sig.
	B	Std. Error		
(Constant)	-9143.03	8124.61	-1.125	.269
GNI_PC	.81	.32	2.537	.016
GNI_GRWT	3074.49	1526.23	2.014	.052

The results given in the Table 4.3 confirms that GNI_PC (P = 0.016), and GNI_GRWT (P= 0.052) are significant at 10% level. Thus the final model for the data set 5 is,

FDI=-9143.0+0.81*GNI_PC+3074.49*GNI_GRWT-9143.03 (R^2=30.5% and AdjR^2=26.2%) ---------- (4.6)

f.) Output for Data Set 6

Table 4.10 Output for Data Set 6

4.10.1 Model Summary

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.501	.251	.224	
2	.613	.375	.329	
3	.683	.466	.404	
4	.727	.529	.454	1.881

4.10.2 ANOVA for the fitted model

	Sum of Squares	Df	F	Sig.
Regression	2507972401.413	4	7.024	.001
Residual	2231505782.742	25		
Total	4739478184.155	29		

4.10.3 Significant test for the coefficients

	Unstandardized Coefficients		T	Sig.
	B	Std. Error		
(Constant)	-20052.904	7436.414	-2.697	.012
GNI_PC	.409	.105	3.908	.001
TOT_TAXRT	436.205	154.761	2.819	.009
CB_DBT	-98.371	38.793	-2.536	.018
PROC_REQ	1437.190	785.146	1.830	.079

It can be seen that (Table 4.10.3) GNI_PC, TOT_TAXRT, CB_DBT and PROC_REQ significant variables on FDI and the fitted model is:

FDI = -20052.9+0.409* GNI_PC+ 436.2* TOT_TAXRT- 98.4* CB_DBT+ 1437.2* PROC_REQ-20052.904 (R^2=52.9%, AdjR^2=45.4%) ---------- (4.7)

g.) Output for Data Set 7

Table 4.11 Output for Data Set 7

4.11.1 Model Summary

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.722	.522	.507	
2	.756	.571	.545	2.144

4.11.2 ANOVA for the fitted model

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	4699968797.022	2	2349984398.511	21.327	.000
Residual	3526029512.591	32	110188422.268		
Total	8225998309.613	34			

4.11.3 Significant test for the coefficient.

	Unstandardized Coefficients		T	Sig.
	B	Std. Error		
(Constant)	7273.584	6295.262	1.155	.256
GNI_PC	.853	.139	6.144	.000
WGASL_WRK	-193.017	100.512	-1.920	.064

The result shown in the Table 4.11 confirms that GNI_PC (P = 0.000), and WGASL_WRK (P= 0.064) were significant at 10% level. Thus the model can be written as,

FDI = 7273.6+0.853* GNI_PC- 193* WGASL_WRK+7273.584 (R^2=57.9%, AdjR^2=54.5%) ---------- (4.8)

i.) Output for Data Set 8

Table 4.12 Output for Data Set 8

Table 4.12.1 Model Summary

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.551	.303	.282	
2	.725	.525	.496	
3	.776	.602	.564	
4	.801	.642	.595	2.200

Table 4.12.2 ANOVA for the fitted model

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	8121505489.877	4	2030376372.469	13.464	.000
Residual	4524017646.461	30	150800588.215		
Total	12645523136.338	34			

4.12.3 Significant test for the coefficient

	Unstandardized Coefficients		T	Sig.
	B	Std. Error		
(Constant)	8137.398	9613.979	.846	.404
GNI_PC	1.012	.163	6.210	.000
TIME_REQ	505.881	129.766	3.898	.001
GNI_GRWT	-1936.556	700.741	-2.764	.010
WGASL_WRK	-242.491	132.683	-1.828	.078

Result in the Table 4.12 confirmed that GNI_PC, TIME_REQ, GNI_GRWT, and WGASL_WRK are significant at 10% level. The four variables are able to explain 64% of the observed variability of FDI. The model is:

FDI = 8137.4+1.012*GNI_PC+ 505.9*TIME_REQ- 1936.6*GNI_GRWT- 242.5* WGASL_WRK+ 8137.398 (R^2=64.2%, AdjR^2=59.5%) ---------- (4.9)

j.) Output for Data Set 9

Table 4.13 Output for Data Set 9

4.13.1 Model Summary

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.505	.255	.232	
2	.596	.355	.315	
3	.700	.490	.440	
4	.749	.561	.503	
5	.801	.642	.580	
6	.826	.682	.614	1.968

4.13.2 ANOVA for the fitted model

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	33346833961.822	6	5557805660.304	10.012	.000
Residual	15543932155.788	28	555140434.135		
Total	48890766117.610	34			

4.13.3 Significant test for the coefficients

	Unstandardized Coefficients		T	Sig.
	B	Std. Error		
(Constant)	-39435.827	20632.978	-1.911	.066
GNI_PC	.778	.261	2.985	.006
GNI_GRWT	5739.514	1363.213	4.210	.000
TIME_REQ	1823.844	413.264	4.413	.000
PROC_REQ	-6736.626	3044.805	-2.212	.035
CB_DBT	353.157	131.527	2.685	.012
LBRTRT_EDU	753.705	400.690	1.881	.070

In this case it is interested to note that more explanatory variables: GNI_PC, GNI.GRWT, TIME_REQ, PROC.REQ, CB_DBT and LBRTRT_EDU significantly influence on FDI and those variables are able to explain 68.2% of the variability of FDI. The final model is:

FDI= 0.778 GNI_PC+ 5739.5 GNI_GRWT+ 1823.8 TIME_REQ- 6736.6 PROC_REQ+ 353.2 CB_DBT+ 753.7 LBRTRT_EDU-39435.827 (R^2=68.2%, AdjR^2=61.4%) ---------- (4.10)

k.) Output for Data Set 10

Table 4.14 Output for Data Set 10

4.14.1 Model Summary

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.654	.428	.410	
2	.698	.487	.454	1.983

4.14.2 ANOVA for the fitted model

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	23391415894.635	2	11695707947.318	15.163	.000
Residual	24683006925.562	32	771343966.424		
Total	48074422820.197	34			

4.14.3 Significant test for the coefficients.

	Unstandardized Coefficients		T	Sig.
	B	Std. Error		
(Constant)	18657.770	17226.672	1.083	.287
GNI_PC	2.165	.402	5.381	.000
WGASL_WRK	-509.063	265.680	-1.916	.064

The result in the Table 4.14.3 confirms that GNI_PC (P = 0.000) and WGASL_WRK (P= 0.064) are significant at 10% level. Thus the final model for the data set 10 is:

FDI = 18657.8+2.165 GNI_PC- 509.1 WGASL_WRK+18657.770 (R^2=48.7%, AdjR^2=45.4%) ---------- (4.11)

The summaries of significant variables for each model are shown in Table 4.15.

Table 4.15 List of significance variable for the models

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
GNI_PC	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
GNI_GRWT	Y	Y	Y	Y	Y	Y		Y	Y	Y
TIME_REQ	Y		Y			Y		Y	Y	Y
CB_DBT				Y					Y	Y
WGASL_WRK							Y	Y		Y
LBRTRT_EDU	Y								Y	
PROC_REQ									Y	Y
TOT_TAXRT						Y				
R2	46.4%	44.8%	46.0%	59.7%	30.5%	52.9%	57.9%	64.2%	68.2%	48.7%

The Percentage of variability explained by the final 10 data set valued for 46% to 67%. The test model is:

Based on the results of the Table 4.15 the following conclusions can be made.

- GNI_PC was found to be significant variable in all ten models and accordingly it can be considered that GNI_PC is the most important and significant macro-economic variable influence on FDI.
- GNI_GRWT is significant in nine models out of ten and thus it can also be consider that GNI_GRWT is highly significant important macro-economic variable on FDI.
- Of the ten models, TIME_REQ was found as significant only in six models and thence TIME_REQ can be considered as important significant macro-economic factor on FDI amount of country.
- CB_DBT and WGASL_WRK were found as significant variables in three models and can be considered as moderately important macro-economic factor for FDI amount of country.

By reason of all the macro-economic variables are not significant in each model it is difficult to come for a common conclusion at this stage. Nevertheless of the ten models fitted above, model nine gave the highest R^2 indicating nearly 70% of the observed variability of FDI can be explained by the following equations.

FDI= 0.778 GNI_PC+ 5739.5 GNI_GRWT+ 1823.8 TIME_REQ- 6736.6 PROC_REQ+ 353.2 CB_DBT+ 753.7 LBRTRT_EDU-39435.827

4.4 Diagnostic Tests for the selected Model

4.4.1 Randomness

The DW statistics of the selected model (4.3.10) is very close to 2 (DW=1.968). Implies that the errors of the fitted model is random and not having any systemic patterns.

4.4.2 Constant Variance

The plot of residuals and fitted values shown in Fig 4.1 clearly shown a random nature of the residuals further confirms that the residuals have homogeneous variance.

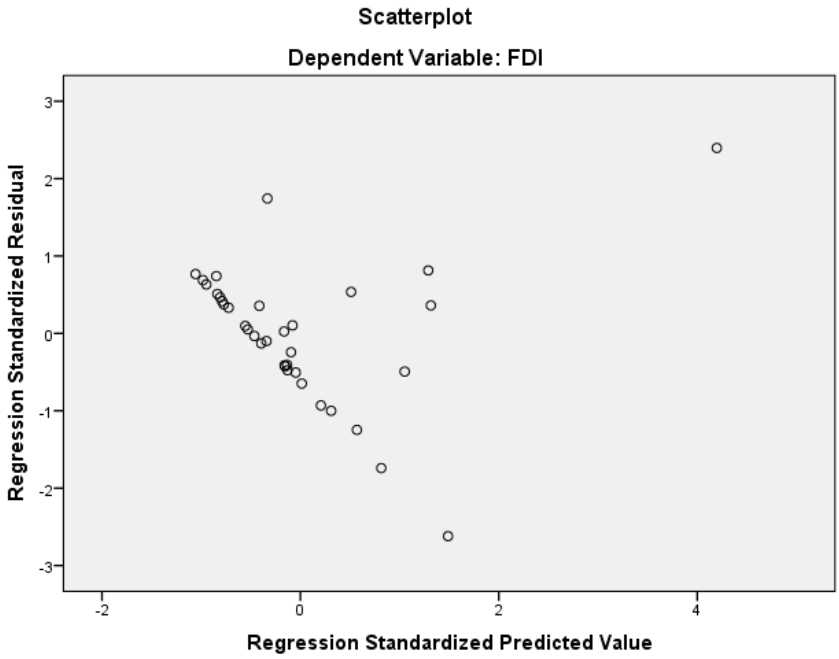

Figure 4.1 Scatter plot of Predicted value vs. standardized residuals

4.4.3 Normality

The normality test for the fitted model was determined using the Kolmogorov-Smirnov test and Shapiro-Wilk test. It can be seen that the both statistics were not significant at 5% level. P Value for Kolmogorov-Smirnov and Shapiro-Wilk statistics are 0.161 and 0.129 respectively (Table 4.16). Thus it can be confirmed that the errors are not significantly deviate from normal.

Table 4.16 Tests of Normality

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	df	Sig.
Unstandardized Residual	.128	35	.161	.952	35	.129

4.4.4. Multicollinearity

The values of variance inflation factor (VIF) of the variable in the final model selected are shown on Table 4.17.

Table4.17 VIF values of the explanatory variables in the model

Dimension	GNI_PC	GNI_GRWT	TIME_REQ	PROC_REQ	CB_DBT	LBRTRT_EDU
1	.01	.01	.00	.00	.01	.00
2	.08	.04	.11	.00	.00	.01
3	.15	.63	.00	.00	.00	.03
4	.41	.01	.04	.00	.12	.31
5	.33	.10	.06	.00	.75	.00
6	.02	.20	.53	.15	.12	.36
7	.00	.00	.26	.84	.00	.29

Results in Table 4.17 indicate that the VIF values are very close to 1. Consequently it can be concluded that there is no multicollinearity among the variables in the selected model.

4.5 Detecting of Influential Points

4.5.1 Cook's distance statistics

Cook's distance statistics is the measure of aggregated impact of each observation on the group of regression coefficients as well as fitted values. If values are larger than 4/n considered as influential. The critical values of Cook's distance value of the data set= 4/35= 0.014.

The Cook' distance measurements substantiate that 2nd, 11th, 22nd, 23rd and 31st observation's cook's distance values are greater than 0.114 (4/n). Thence it can be concluded that the 2nd, 11th, 22nd, 23rd and 31stobservation are influential observations according to the cook's distance measurements. Detailed table of cook's distance measurements analysis were given in Annexure 3.

4.5.2 DFITS

DFITS is a statistic measuring of how much an observation has affected its fitted value of the regression model. The DFITS Statistic is given by,

DFITS = $2 * \frac{\sqrt{k+1}}{n}$ where k is number of variables and n is number of observations.

$= 2 * \frac{\sqrt{9+1}}{35}$

$= 1.069$

Further the DFITS value obtained it is clear that the observation number 23rdand 31st DFITS values are greater than 1.069. Hence it is conclude that the 23rd and 31stobservations are influential according to the DFFITS measurements. Detailed table of cooks distance measurement analysis is given by Annexure 3.

4.5.3 Leverage

Belsley and Welsch (1982) recommended that h_{ii} is considered as "large" if, $h_{ii}>2(m+1)/n$ such points are highlighted as "high leverage points". The calculated leverage value of this research is – 2(8+1)/35 =0.514

As per the LEVARAGE it is clear that the observation number 22ndand 23rd LEVARAGE values are greater than 0.514. Hence it was concluded that the 22nd and 23rd observations are high leverage points. Detailed table of Leverage measurement analysis is given on Annexure 3.

4.5.4 Externally Studentized residuals (RSTUDENT)

The data points which has RSTUDENT > 2 considered as highly influential and place into further analysis. According to the RSTUDENT it is clear that the observation number 22nd has higher Studentized residual values (>2). Hence it is concluded that the 22nd observation is highly influential. Detailed table of RSTUDENT measurement analysis is given in Annexure 4.

Since there are some unusual observations on the model which was identified during the model diagnosis process, those unusual observations were removed from the data set and secondary model was built. The output derived from the secondary model is given on section 4.4.7.

4.6 Interpretation of the Model

Table 4.18 Secondary Model of the model building process

4.18.1 Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.644	.415	.396	12426.65790	2.073

4.18.2 ANOVA for the fitted model

	Sum of Squares	Df	Mean Square	F	Sig.
Regression	3392346595.99	1	3392346595.99	21.968	.000
Residual	4787076626.67	31	154421826.67		
Total	8179423222.67	32			

4.18.3 Significant test for the coefficients

	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	-2045.814	3052.583		-.670	.508
GNI_PC	.572	.122	.644	4.687	.000

The result in the Table 4.18 affirms that only the GNI_PC is significant on the secondary model. R^2 value was reduced to 42% which suggest that the model accuracy was reduced in the modified model. The DW statistics of the model is 2.073 (~ 2) which compromised the errors are random in the model.

The comparison of primary model and the secondary model of Model 9 confirms primary model covers more variables and compromise with higher number of R^2 value. The objective of this research was explaining the relationship between FDI and socio-economic variables and not to develop a forecast model. Hence primary model is selected for interpretation purposes.

4.7 Identification of Common Factors among Macro-Economic Variables

Though it was found that there is no significant multicollinearity among the variables in the model and to reduce the number of explanatory variables, factor analysis was carried out to identify the common factors.

For the factor analysis the sample of 44 countries selected as the factors were extracted using Principal components factoring (PCF) method and they were then rotated using orthogonal transformation such as varimax, quartimax and equamax. However prior to FA it is necessary to test conditions of data for FA as described below for this analysis all eight explanatory variables were considered.

4.7.1 Association among variable

The correlation matrixes among the macro economic variables are shown in Table 4.19.

Table 4.19 Correlation Matrix

		GNI_GRWT	GNI_PC	CB_DBT	PROC_REQ	TIME_REQ	TOT_TAXRT	LBRTRT_EDU	WGASL_WRK
Correlation	GNI_GRWT	1.000	.188	.259	.097	-.060	-.312	-.037	-.051
	GNI_PC	.188	1.000	.377	-.311	-.350	-.043	.464	.578
	CB_DBT	.259	.377	1.000	-.013	-.174	-.001	.216	.237
	PROC_REQ	.097	-.311	-.013	1.000	.780	.266	-.540	-.237
	TIME_REQ	-.060	-.350	-.174	.780	1.000	.252	-.504	-.366
	TOT_TAXRT	-.312	-.043	-.001	.266	.252	1.000	-.024	-.027
	LBRTRT_EDU	-.037	.464	.216	-.540	-.504	-.024	1.000	.512
	WGASL_WRK	-.051	.578	.237	-.237	-.366	-.027	.512	1.000
Sig. (1-tailed)	GNI_GRWT		.111	.044	.266	.350	.020	.407	.372
	GNI_PC	.111		.006	.020	.010	.391	.001	.000
	CB_DBT	.044	.006		.467	.129	.498	.080	.061
	PROC_REQ	.266	.020	.467		.000	.040	.000	.061
	TIME_REQ	.350	.010	.129	.000		.049	.000	.007
	TOT_TAXRT	.020	.391	.498	.040	.049		.439	.431
	LBRTRT_EDU	.407	.001	.080	.000	.000	.439		.000
	WGASL_WRK	.372	.000	.061	.061	.007	.431	.000	

The results in Table 4.19 confirms that the PROC_REQ and TIME_REQ are highly significantly correlated each other (r = 0.780, p =0.000). The correlation coefficient which are significantly correlated were underlined Table 4.19. Also PROC_REQ and LBRTRT_EDU also highly correlated (r= 0.504, p= 0.000). The correlation of 0.512 between LBRTRT_EDU and WGASL_WRK confirms that those variables are highly correlated. Since most of pairs are highly significantly correlated it can be confirmed

that the correlation structure among variables is suitable for FA. This was further reconfirmed by Bartlett's Test (Table 4.20).

Table 4.20 - KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.621
Bartlett's Test of Sphericity	Approx. Chi-Square	111.980
	Df	28
	Sig.	.000

Results in Table 4.20 confirmed that the Bartlett's test is significant and it revealed that the true correlation matrix among 8 macro-economic variables is significantly different from zero. Furthermore, results in Table 4.18 reveal that the KMO statistics is 0.621 (> 0.6). Thus it confirmed the data set is suitable for FA.

4.7.2 Number of Factors

Table 4.21 - Eigenvalues Analysis

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.013	37.668	37.668	3.013	37.668	37.668
2	1.403	17.535	55.203	1.403	17.535	55.203
3	1.334	16.675	71.878	1.334	16.675	71.878
4	.713	8.913	80.792			
5	.558	6.969	87.760			
6	.444	5.546	93.306			
7	.380	4.753	98.059			
8	.155	1.941	100.000			

The SPSS output in Table 4.21 confirms that that 72% of the total variance explained by the first three components. The Scree plot shown in Fig. 4.2 further confirmed that the selection of three components is correct as the elbow shape can be seen at third. Hence the initial eight dimensional macro-economic variables can be successfully explained by a 3-D system which consists of three factors.

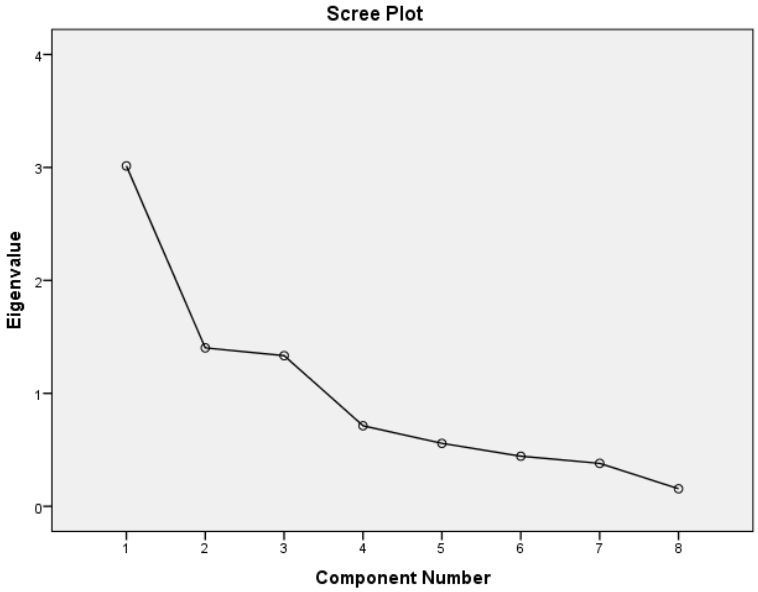

Figure 4.2 Scree plot

4.7.3 Identification of Factor Loadings

To identify the factor behavior further analysis was carried out using the 3 rotational methods namely: (i) varimax, (ii) quartimax, (iii) equamax. The results of each rotation are shown in Table 4.22 to 4.24 respectively.

Table 4.22 Factor loading of three factor model extracted using PCF and rotated via varimax.

Macro-Economic Variables	Component		
	1	2	3
GNI_GRWT	.166	.250	-.828
GNI_PC	-.275	.788	-.067
CB_DBT	.126	.719	-.269
PROC_REQ	.924	-.051	.026
TIME_REQ	.846	-.220	.140
TOT_TAXRT	.388	.185	.730
LBRTRT_EDU	-.616	.514	.172
WGASL_WRK	-.342	.693	.193

Results in Table 4.22 indicate that the factor loading in PROC_REQ, TIME_REQ and LERTRT_EDU are significantly higher (> 0.600) in factor 1 than that of others. Thus

it indicates that those three variables have significantly higher impact on factor 1 than the impact from other variables on factor 1. The factor loading in GINI_PC, CB_DBT, LBRTRT_EDU in factor 2 are significantly greater than (> 0.6) that of others in Factor 2. Similarly it can be seen that the factor loading for GINI_GRWT and TOT_TAXRT are exceptionally higher than the corresponding loadings in other variables in factor 3. Thus it can be concluded that the factors 1-3 can be formed with the linear combination of {PROC_REQ, TIME_REQ, and LBRTRT_EDU}, {GNI_PC, CB_DBT and WGASL_WRK} and {TOT_TAXRT- and GNI_GRWT} respectively.

To understand the result is same even if for the quartimax and equamax rotation methods, factor loadings using the quartimax and equamax obtained. The result obtained from the two method quartimax and equamax were same for the data set. Hence it can be concluded that the factors obtained are independent of rotation method. The factor loading obtained by quartimax and equamax rotation are shown in Table 4.23 and table 4.24 respectively.

Table 4.23 Factor loading of three factor model extracted using PCF and rotated via quartimax.

Macro-economic variables	Component		
	1	2	3
GNI_GRWT	.165	.261	-.825
GNI_PC	-.277	.789	-.056
CB_DBT	.125	.723	-.260
PROC_REQ	.924	-.050	.025
TIME_REQ	.846	-.221	.136
TOT_TAXRT	.388	.176	.732
LBRTRT_EDU	-.616	.511	.179
WGASL_WRK	-.343	.690	.203

Table 4.24 Factor loading of three factor model extracted using PCF and rotated via equamax.

Macro-economic variables	Component		
	1	2	3
GNI_GRWT	.167	.243	-.830
GNI_PC	-.274	.788	-.073
CB_DBT	.127	.717	-.275
PROC_REQ	.924	-.052	.027
TIME_REQ	.845	-.220	.142
TOT_TAXRT	.388	.191	.729
LBRTRT_EDU	-.615	.517	.168
WGASL_WRK	-.341	.696	.187

As explained in Table 4.23 to Table 4.24 the factors are independent from the rotation method. Further it can be seen that loading for PROC_REQ, TIME_REQ and LERTRT_EDU are significantly higher (> 0.600) in factor one than that of others. Thus it indicates that those three variables have significantly higher impact on factor one than the impact from other variables on factor one. The factor loading in GINI_PC, CB_DBT, LBRTRT_EDU in factor two are significantly greater than (>0.600) that of others in Factor two. Similarly it can be seen that the factor loading for GINI_GRWT and TOT_TAXRT are exceptionally higher than the corresponding loadings in other variables in factor three.

Therefore it can be concluded that the macro-economic variables identified for the three factors are the same for all three orthogonal rotations. The summary of the variables determined for each factor under each rotation is shown in Table 4.25.

Table 4.25 Summary of the result obtained from three rotation types.

Type of Rotation	Identified Macro-economic Variables		
	Factor 1	Factor 2	Factor 3
Varimax	PROC_REQ TIME_REQLBRTRT_EDU	GNI_PC CB_DBT WGASL_WRK	TOT_TAXRT GNI_GRWT
Equamax	PROC_REQ TIME_REQLBRTRT_EDU	GNI_PC CB_DBT WGASL_WRK	TOT_TAXRT GNI_GRWT
Quartimax	PROC_REQ TIME_REQLBRTRT_EDU	GNI_PC CB_DBT WGASL_WRK	TOT_TAXRT GNI_GRWT

The results in Table 4.25 further confirm that identified macro-economic variables for three factors are invariant of the type of rotation. In other words, the factors derived using the three rotation methods are the same. Hence the factor F1, F2 and F3 can be used to describe the eight macro-economic variables. Furthermore the statistical importance of these factors is the orthogonal property. That is the three factors obtained were statistically independent. The Fig. 4.3 describes the variable distribution in to three components in three dimensional spaces.

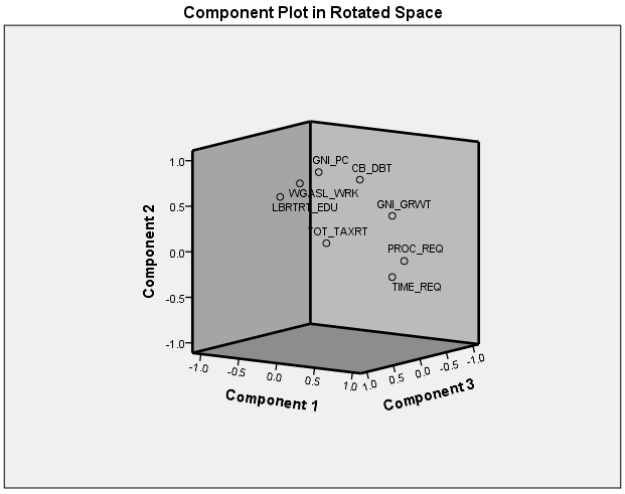

Figure 4.4 Component Plot

4.7.4 Defining the Factors

After the number of factors and the variable corresponding to each factor were identified it is necessary to define factors. For this purpose factor score coefficient are obtained. It can be seen that the factor loadings given in Table 4.21 to 4.23 are almost the same. Nevertheless out of the three rotation methods varimax is the most popular and widely used method. Therefore factor score coefficients were obtained under varimax rotation given in Table 4.25.

The result of Table 4.25 substantiate that the initial eight dimension system of macro-economic variables reduce to three dimension system successfully. The factor coefficient for the identified factors were given in the Table 4.26.

Table 4.26 Component Score Coefficient Matrix

	Component		
	1	2	3
GNI_GRWT	.037	.560	-.287
GNI_PC	.239	.219	.225
CB_DBT	.129	.440	.205
PROC_REQ	-.246	.306	.263
TIME_REQ	-.266	.160	.227
TOT_TAXRT	-.083	-.151	.586
LBRTRT_EDU	.259	-.123	.135
WGASL_WRK	.227	.032	.304

The development of new three dimension system described in the equation 4.12 to 4.14.

$$F_1 = -0.246*Z_{PROC\_REQ} - 0.266*Z_{TIME\_REQ} + 0.259Z_{LBRTRT\_EDU} \text{ ---------- (4.12)}$$

$$F_2 = 0.560*Z_{GNI\_PC} + 0.440*Z_{CB\_DBT} + 0.032*Z_{WGASL\_WRK} \text{ ---------- (4.13)}$$

$$F_3 = 0.586*Z_{TOT\_TAXRT} - 0.287*Z_{GNI\_GRWT} \text{ ---------- (4.14)}$$

The first factor in equation 4.12 illustrate that the PROC_REQ, TIME_REQ&LBRTRT_EDU can be grouped in to one factor as these variable has similar patterns of responses because they are all associated with a latent (i.e. not

directly measured) variable. Further GNI_PC, CB_DBT and WGASL_WRK and GNI_GRWT can be grouped likewise.

Further the research extended to identify linear relationship between the factors.

4.7.5 Identification of Linear Relationship among Factors

The initial step of the model building process was normalizing the variables and developing the equations for each factor. Equations 4.15 to 4.17 illustrate the normalized factor equations. The new normalized factors were renamed as Composite Factor 1 to 3.

$$C\_F_1 = -0.246*_{ZPROC\_REQ} - 0.266*Z_{TIME\_REQ} + 0.259Z_{LBRTRT\_EDU} \text{ ---------- (4.15)}$$

$$C\_F_2 = 0.560*Z_{GNI\_PC} + 0.440*Z_{CB\_DBT} + 0.032*Z_{WGASL\_WRK} \text{ ---------- (4.16)}$$

$$C\_F_3 = 0.586*Z_{TOT\_TAXRT} - 0.287*Z_{GNI\_GRWT} \text{---------- (4.17)}$$

The multiple linear regression analysis was carried out using the three factors derived and the results were given in Table 4.27.

Table 4.27 Factor Regression Model

4.27.1 Model summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.540	.292	.275	29125.38944	1.538

4.27.2 ANOVA for the fitted model

	Sum of Squares	df	Mean Square	F	Sig.
Regression	14691187438.635	1	14691187438.635	17.319	.000
Residual	35628109011.117	42	848288309.789		
Total	50319296449.752	43			

4.27.3 Significant test for the coefficients

	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	T	Sig.
(Constant)	12681.666	4390.818		2.888	.006
Composite_Factor2	21191.178	5092.117	.540	4.162	.000

The result in the Table 4.27.3 confirms that Composite_Factor2 (P = 0.000) and is significant at 10% level. Further the DW statistics 1.538 (~2) confirms that the errors are random. Thus the model developed to identify the relationship among factors is,

FDI = 21,191.178 Composite_Factor2 + 12681.666 (R^2=29%, AdjR^2=27.5%) ---------- (4.18)

The results in Table 4.27 and confirms that the model in Equation 4.18 cannot be accepted as best model to explain relationships since the models consist with low R^2 value (27.5%). It is recommended to further development of model in different research work.

Consequently the relationship between FDI amount and macro-economic variables can be explained in two ways. The multiple regression models to identify linear relationship between macro-economic variables and FDI amount and the factor analysis for identifying underlying effects between the macro-economic variables. Further the linear relationship between factors can be explained. The interpretations further discussed on chapter Five.

4.8 Testing the Hypothesis.

H_0: All the factors contribute equally to the amount of foreign direct investment of the country.

H_1: All the factors contribute differently (contribution not equal) to the amount of foreign direct investment of the country.

Moreover the ten model developed based on the sample (Table 4.15 Model summary.) it is significant that there is no equal contribution among eight macro-economic variables. Hence H_0 is rejected and H_1 is accepted. So it is 90% confidence that the macro-economic variables contribute differently (contribution not equal) to the amount of foreign direct investment of the country.

4.9 Summary of the Chapter

A linear relationship was established between FDI amount and macro-economic variables. Based on the model it can be confirmed that GNI_PC, GNI_GRWT, TIME_PC, CB_DBT, WGASL_WRK, LBRTRT and PROC_REQ are significantly

influence on FDI. The multiple regression model confirmed that macro-economic indicators selected was not equally contributed to investing decision.

Further, it was found that 8 macro-economic variables can be explained by three independent factors namely (i) Business environment friendliness. (ii) Economic condition of the country. (iii) Development ratios of the country were formed. Additionally it is found that macro-economic variables affecting the foreign direct investment can be further categorized into three factors using factor analysis and it was identified that the forthcoming FDI of the country can depend only on Economic condition of the country factor. But factor analysis implies that there is a high correlation among the macro-economic variables and there are cluster effects between macro-economic variables and can be redefine as three factors.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The fundamental objective of the research is to examine where FDI amount of the country is influenced by selected macro-economic factors equally and to determine the extent of influence. The multiple regression analysis corroborate that FDI amount of a country has linear relationship with macro-economic factors. Although the model developed and confirmed through the multiple regression model confirms that the selected macro-economic indicators are not significantly influenced equally for the FDI amount of a country. Some macro-economic factors influence less and some macro-economic factors influenced highly and established that null hypothesis can be accepted.

The outcome based on the multiple regression models developed using the sample of forty four countries were given in (a) to (e) below. Although the multiple regression model confirms that macro-economic indicators selected was not equally contributed to investing decision, factor analysis implies that there is a high correlation among the macro-economic variables and there is a cluster effects between macro-economic variables and can be illustrated as three factors. After all the three factor model implies that all variables has similar patterns. It can be concluded that the macro-economic variables, which were ignored in multiple regression model have some influence on the attraction of Multinational enterprises (MNE's) for particular country. The judgments taken based on factor analysis given in point (f) to (h) below,

a) The economy growth of the country and the size of the economy is the most engaging indicator for attracting the foreign direct investment of a country. In other words the MNE's are mostly focused on particular country's economic stability before they invest in particular country.
b) MNE's are acknowledging on countries those who are equipped with business friendly environment. Consideration of the Time required in starting a new

business has significant influence for the investment decision of MNE's. Countries need to focus on loyalty for new business. The macro-economic variables that Procedures required to start new business and Time required to start new business were served as the indicators of ease of doing business. It is clear that the countries should develop business friendly rules and procedures to attract MNE's for invest in their countries.

c) MNE's are not significantly focused on the debt of the particular country when taking investing decision of selected country. Even the government debt percentage is a key indicator of the economic stability of a country; it can be concluded that it was not a main influencing indicator for the investing decision of a particular country.
d) The MNE's do not significantly examine for work force quality and human capital cost of the selected country when the investment decision is taken. The work force quality and human capital cost were quoted using the indicators of labor force education level and salaries of workers respectively. The rationality behind this interpretation was, in modern industrial environment most of the industries are automated and human influence is less hence the large enterprises employing less human intervention for their operations and human interference was very less and motivate multinational enterprises to less focus on human resource focused indicators on their investing decisions.
e) MNE's are very less focused on the tax rates of the countries which they invest. It can be concluded that most of the countries are offering special tax rates for multinational enterprises to attract the MNE's which inspire multinational enterprises not to implicated on existing tax rates of the country which planned to invest.
f) The first factor consists of macro-economic indicators namely procedures required to start new business, minimum time required to start new business and labor force education level can be elected as business environment friendliness.
g) The second factor contain of macro-economic indicators listed below. The gross national income, central government debt rate and wages and salaries of work force can be nominate as economic condition of the country.

h) The third factor which comprise the gross national income growth and total tax rate of profit can be suggested as development ratios of country.

As stated in the observations (a) to (e) it can be concluded that the Multinational Enterprises (MNE's) tend to invest on countries which has stable economy and business friendly environment. They were not focused on labour force skills salaries and the countries tax rates or debt rate of the country. Hence the governments should maintain sustainability of their economy and tend to develop business friendly environment to attract MNE's to them.

The outline of explanation in factor analysis is the eight macro-economic indicators can be reclassified into three latent indicators and the new indicators were given below.

Factor 1: Business environment friendliness.

Factor 2: Economic condition of the country.

Factor 3: Development ratios of the country.

Further the linear relationship between factors was identified. And the result confirms that the FDI inflow can be forecasted using the indicator of Economic conditions of the country.

5.2 Recommendation

The following recommendations are suggested based on the study.

(a.) The country should maintain stable economic condition and business friendly environment to attract foreign investment for county.

(b.) As this study was limited to linear regression models, the use of non-linear models should be investigated.

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ANNEXURE 1

Countries selected for analysis.

Country Name	Country Code	FDI (US $ Mn)	GNI_GRWT	GNI_PC	CB_DBT	PROC_REQ	TIME_REQ	TOT_TAXRT	LBRTRT_EDU	WGASL_WRK
Albania	ALB	981.50	2.55	4280.00	70.36	5	5	36.50	7.90	40.20
Algeria	DZA	(403.40)	3.52	4870.00	0.00	12	20	72.70	15.20	69.00
Antigua and Barbuda	ATG	154.06	3.78	13270.00	77.43	9	22	41.90	8.20	79.70
Armenia	ARM	178.45	2.48	3880.00	0.00	3	4	20.00	25.40	55.60
Australia	AUS	36,852.28	2.94	60070.00	38.34	3	3	47.60	33.80	88.80
Barbados	BRB	254.42	0.22	14510.00	128.92	8	18	34.70	18.40	83.20
Belarus	BLR	1,568.30	-5.76	6460.00	24.63	5	5	54.00	24.30	94.20
Belize	BLZ	59.12	3.98	4490.00	76.53	9	43	31.10	12.40	69.30
Bhutan	BTN	33.64	4.30	2380.00	96.14	8	15	35.30	0.00	27.50
Botswana	BWA	393.57	-0.18	6460.00	18.85	9	48	25.10	0.00	68.20
Brazil	BRA	75,074.56	-3.98	9850.00	57.39	11	83	68.10	17.20	66.40
Bulgaria	BGR	1,773.86	2.39	7480.00	17.10	6	25	27.00	26.60	87.90
Burundi	BDI	7.36	-4.15	260.00	0.00	3	4	40.30	0.00	5.20
Central African Republic	CAF	3.00	0.00	330.00	0.00	10	22	73.30	0.00	0.00
Chad	TCD	600.22	4.49	880.00	0.00	9	60	63.50	0.60	4.90
Croatia	HRV	158.97	3.11	12700.00	0.00	8	12	20.00	21.60	81.90
Cyprus	CYP	5,243.14	5.17	25990.00	145.85	6	8	24.50	41.50	82.40
Czech Republic	CZE	2,478.53	4.75	18140.00	40.61	8	15	50.40	20.00	82.10
Denmark	DNK	1,671.05	0.08	58550.00	46.15	4	3	24.50	31.60	91.00
El Salvador	SLV	518.50	2.25	3940.00	56.35	8	17	38.80	11.80	53.50
France	FRA	44,182.40	1.59	40540.00	88.58	5	4	62.80	33.70	88.80
Georgia	GEO	1,341.91	0.83	4160.00	33.92	3	3	16.40	31.20	38.40
Germany	DEU	46,227.11	1.70	45940.00	52.23	9	11	48.80	28.10	88.80
Greece	GRC	(289.38)	0.41	20320.00	181.66	5	13	49.60	29.10	63.00
Guatemala	GTM	1,147.50	4.18	3590.00	24.81	7	20	37.50	6.30	45.70
Guinea	GIN	85.00	0.38	470.00	0.00	6	8	68.30	3.20	0.00
Guinea-Bissau	GNB	18.34	0.00	590.00	0.00	8	8	45.50	0.00	0.00
Hungary	HUN	(966.57)	2.92	12980.00	94.34	6	7	48.40	24.50	88.90
Iceland	ISL	386.63	0.00	50140.00	112.51	5	4	30.10	31.00	86.90
Indonesia	IDN	15,508.16	4.87	3440.00	27.78	12	48	29.70	7.10	36.50
Ireland	IRL	203,463.37	14.54	52580.00	132.42	4	6	26.00	41.50	82.70
Japan	JPN	(41.89)	1.44	38840.00	191.92	8	11	50.40	41.40	87.70
Kazakhstan	KAZ	4,020.71	7.46	11390.00	10.84	6	11	29.20	50.00	69.40
Kyrgyz Republic	KGZ	760.41	2.80	1170.00	42.81	4	10	29.00	2.50	50.80
Latvia	LVA	719.04	2.67	14980.00	59.45	4	6	35.90	31.10	88.40
Lithuania	LTU	627.35	-1.53	14940.00	43.76	4	6	42.60	37.10	88.20
Malaysia	MYS	10,962.72	5.60	10570.00	53.00	6	7	40.00	24.40	73.90
Malta	MLT	3,174.41	7.17	23930.00	83.59	10	28	41.50	20.90	86.10
Mauritius	MUS	208.29	5.19	9780.00	49.10	5	6	21.50	11.20	79.40
Moldova	MDA	270.96	-3.39	2240.00	23.69	5	6	39.90	24.80	68.80
Mongolia	MNG	196.46	2.54	3870.00	45.89	5	6	24.70	26.20	47.50
Montenegro	MNE	699.74	4.50	7220.00	0.00	6	10	21.80	25.50	82.40
Namibia	NAM	1,060.29	5.18	5190.00	23.26	10	66	21.30	6.70	63.60
Nepal	NPL	18.63	2.69	730.00	0.00	7	17	29.50	10.40	24.60
New Zealand	NZL	(546.80)	0.00	40020.00	59.32	1	1	34.30	36.20	83.40
Oman	OMN	821.85	8.80	16910.00	4.90	6	8	23.40	13.80	96.30
Peru	PER	6,861.18	3.90	6130.00	18.39	6	26	37.30	15.10	48.20
Russian Federation	RUS	6,478.40	-3.06	11450.00	9.32	4	11	47.00	54.00	92.70
Singapore	SGP	65,262.63	2.13	52090.00	101.86	3	3	18.00	29.40	85.10
Slovak Republic	SVK	2,149.68	3.97	17570.00	58.48	6	12	51.70	19.80	84.50
Sri Lanka	LKA	681.24	4.76	3800.00	70.82	8	10	55.20	16.80	53.80
St. Kitts and Nevis	KNA	78.16	0.00	15060.00	74.49	7	19	49.70	18.20	85.00
United Arab Emirates	ARE	10,975.83	3.68	43090.00	1.90	6	8	15.90	16.60	95.60
Uruguay	URY	1,747.70	0.51	15720.00	42.74	5	7	41.80	19.70	73.10

ANNEXURE 2

Sample Frames

Stratum 1		
Country	**FDI Amount**	**Ran #**
Algeria	(403.40)	0.08
New Zealand	(546.80)	0.22
Aruba	(22.68)	0.32
Marshall Islands	(53.71)	0.36
Papua New Guinea	(27.81)	0.41
Japan	(41.89)	0.42
Greece	(289.38)	0.44
Swaziland	(120.92)	0.52
Hungary	(966.57)	0.53
Bahrain	(1,462.77)	0.55
South Sudan	(277.00)	0.59
Belgium	(20,716.15)	0.64
Yemen, Rep.	(1,191.00)	0.68
Estonia	(174.21)	0.69
Palau	(9.00)	0.74
Bermuda	(203.94)	0.74
Congo, Dem. Rep.	(507.78)	0.83
Norway	(5,982.16)	0.86
Gibraltar	(412.02)	0.91
Portugal	(1,315.58)	0.91

Stratum 2		
Country	**FDI Amount**	**Ran #**
Samoa	15.60	0.12
Tuvalu	0.60	0.13
Micronesia, Fed. Sts.	0.80	0.14
Vanuatu	29.12	0.17
Timor-Leste	43.00	0.20
Cabo Verde	75.26	0.24
Tonga	12.63	0.30
Sint Maarten (Dutch part)	27.77	0.31
Eritrea	49.32	0.32
Dominica	35.96	0.35
Gambia	10.60	0.37
Bahamas, The	76.08	0.41
French Polynesia	82.72	0.43
Guinea-Bissau	18.34	0.43
Central African Republic	3.00	0.47
Guinea	85.00	0.54
Nepal	18.63	0.58
Grenada	60.67	0.67
People's Republic of Korea	82.92	0.74
Sao Tome and Principe	28.46	0.76
St. Kitts and Nevis	78.16	0.77
Belize	59.12	0.79
Solomon Islands	21.90	0.84
Burundi	7.36	0.87
Togo	52.65	0.87
St. Lucia	95.03	0.87
Comoros	5.15	0.89
Bhutan	33.64	0.93
Kiribati	1.70	0.98

Stratum 3		
Country	**FDI Amount**	**Ran #**
Afghanistan	169.09	0.00
Montenegro	699.74	0.01
Lithuania	627.35	0.03
Iceland	386.63	0.07
Burkina Faso	167.40	0.08
Moldova	270.96	0.13
El Salvador	518.50	0.13
Antigua and Barbuda	154.06	0.16
Fiji	332.40	0.16
Equatorial Guinea	316.17	0.17
Seychelles	105.89	0.18
Benin	229.25	0.20
West Bank and Gaza	120.00	0.22
Paraguay	315.27	0.25
Senegal	345.21	0.26
St. Vincent and the Grenadines	120.74	0.27
Sierra Leone	518.68	0.29
Mali	152.94	0.32
Kosovo	360.34	0.34
Guyana	116.96	0.35
Madagascar	517.46	0.39
Bolivia	503.40	0.40
Tajikistan	391.25	0.47
Niger	524.98	0.48
Maldives	323.87	0.48
Croatia	158.97	0.50
Curacao	137.10	0.51
Chad	600.22	0.51
Haiti	109.43	0.53
Mauritius	208.29	0.54
Sri Lanka	681.24	0.56
Zimbabwe	421.00	0.58
Somalia	516.00	0.62
Suriname	196.70	0.62
Barbados	254.42	0.66
Lesotho	113.27	0.68
Gabon	623.89	0.78
Djibouti	124.00	0.83
Mauritania	501.73	0.83

Armenia	178.45	0.86
Cote d'Ivoire	430.16	0.87
Malawi	142.50	0.89
Bosnia and Herzegovina	267.28	0.90
Kuwait	284.65	0.91
Mongolia	196.46	0.94
Brunei Darussalam	173.24	0.95
Rwanda	323.21	0.96
Macedonia, FYR	192.65	0.97
Cameroon	620.12	0.97
Botswana	393.57	0.97

Stratum 4		
Country	**FDI Amount**	**Ran #**
Czech Republic	2,478.53	0.04
Liberia	721.03	0.04
Lao PDR	1,079.14	0.05
Uruguay	1,747.70	0.05
Dominican Republic	2,243.90	0.06
Ghana	3,192.32	0.07
Trinidad and Tobago	1,618.61	0.07
Malta	3,174.41	0.09
Serbia	2,345.15	0.13
Congo, Rep.	1,486.18	0.16
Libya	725.67	0.20
Uzbekistan	1,068.39	0.23
Iran, Islamic Rep.	2,050.00	0.29
Slovenia	1,680.44	0.31
Kyrgyz Republic	760.41	0.33
Kenya	1,437.00	0.35
Ethiopia	2,167.60	0.36
Namibia	1,060.29	0.39
Costa Rica	3,008.64	0.41
Uganda	1,057.30	0.42
New Caledonia	1,879.15	0.44
Ukraine	3,050.00	0.45
Guatemala	1,147.50	0.47
Zambia	1,653.00	0.49
Tanzania	1,960.58	0.49
Latvia	719.04	0.50
Myanmar	3,137.28	0.52
Georgia	1,341.91	0.54
Jamaica	794.48	0.57
Mozambique	3,712.31	0.58
Albania	981.50	0.59
Nigeria	3,064.17	0.60
Pakistan	979.00	0.61
Belarus	1,568.30	0.62
Denmark	1,671.05	0.62
Qatar	1,070.88	0.63
South Africa	1,575.17	0.66
Cambodia	1,700.97	0.66
Tunisia	1,001.72	0.68
Slovak Republic	2,149.68	0.69

Oman	821.85	0.70
Lebanon	2,341.88	0.70
Iraq	3,468.53	0.80
Bangladesh	3,380.25	0.81
Bulgaria	1,773.86	0.85
Nicaragua	835.00	0.87
Jordan	1,274.79	0.88
Morocco	3,160.04	0.90
Honduras	1,316.68	0.91
Ecuador	1,060.06	0.93
Sudan	1,736.76	0.93

Stratum 5		
Country	**FDI Amount**	**Ran #**
China	249,858.92	0.02
Malaysia	10,962.72	0.09
Switzerland	119,713.93	0.11
Kazakhstan	4,020.71	0.12
France	44,182.40	0.13
Cyprus	5,243.14	0.16
Angola	8,680.94	0.17
Brazil	75,074.56	0.18
British Virgin Islands	51,605.70	0.22
Russian Federation	6,478.40	0.23
Macao SAR, China	3,907.05	0.23
Peru	6,861.18	0.23
Egypt, Arab Rep.	6,885.00	0.26
Germany	46,227.11	0.27
Cayman Islands	18,987.38	0.28
Indonesia	15,508.16	0.32
Australia	36,852.28	0.35
Singapore	65,262.63	0.37
Ireland	203,463.37	0.38
United Arab Emirates	10,975.83	0.40
Venezuela, RB	3,764.00	0.47
Panama	5,760.10	0.54
Colombia	11,942.00	0.55
Spain	23,112.66	0.56
Philippines	5,724.22	0.56
Chile	20,457.23	0.56
Saudi Arabia	8,141.03	0.58
Turkey	16,899.00	0.62
India	44,208.02	0.70
Romania	3,890.53	0.71
Hong Kong SAR, China	180,844.26	0.80
Turkmenistan	4,258.77	0.80
Canada	55,685.38	0.82
Korea, Rep.	5,042.00	0.82
Mexico	30,284.60	0.84
Vietnam	11,800.00	0.85
Italy	7,959.45	0.86
Netherlands	67,456.92	0.86
Argentina	11,978.69	0.86

Thailand	7,062.30	0.87
Sweden	15,852.52	0.89
Finland	18,710.77	0.90
Luxembourg	24,595.77	0.91
United States	379,434.00	0.92
United Kingdom	50,438.64	0.93
Austria	5,746.78	0.95
Azerbaijan	4,047.63	0.95
Poland	7,353.00	0.96
Israel	11,510.20	0.98

ANNEXURE 3

Model Diagnosis.

Cook's Distance measurement analysis.

#	Country	COOK's D	Cook's D Calculated
1	MYS	0.000	0.114
2	ISL	0.234	0.114
3	FRA	0.006	0.114
4	IDN	0.001	0.114
5	ALB	0.015	0.114
6	AUS	0.016	0.114
7	DNK	0.061	0.114
8	LKA	0.003	0.114
9	CZE	0.000	0.114
10	RUS	0.087	0.114
11	KAZ	0.251	0.114
12	MNG	0.002	0.114
13	BWA	0.000	0.114
14	KGZ	0.024	0.114
15	GTM	0.004	0.114
16	SLV	0.010	0.114
17	SVK	0.001	0.114
18	HRV	0.000	0.114
19	OMN	0.009	0.114
20	ARE	0.009	0.114
21	LVA	0.005	0.114
22	BRA	0.451	0.114
23	IRL	4.934	0.114
24	LTU	0.005	0.114
25	MUS	0.000	0.114
26	BLZ	0.097	0.114
27	MNE	0.002	0.114
28	ARM	0.000	0.114
29	KNA	0.007	0.114
30	BRB	0.019	0.114
31	DEU	0.363	0.114
32	GEO	0.008	0.114
33	PER	0.001	0.114
34	SGP	0.007	0.114
35	BGR	0.003	0.114

DFFITS measurement analysis.

#	Country_Code	DFFITS	DFFITS Calculated
1	MYS	0.007	1.069
2	ISL	-1.496	1.069
3	FRA	0.203	1.069
4	IDN	0.072	1.069
5	ALB	0.323	1.069
6	AUS	-0.327	1.069
7	DNK	-0.657	1.069
8	LKA	0.146	1.069
9	CZE	-0.033	1.069
10	RUS	0.777	1.069
11	KAZ	-1.368	1.069
12	MNG	0.111	1.069
13	BWA	0.058	1.069
14	KGZ	0.405	1.069
15	GTM	0.166	1.069
16	SLV	0.269	1.069
17	SVK	-0.096	1.069
18	HRV	-0.056	1.069
19	OMN	-0.253	1.069
20	ARE	0.254	1.069
21	LVA	-0.186	1.069
22	BRA	1.804	1.069
23	IRL	9.313	1.069
24	LTU	0.188	1.069
25	MUS	-0.012	1.069
26	BLZ	-0.866	1.069
27	MNE	-0.115	1.069
28	ARM	0.022	1.069
29	KNA	-0.219	1.069
30	BRB	-0.360	1.069
31	DEU	1.715	1.069
32	GEO	0.229	1.069
33	PER	-0.090	1.069
34	SGP	0.214	1.069
35	BGR	-0.137	1.069

Leverage Measurements Analysis.

#	Country_Code	Leverage	Leverage_ cal
1	MYS	0.038	0.514
2	ISL	0.137	0.514
3	FRA	0.086	0.514
4	IDN	0.237	0.514
5	ALB	0.130	0.514
6	AUS	0.224	0.514
7	DNK	0.215	0.514
8	LKA	0.117	0.514
9	CZE	0.066	0.514
10	RUS	0.370	0.514
11	KAZ	0.374	0.514
12	MNG	0.048	0.514
13	BWA	0.197	0.514
14	KGZ	0.212	0.514
15	GTM	0.076	0.514
16	SLV	0.072	0.514
17	SVK	0.006	0.514
18	HRV	0.115	0.514
19	OMN	0.201	0.514
20	ARE	0.246	0.514
21	LVA	0.044	0.514
22	BRA	0.606	0.514
23	IRL	0.638	0.514
24	LTU	0.122	0.514
25	MUS	0.073	0.514
26	BLZ	0.130	0.514
27	MNE	0.037	0.514
28	ARM	0.110	0.514
29	KNA	0.022	0.514
30	BRB	0.265	0.514
31	DEU	0.323	0.514
32	GEO	0.121	0.514
33	PER	0.084	0.514
34	SGP	0.191	0.514
35	BGR	0.067	0.514

RSTUDENT measurement analysis.

#	Country_Code	RSTUDENT
1	MYS	0.025
2	ISL	-2.870
3	FRA	0.570
4	IDN	0.121
5	ALB	0.750
6	AUS	-0.570
7	DNK	-1.150
8	LKA	0.359
9	CZE	-0.105
10	RUS	0.956
11	KAZ	-1.614
12	MNG	0.390
13	BWA	0.109
14	KGZ	0.727
15	GTM	0.492
16	SLV	0.809
17	SVK	-0.515
18	HRV	-0.139
19	OMN	-0.470
20	ARE	0.418
21	LVA	-0.673
22	BRA	1.347
23	IRL	4.153
24	LTU	0.451
25	MUS	-0.036
26	BLZ	-1.897
27	MNE	-0.441
28	ARM	0.056
29	KNA	-0.956
30	BRB	-0.566
31	DEU	2.165
32	GEO	0.553
33	PER	-0.258
34	SGP	0.410
35	BGR	-0.428