

**Foreign Direct Investment and  
Economic Growth in México**

An Empirical Analysis

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## **Abstract**

Trade openness, market size, transparency, ease of doing business, location advantages and low levels of corruption and country risk are the main determinants that attract Foreign Direct Investment into a host country. FDI inflows in México have increased remarkably since 1994 when the North America Free Trade Agreement (NAFTA) came into effect. Using multiple regression analysis in order to measure the impact of FDI on GDP; the Empirical results showed that a one percent increase in FDI leads on average to an increase of 0.08 percent in GDP which clearly reflects a positive but neither an important nor a substantial impact of FDI on economic growth in México as it would be expected. Time series data analysis for the period 1980-2007 has been tested for Unit Root by applying the Dickey-Fuller (DF) test. Each time series after the first difference becomes stationary and therefore it might be a causal relationship among the variables. However, FDI will not have a real impact on the society unless there is an effective stock of Human Capital capable of learning and absorbing the know-how to work successfully with the technology that Multinational Corporations bring into the host country with their investment. The challenge for the Mexican Government is to create structural reforms such as the deregulation of energy and oil sector for private investment that will lead to constantly higher flows of FDI. In the medium term this will then be reflected in the society in terms of poverty reduction and development of its population.

**Key Words:** economic growth, FDI, labor force, exports, unit root.

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## 1. Introduction.

In order to achieve sustained economic growth in a world experiencing globalization the competition among developing countries to attract Foreign Direct Investment (FDI) from the Multinational Corporations (MNC) will become extremely intense. According to the IMF the aim of FDI is to “acquire a lasting interest in an enterprise operating in an economy other than that of the investor, the investor’s purpose being to have an effective voice in the management of the enterprise”. FDI can be enormously helpful to the level of social wealth as well as to the welfare of the host country. The quality of the FDI can be more important than the quantity.

Some studies reveal that the most important factors that attract FDI are institutions and agglomeration economies, natural resources, low labor costs, trade liberalization and less restriction in bureaucracy on FDI. (Campos and Kinoshita, IMF 2003). The variables explained by Dunning (1988) that pull FDI include economic and cultural ambience congenial to competition, entrepreneurship and innovation as well as the involvement of the government to ensure that human and physical resources are properly directed to this end. While FDI expansion was to a large extent prompted by global abolition of capital controls, Trade expansion was fueled by multilateral trade liberalization. Trade and FDI are closely connected and several different links between both can be identified. It is well known that trade openness encourage competition, therefore the production of quality and lower cost products will lead in economic growth by increasing exports and competitive advantages. FDI only contributes to economic growth when the recipient country has the ability and capacity to implement the advanced technology that came along with the investment from developed countries. It is usually channeled through MNC in terms of research and development. This can lead to the acquisition of substantial knowledge regarding the host country; however technology is not enough to impel economic growth. The transfusion of technology must be backed by a human capital stock capable to absorb, develop and work with the new technology brought by MNCs (Borensztein E., De Gregorio J., Lee J. 1998). On the other hand the lack of FDI and excessive participation of the government in the economy will lead to deficits, inflation and corruption (Easterly, 2001). One of the most important factors that attract FDI in any country is the willingness of the host country to make policy reforms. During 2006 developing countries introduced 74 percent of the total number of policy reforms in the world mainly focusing on lowering corporate income tax and liberalization of specific sectors. Meanwhile the FDI inflows in Latin America increased 11 percent, México remained as the main recipient with \$19.7 billion, which represents 22.7 percent of the total FDI in Latin America, followed by Brazil (UNCTAD 2007).

Despite the fact of being the main recipient of FDI inflows in Latin America México is still ranked as a country with Low FDI performance but with a High FDI potential (UNCTAD 2007) . It must be mention the important role that United States plays in the economic growth and development of México. During 2007 the most important country investing in México was United States with 47.3 percent of the total FDI, 49.6 percent of the total imports came from United States while México exported 82.1 percent to United States according to the National Institute of Statistics, Geography and Informatics in México (INEGI. 2007). The future growth of FDI in México will depend not only on infrastructure conditions and policy changes, but also on the competition against

alternative countries as better destinations for the FDI. Mexico is currently and will continue to be facing competition with countries that might be better prepared to attract substantial investment such as China, India, Brazil and Russia.

The aim of this work is to investigate the impact of FDI on economic growth in México. In order to test the empirical hypothesis where economic growth is related to FDI in México, this work is going to analyze the following variables: Economic growth, FDI and Labor force for the period 1980-2007.

In order to achieve this purpose, the focus will be on the following questions:

- 1.-Has the growth in FDI been consistent with GDP's growth?
- 2.-Does FDI has an impact on economic growth in México?
- 3.-Does Labor Force and Exports contributes to economic growth in México?
- 4.-Is there a correlation between the impact of FDI on GDP and Labor Force?

Previous studies about the impact and the relationship between FDI and economic growth have tested different variables and have used different frameworks and data. For example according to Blomström et al. (1994) using cross-country data from 78 developing countries shows that developing countries with low income do not enjoy substantial growth benefits from FDI, whereas high income developing countries do. Balasubramanyam et al. (1996) using cross country data for a sample of 46 developing countries found that openness to trade is a crucial factor for acquiring the potential growth impact of FDI. Borensztein et al. (1998) using regression analysis and by analyzing 69 developing countries over the 1970-1989 period found that the impact of FDI on economic growth is associated with the technologic absorptive ability of the host country and with the level of the human capital stock measured in terms of secondary school achievement of the host country. In this work it is mentioned that technology comes along with FDI through MNCs and affects positively the growth of income of the recipient country in the long term. Furthermore the study tested as well the relationship between FDI and other indicators such as tariffs and balance of payments with results showing very low levels of significance. On the other hand the study show that countries with poor human capital appear to be affected by FDI which could be the case of México since the human capital stock is basically low skilled and labor intense. Bengoa and Sanchez-Robles (2002) studied the relationship among economic freedom, economic growth and FDI by analyzing 18 Latin American countries, among them México, from the period 1970-1990 showing that FDI appears positively and significantly correlated with economic growth. Other countries with higher economic freedom indexes reflect a positive capital flows; the economic freedom was measured using the index of economic freedom that measure certain country indicators such as transparency and corruptions levels, as well as the strength of institutions. In the same work the variables of inflation and debt services show a negative correlation with FDI. The former reflects an inappropriate management of monetary policy whereas the latter reflect a country risk. Van Den Berg (1997) compile previous work related to the analysis of FDI and made interesting comments regarding the suitability and accuracy of the methods used previously. He analyzed data from the period 1960-1991 and tested the relation between trade and economic growth. Using regression analysis with single and simultaneous equations he found a significant and positive relationship between trade and economic

growth in México. Simultaneously it is mentioned the impact that trade policies have in economic growth and the need of a higher commitment from the Mexican Government to create structural reforms that encourage trade and therefore economic growth.

Finally, and more recently Ramirez (2000) by applying unit root test and co-integration analysis find that FDI and export growth rates have a positive impact on labor productivity growth in México. The study analyzed data during the period 1960-1995 and it is mentioned that the positive effects derived from policy changes result in an increase of FDI inflows during the 1986-1996 period. Nevertheless, the study of the impact of FDI on economic growth measured in terms of Gross Domestic Product (GDP) and labor force in México is rather limited. Therefore, this work will focus on analyzing the impact of FDI on GDP by analyzing data from 1980 to 2007. This period has been chosen due to the availability of data and because after the recession of 1930 two major events occur and played a determinant role in the path of Mexican economy. They are the debt moratoria of 1982 and later the deep crisis of 1995 with the peso devaluation. This work will focus on analyzing the FDI evolution in México as well as the impact and the correlation between the FDI and economic growth measured as Gross Domestic Product in México.

The method of research intended to use is descriptive and longitudinal by analyzing quantitative data during the period 1980-2007. The rest of this work is organized as follows. Chapter two discusses the FDI economic theory and its main framework. In chapter three the historical data is presented. The factors enhancing economic growth in México are analyzed as well as the historical trends and the main determinants of economic growth, including the main sectors and industries that contribute to economic growth in México. The models, methodology applied as well as the empirical analysis are described in Chapter four. The results of the model are described in Chapter five. Finally, Chapter six concludes this work.

## 2. Foreign Direct Investment Framework.

The impact and positive effects of FDI should be noticed in terms of poverty reduction, sustainable development and integration into the modern period of globalization for a developing country. Globalization does not necessarily mean equality for every country moreover can lead to an increase of poverty, high unemployment rates, low wages and low job opportunities. All these facts nowadays are the main features of least developed countries (LDC). These nations may rely greatly on FDI in order to achieve development and reduce poverty on a large scale. There are many factors, determinants and effects of FDI regarding both the host country and the investor's home country. The World's FDI performance during 2007 saw the highest flows ever reaching \$1.5 trillion. The United States still at the top with 12.9 percent of total FDI inflows, followed by the European Union with 40 percent. In summary, 66.6 percent of total FDI is still concentrated in developed countries, Asia with 18.5 percent of total FDI, Latin America also reached its highest level ever with a modest 8.3 percent impelled by new investments and expansion which makes its economic growth more sustainable and stronger. Due to high oil prices Africa received as well the highest inflows ever with 2.4 percent of total FDI. However it is expected that during 2008 FDI flows will be lower due to the expected slowdown in world economic growth and due to the mortgage credit crunch. There is many literature providing evidence that FDI has a positive effect on economic growth (De Gregorio (1992), Blomström et al. (1994), Balasubramanyam et al. (1996), Borensztein et al.(1998), De Mello(1999)). It is mentioned that the main prerequisites that the host country should have in order to be able to attract FDI and to take advantage of the spillovers due to FDI are infrastructure, human capital, market size, economic policies, trade openness, low taxation, low country risk and copyright protection. The following section is to provide an overview of the theoretical foundation and determinants of FDI. The aim is to show the contributions and weaknesses of the theory and its main representatives, thus it is not the aim to show the algebraic development or the conjectures. Krugman and Obstfeld (2005) states that FDI is the international cash flow of capital by which an enterprise set up or expand a subsidiary in another country; in the same way Kindleberger (1985) states, "to have ownership of real assets or of an equity position in a company that gives the foreign owner control". Even though FDI occur through an important and specific channel that is Multinational Enterprises (MNE's) which according to Dunning (1977) "is a company that takes productive activities outside the country in which they are incorporated". The relationship and the amount of control that foreigners can have in a home country enterprise can be either by taking some control, in which the decisions of one company are reflected in another or by acquiring legal ownership by buying equity of the home country firm, then a foreign direct investment occurs.

According to Hymer (1960, first published in 1976) the main reason why a firm is interested in controlling another firm in a foreign country is that some companies specialize in one activity and find profitable to take advantage of this in a different country. It is clear that there are two important players in FDI; MNC's and Trade among countries. FDI is generally a risky process in which firms should measure the risk of diversification and its costs, comparing the return that they will obtain by taking this risk. The following section of this work will try to explain in depth its specific role.

## **2.1 Economic Theory.**

One of the main aspects of capitalism was free competition and therefore the export of goods. In new capitalism and imperialism where monopoly's often takes place, the export of capital is the main characteristic, Lenin (1977). International trade theory contributes highly to developing some important principles that might be related to or overlap with some principles in the fundamental theory of FDI. International trade basic principles such as absolute advantage developed by Adam Smith in 1776 in which it is argued that trade relationship between two countries would be beneficial if each country would focus on the specialization of that product in which they assume a lower cost of producing it. Also Ricardo in 1817 argued that nations should focus on those activities that would offer a comparative advantage and stop producing activities that do not. As a result of this the international trade will increase since the nations will export its surpluses while importing those products that the nation decided not to produce.

These strategies were used with the aim to increase national industry efficiency and productivity. Later, the comparative advantage principle developed by Ricardo was enhanced by the Swedish Heckscher-Ohlin factor endowment model where it is stated that the nations export the goods that use the endowment factors that are more available in the country. Therefore the comparative advantage of a nation would depend on exporting goods in which production factors are well endowed and in which they assume a lower cost. The issues of transportation costs are not mentioned.

These factors are not only the basic inputs necessary in production, while Ricardo only considered one factor that was work; the Heckscher-Ohlin factor endowment model consider two factors of production, work and capital. When combining them it gives place to different production methods. In turn these different endowment factors will define the production and trade models. Even more international trade theory does not considered costs of transportation, these costs were assumed to be null; all these facts will be pointed out and summarize latter by Krugman (1993) who states that the best location for an industry or a firm is where the market is sufficiently large, with high concentration of population, with high demand of goods and services, large availability of natural resources, and with relevant low costs of transportation. The latter plays an important role since the industry or firm will locate in a strategic geographic place in order to supply the large market where it is located as well as other markets. On the other hand another determinant is whether a well-developed transport network exists in the market or the country. This can lead to transportation economies of scale and therefore in total costs reduction. Whether a location is able to offer all this features mentioned above will definitely impact the decision of more manufactures or firms to establish operations by offering them a competitive advantage, thus the process of FDI occurs.

### **2.1.2 Market Imperfections Approach- Industrial Organization Theory.**

After the fact that traditional neoclassical theories were not able to explain the causes and reasons why a firm becomes a MNC and whereas FDI was related as a variation of the international capital movement theory, Hymer (1976) did not agree on the assumptions of market perfections and free flows of information.

Moreover, Hymer (1976) states that foreign firms must have a monopolistic advantage in order to compete with national firms in a foreign market. It is pointed out that national firms have better competition advantages under the assumption that they have a better knowledge of the market, economy, the way of doing business, law and bureaucracy. Multinational Corporations (MNC's) may decide to have a relationship with the national firm either by a joint venture or by an ownership in the equity of the host country firm because it will take too much time and money for the foreign firm to acquire all these knowledge. More over the foreign firm will need to deal with some barriers like exchange rate effects, sovereign risk or government discrimination by means of restrictions in procedures or activities as well as the possibility of expropriation.

The advantages considered by Hymer (1960) that will make the firms to take the decision to operate internationally are lower cost of production, product differentiation and better transportations facilities. A foreign firm with considerable advantages and willing to operate internationally can either licensing its advantages to a national firm or operate by itself in the foreign country. The foreign firm should analyze what option is better to transmit and sell the advantage to a foreign country firm, if licensing is the best option there is a risk of losing the advantage and losing control or to establish international operations by a subsidiary. Hymer emphasized in the process and entry barriers that a transnational company faces once it tries to start exporting or taking partially control in a foreign market, but he do not look towards the future development of the MNC's once they were established in a foreign country.

On the other hand when the foreign firm not decide to licensing, but the option to establish a subsidiary Kindleberger (1969) states that it is still risky because the national firm will still have control of the managerial decisions within its country and further more, the host firm will have more clear, direct and updated communication rather than the foreign firm when subsidiary is chosen. As well, Aharoni (1966) views FDI as a risky process where MNC's analyze the disadvantages to establish a subsidiary in a foreign country in substitution to local production or local operations where exporting and licensing are the best option. He points out some firm specific factors as well as ancillary forces that impelled firms to invest or not in a foreign country, among the internal factors are: the desire and intention of the owners to enter into the new market, the knowledge of the new market. The external factors would be, the worry to lose the market, high competition in the home market that force the firm to search new markets, a government formal invitation to invest in the foreign country or simply the willing to join and follow the leader or main competitor.

Finally all the remaining advantages of investing abroad are the ancillary forces that on the whole will definitely impact the firm decision. Caves (1971) points out that in order to make successful decisions of direct investment firms should have a product differentiation that allow the firm to transfer the advantage to the foreign country and establish distinction on the product against competitors by means of a better knowledge at a little cost to manage marketing and advertising in order to praise the product advantages and then sell the product. Thus, this will allow the firm to offset the costs of acquiring information, cultural and economic knowledge in the host country

### **2.1.3 Product Cycle Hypothesis.**

Raymond Vernon (1966) argued that product innovation is a result of an opportunity or threat in the market and is commonly discovered in developed countries with high income and then transfer to many other countries firstly through international trade then via foreign direct investment. This hypothesis points out the advantages that a company can gain by innovate a product and then transfer the benefits of this innovation to another nation. It is mentioned that the product life consists of an inception, growth, maturity and a slope. In the inception the production of the new products will be located in the firm's home country where will offer the product to the local market as well as continue improving the product. Before a location decision for a new product is made, more relevant than the low cost of transportation and labor costs is the fact that producers will select a place to invest where the flexibility and potential availability to acquire the inputs has a low cost, a high liberty and feasibility to change them. Furthermore, the need of a well developed communication in the market between customer and producer as well as supplier-producer will be a determinant in making the decision. Once the product has been tested, better established and that it has shown a high performance in the local market the firm will try to enter into foreign markets by initially exporting and it is in this stage when tariffs play an important role since high government tariffs could decrease exports from foreign firms or make firms to invest directly in production plants in the host country instead of exporting.

When the product is at the maturity stage, the demand increase substantially, the price of the product becomes the most important competitive instrument as well as the product diversification. Thus, the specialization stage has been reached and there is a need to start exporting, the firm need to establish in foreign countries where the current and future low tariffs are mainly important. Moreover if the difference in labor costs and cost of transportation are enough lower to still be profitable then the firm can decide either to start exporting or to start manufacturing in another country. Once the high income product is enough standardized it might be that the home country where the product was initially produced will import it in the long term from the foreign country where it is less costly. Another fact that may cause a firm to decide invest abroad is to gain market share and maybe the decision could be impelled just because one competitor decide to invest abroad firstly and the firm may think that it is losing market share. When the product is at the standardized stage firms surely are not concerned about marketing considerations because the intrinsic advantages of the product will make easier to be accepted by the market. Firms must ensure that their product fulfill main features that a standardized products should have like a high price elasticity of demand, standardized specifications than enable the product to be in-stock for a long time period as well as easily handle and low weighted in order to reduce costs of transportation. According to Vernon (1966) less developed countries are the best location for products in the high stage of maturity and that are already well standardized. México as a developing country is a good representation of this statement since the higher percentage of FDI is in the manufacturer sector with a 49.7 percent of the total FDI in 2007 (INEGI, 2007) where standardized products like textiles, clothing, electronic devices, automobile accessories among others are produced by foreign firms impelled by low salaries, low labor and transport costs that benefit and attract the MNC's in Mexico's border with United States.

#### **2.1.4 Eclectic Theory.**

The Eclectic Theory or OLI Framework developed by Dunning (1977) argues that having low wages, natural resources and big market is not enough for a country to attract FDI. MNC's should analyzed and compared to national firms when investing abroad in three different advantage areas in terms of O= Ownership advantages, L= Localization advantages and I= Internalization advantages. The Ownership specific advantages are all those specific features and characteristics of a firm compared to a foreign firm and foreign market based on its intangible assets such as own technology, ability to develop new technologies, managerial and organization skills as well as patents. Foreign companies interested in investing abroad should have knowledge, resources, skills and techniques that other firms cannot easily obtain and the reward to the foreign firms should be higher than the benefits of selling its know-how to national firms.

The localization advantage are all those factors such as economies of scale, the factor prices, the size of the market, customs duty barriers, law trade, transport costs, price elasticity of demand, income per capita, monetary policy, sovereign risk (inflation, volatility of exchange rate) which in an overall analysis make more profitable to a firm the decision to invest directly in a foreign country rather than exporting. When a firm find more profitable to move a plant of production and produce in the foreign country from where it is importing since it is cheaper then the localization advantage occurs. Internalization advantages are the interest of firms to exploit internal and specific assets and knowledge such as retaining know-how, specialized techniques and technology. In this case the foreign firm will be more confident to invest if the country has a good property rights policy since its patents are going to be well protected. On the other hand internalization offer the MNC's the possibility to take advantage in countries where financial policies are beneficial and where the taxation system is lower allowing the firm to reduce tax burden and being more profitable. Moreover the possibility to transfer prices among subsidiaries across different countries and make profits are the pros of internalizing. By internalizing the firm will avoid the risk of information piracy and lose of quality if licensing since the disadvantages of licensing are many. According to Hymer (1960) when licensing the firm is exposed to lose price control on the advantages, to lose control among competitors which can be reflect in profit loss. Even more dangerous if licensing the firm is exposed to lose the advantage. Therefore another type of agreement may be pursued such as a partnership with share of profits. Later Dunning (1988) identify three wide types of MNC's when taking FDI decisions. The firms in search of efficiency, firms in search of better raw materials and finally firms in search of national or regional market access.

#### **2.1.5 New Trade Theory - General equilibrium model.**

In this model it is assumed an imperfect competition and that the market structure arises endogenously. All this new theory is based on the fundamental theory of international operations developed by Caves (1971) where among other contributions is to first formulate and split the types of FDI that can occur in a country. Caves stated that when

oligopoly and product differentiation exist in the market the horizontal investment is more feasible to occur whereas if only oligopoly exists in the market vertical investment prevails. Later and taking all the fundamental theory of vertical and horizontal FDI developed by Caves, Helpman (1984) argues that most of the FDI is vertical FDI, arguing that most of the MNC's production process of a product can split in a corporate process and in a productive process at a low cost by establishing the corporate process in a country well endowed of capital where management services and R&D are the main capital whereas establishing the productive process within a country with low production costs. Therefore it is assumed that both can be geographically split.

In the vertical FDI the investing firm adds one step or level to a production process either before or after the firm's main activity (Caves, 1971). Firms divide its production process vertically, establishing each process in the country with lower costs and exchange products and devices between countries. Even more, in order to avoid access barriers foreign firms prefer to invest in production plants that produce the same product as in the country of origin. In vertical FDI the ownership advantages and costs of factor endowments are the main determinants for MNC's. The weaknesses of this model are that it excludes the possibility of FDI between countries with similar factor endowments which in fact is inconsistent with reality and the assumption of zero trading costs in terms of tariffs and transportation. Later this model was modified by Helpman and Krugman (1985) adding more steps into the production process as well as internal trade within the company. Nowadays the model of Helpman works and it is used since the MNC's establish each stage of the production process in the less costly location available as well as exchanging intermediate goods and components among different areas or business sections.

However, Brainard (1993) oppose the former model and states that MNC's produce the same operations in different countries and its main objectives are in terms of searching potential markets or even to search assets. Thus, the horizontal FDI model arises by producing in a foreign country the same goods as produced in the home country. The firm produces the same operations in different countries as well as in its home country because there are similarities either in size of market or availability and supply of factors (Caves 1971). The volume of horizontal FDI depends on the link among fixed costs of the company, fixed costs at the plant and trade costs. The latter includes entry barriers and transportation costs, thus if there are trade entry barriers each market should be supplied totally by local production. Therefore horizontal FDI is much more a strategy to avoid trade barriers among countries. For a wide range of horizontal models see Markusen (1984). Markusen and Venables (1998) argue that high proportions of FDI is actually horizontal and it is more feasible that occurs among countries with similar factor endowments such as high developed countries and that developed countries compete among each other by investing one to each other. As a result, international trade has a lower growth compared to FDI. This statement is consistent with the fact that 66.6 percent of the total world FDI inflow is among developed countries (UNCTAD, 2007). All these assumptions are in line with previous research made by Caves (1971) in which he states that it is more feasible that countries with large market and with high income per capita tend to exchange direct investment between each other.

## **2.2 Determinants and effects of FDI.**

With the aim to show the positive and negative effects due to FDI in both the host and foreign country, there are some important studies trying to show how deep the impact of FDI can be to the host country and its citizens in terms of employment, currency exchange rate and manpower training. Among the most important studies is the research made by Graham and Krugman (1989). They analyzed the pros and cons of FDI in the United States and found that FDI has no impact on US employment, even though the foreign firms tend to import more than host country firms does, as well it was shown that the impact is quite low and has little effect on the dollar depreciation. Therefore, the theories that argue that FDI leads to bad quality jobs and that research and development areas of a firm stay at the headquarters of the foreign company are discarded. The only potential negative effect that is known all around the world is the possible tax avoidance or transfer mispricing by foreign firms where FDI could lead in losses to the host country. Johnson (1970) argued that the host country will benefit from FDI as long as the technology advantages brought by foreign firms are reflected in lower prices that will benefit national citizens whereas taxation to foreign firm profits and tariffs are other natural ways a nation can benefit from FDI.

On the other hand there are some justifications against FDI like nationalism in host country main industry. México could be the case with no access to FDI in Oil Industry or fear that FDI will impel monopoly. The benefits to a host country according to Caves (1971) among others are social benefits such as labour training, the manpower of the home country will improve its knowledge and then it is possible that this knowledge could be transfer to other national firms that will take advantage of this in order to produce similar products than the foreign company without investing in training. On the other hand Kindleberger (1985) states that FDI is furthermore a defensive strategy for firms in the case a foreign firm invest in the home country of a competitor. The latter will then invest as well at competitor's home country in order to alert it not to produce troubles in its home market and let the competitor know about its presence. Normally FDI is used as a defensive strategy to avoid possible losses in other countries and the countries where it is invested do not offer high rates of return to investors. Its main function is to hedge against losses in other investments. FDI is another source to acquire liquidity for a host country.

Peter J. Buckley (1985) argues that in the international industrial co-operation the more risk of leakage in information the less the opportunity to transfer resources and knowledge to a foreign country. There are many forms to transfer resources to another country among these methods are licensing and joint venture as an option agreement but the risk is high and it would be easy to lose control. Another option of agreement is franchising by granting the right to commercialize or do business for a specific time period, the home country will benefit from the sufficient training and marketing support from the franchisor in order to make the firm to succeed. The turnkey contracts allow a foreign company to set up, initiate, to build either a plant or infrastructure during a specific time which later will be under host country control or under local management.

### **3. Data of Economic Growth and FDI in México.**

#### **3.1 Overview.**

After 1982, when Mexican government announced a delay in debt interest payments and on principals and with 50 percent of the Mexican debt held by the top 10 US commercial banks (Kilic, 2000), as well as with an overall debt moratoria of \$85 billion, again México faced the worst recession since the 1930s when a deepest crisis arise during 1995. After a tough year of 1994 marked my several economic and political events beginning with the NAFTA agreement came into effect at the beginning of 1994, the assassination of a potential presidential candidate, the Chiapas conflict, the rise in interest rates in US which leads in discourage to invest resources in México and moreover in capital outflows leaving the international reserves amounting \$28,321 million on February 1994. After all the negative facts and events above mention at the end of the year international reserves plunged more than 62 percent in less than a year amounting \$10,457 million which later will be reflected in the peso devaluation occurred on December 22<sup>nd</sup> with a depreciation of 49.7 percent just on December of 1994 and a current account deficit of \$30 billion. On November 1994, the US exchange rate was \$3.44 Mexican pesos per dollar and at the end of December the exchange rate closed at \$5.695 Mexican pesos per dollar (Banxico, 2008). Even though during 1994 the FDI growth reached an historical 82 percent compared to the previous year.

Followed by this set of events the crisis of 1995 carry a worst scenario composed by some facts such as a GDP decline of 6.9 percent, the inflation rate reached a historical record of 52 percent, an unemployment rate reached a maximum of 7.5 percent and dropped to 5.2 percent at the end of 1995. The US dollar exchange rate increases from \$3.3 in the beginning of 1994 to \$7.7 Mexican pesos at the end of 1995 reflecting an amazing depreciation of 133 percent. Whereas the accumulated depreciation of the Mexican peso against US dollar along 1995 was 49 percent and the interbank interest rate reaching top values of 110 percent (Banxico, 2005). Immediately and due to several repercussions of the crisis in México as well as in other emerging markets of the region and in order to avoid a higher catastrophe as well as to protect the Mexican financial market and its economy, beginning on the 21<sup>st</sup> of February of 1995 the International Monetary Fund (IMF) together with United States under President Clinton administration put an aid package of \$50 billion with the loans being collateralized by Mexican oil revenues leading in a whole painful mortgage of the total oil production.

Later and fortunately due to the high performance of the economy during 1996 with an economic growth of 5.1 percent and a inflation reduction from 52 percent to 28 percent as well as higher oil market prices achieving an increase of 20.6 percent and a 43.1 percent growth in total oil exports value with 79 percent of the total exports delivered to the United States enable México to pay back all the loans in the early of 1997 (Saunders, 2008). Along with these loans a drastic plan of austerity took place in 1995 leading to increases in direct taxes (IVA Taxation) in the order of 50 percent in order to increase the saving rate, the public services tariffs in terms of increases in prices of petrol, gas, electricity as well as roads and airports.

During 1995 salary decreased 23.4 percent compared to 1994 as well as the wage restraint below the new prices but unfortunately affecting as well the social expenditure with an investment of just 7.8 percent of the GDP compared to the 9.1 percent in 1994. The private and public investment dropped 33.9 and 18.9 percent respectively due to the higher interest rates, a restraint of total resources due to a cut in external financing and high debt levels of enterprises making impossible to set up or start projects whereas the social consumption dropped 11.6 percent. According to Bank of México (1995) the FDI declined from a share of 7.8 percent in 1994 to only 0.3 percent of the GDP in 1995.

During 1994 the total FDI amount \$10,972 million and plunged to only \$6,964 million in 1995 with a total amount drop of 36.5 percent in a year giving the industrial sector the highest participation with 54 percent and United States as the main foreign investor with 62.4 percent (Banxico, 1995). Furthermore due to high level of country risk rate the magnitude and the impact to the economy turns into capital leakage. Even though the only component that in 1995 had a positive value was the export sector with 30 percent total growth impelled by the manufacture sector.

On the other hand the imports decline 8.7 percent due to shrinkage of demand and economy production as well as the rise of foreign product prices which in an overall leads to a positive trade balance since 1989. During 1995 the total trade balance amount \$7,089 million compared to a negative trade balance of \$18,464 million the previous year (Banxico, 1995). In addition to the aforementioned 40 percent of the population living under extreme poverty and at least another 25 percent living in the limits of poverty definitely México stressed its position in Latin America as the country with more social inequality.

Impelled by the crisis in 1995 several policy and structural reforms occur in order to attract FDI among the most important were the liberalization and deregulation of many sectors to foreign investment such as the train sector, transportation, airports, telecommunications; followed by the most expected by the foreigners the energetic sector with reforms to liberalization and deregulation of the supply storage and trade of gas and secondary petrochemical industry to foreign and private investment which in turn will definitely impact the levels of FDI in the long term. Finally the reform that later will lead to a greatest impact was the electoral reforms taking place between 1993-1996 with the deregulation of the Federal Electoral Institute (IFE) in charge of organizing Presidential elections without strings attached to the President in turn as use to be in previous years and giving a real autonomy and opportunity to citizens to play an active role in terms of higher level of participation in the whole organization and process in terms of making decisions to chose its representatives, management, coordination and involvement in the vote counting process. All these facts allowed that in 2000s Presidential elections became the most democratic presidential elections ever enabling Mexicans to take out the political party that had been in the government for 75 years long and the hope of a new democratic and social stage that may lead to a better México as a whole.

All the facts and events mentioned in this section played an important role in settling bases and give place to a new stage of sustainable transition both political and economical in the past two decades. The following section will give a clear overview of the current situation in México.

### **3.2 Foreign Investment Policy.**

México started its process of trade liberalization and international market integration in 1986 when México join the General Agreement on Tariffs and Trade (GATT) in order to carry out international trade agreements as well as businesses with the aim to gain access to international markets for Mexican products, to encourage and generate long term investment and to increase total export volumes by magnifying and diversifying Mexican products destinations by the reduction on tariffs.

Nowadays México is ranked 33 out of 178 countries in protecting investors which leads to a good indicator of confidence to investors (World Bank, 2008). Since 1995 Mexican Government has focused on signaling a positive message of legal and protection environment to Foreign Investors by signing 17 Agreements for Mutual Promotion and Protection of Investment (APRIs) with Germany, The Netherlands, Austria, Spain, Belgium, Luxemburg, France, Finland, Portugal, Italy, Denmark, Greece, Sweden, Switzerland, Korea, Argentina, Uruguay and Cuba, in order to legally protect and improve foreign capital inflow. Nowadays the Foreign Investment Law allow to invest a 100 percent in equity of Mexican firms related to production and automobile parts assemble, building and construction of infrastructure, Holdings of Financial Institutions, Banks, Brokerage firms but most importantly the Law allow to invest up to 49 percent without resolution of the National Commission of Foreign Investment (CNIE) and 100 percent with resolution of (CNIE) in the sectors that are more attracting to FDI such as Satellite communications, railroads, harbors, supply and storage of gas, management and construction of airports and financial sector as mention above. Since 2001 it is allow the participation of foreign investment up to 51 percent on equity in national passenger and tourism transportation and central bus stations activities along the country.

In 2001 México join the World Intellectual Property Organization (WIPO) and signed six agreements related to Copyright protection to patents, trademarks, industrial designs as well in the free trade agreements signed in the last four years a intellectual copyright protection has been included as a positive signal to attract FDI. In order to encourage FDI in México one of the aims of the government has been to simplify the procedures to obtain authorization as a foreign investor. Even though, México is still far from the expected levels. Nowadays can take 22 days to register as a Foreign Investor plus the 27 days it takes to set up a business leading in a total of 49 days total procedure. Unfortunately in 2008 México fell in rank from 62 to 75 related to the ease of starting a business. In the same line but with another example is the 131 days it takes to acquire a license for example to construction (World Bank, 2008). All these factors play an important role to attract investment and in the competition with other developing countries which actually is intense.

There is some evidence showing that from the period 1986-1990 in México Industries with higher incidence of FDI have more protection from the government rather than to domestic firms and to social welfare. Furthermore that FDI influence on tariffs and on trade policy (Grether, De Melo 2001). In terms of jurisdiction from 1987 to 2006 the total investigations related to unfair practices where 91 percent due to dumping issues mainly in the metal, chemical, machinery and equipment industry. But among the mainly issues that affect and signal the foreign countries to invest in a host country is the strength of its institutions in terms of property rights, corruption, legal system and corporate governance

which in a whole encourage FDI (Mishkin, 2007). According to World Bank (2008) México is ranked 44 out of 178 economies in the ease of doing business being above its main competitors as developing countries such as China and India ranked 83 and 120 respectively. In terms of corruption level which is as well a measure of country risk to FDI is still a main issue and a big challenge for Mexican Government.

The Corruption Perception Index in 2007 for México was 3.5 which is within the scale of 3 and 5, meaning that politicians and public officials are seriously corrupt leading México ranked 72 worldwide. This perception do not help in the process of encouraging FDI even worse it is known that high corruption levels come together with high levels of inequality, violence and poverty. The latter due the fact that poor people are more prone to pay bribes (Transparency International, 2007). Therefore, there is still the need to set up programs to eliminate corruption and to impel good corporate governance.

In the case of México the reduction of corruption in borders will be a determinant in the reduction of transaction and transport costs to the private sector. On the other hand the corruption can be measured by means of tax evasion levels which in the case of México during 2004 amount \$19,750 million which represents 3 points of total GDP.

An improvement has been shown with a 17 percent reduction in the rate of tax evasion during the period 2004-2006. According to the Economic Freedom Index 2008 (measured and compiled by the Heritage Foundation, which is based on economic theory and empirical research by measuring ten different areas and the higher the scores represents higher living standards México is ranked 44 worldwide with and overall score of 66.4 out of 100 pointing out the poor scores reached on important sectors to attract FDI such as the Investment freedom score (50 out of 100), property rights (50), freedom from corruption (33), financial freedom (60), with the highest levels shown in Fiscal freedom (83.4) and Business freedom (82.6) which definitely lead México in a disadvantage position for competition (Heritage Foundation, 2008). No less important is the Country Risk Index for Investment, which measures the possibility that an emerging country do not pay external debt. In the case of México the country risk is measure by the difference between the interest of US treasury bonds and the return of Mexican government securities. This Index is measure by JP Morgan in which México was ranked on February 2008 with 175 points compared for example with 50 points of Poland. The meaning of the Index is: one hundred points equals a surtax of one percent.

All these factors can affect the investment decision but on the other hand there are still many sectors within the economy where deregulation and foreign investment is definitely a priority such as Postal Service, Natural Gas, energy sector and telephony which still are law restraint and without access to competition. Thus, the need to develop competition policies and its observance which currently and often is hinder by lawsuits taking large time consumption. It must be point out that in 2008 the President of México is trying to impel the most important reforms both the fiscal and energy. The former to increase tax levels and reduce government spending whereas the latter to allow entry of FDI into *para-statals* or national enterprises such as Oil and Energy Industry but political factors and the threat of inflation growth are making the reforms process to be much harder (The Economist, October 2007).

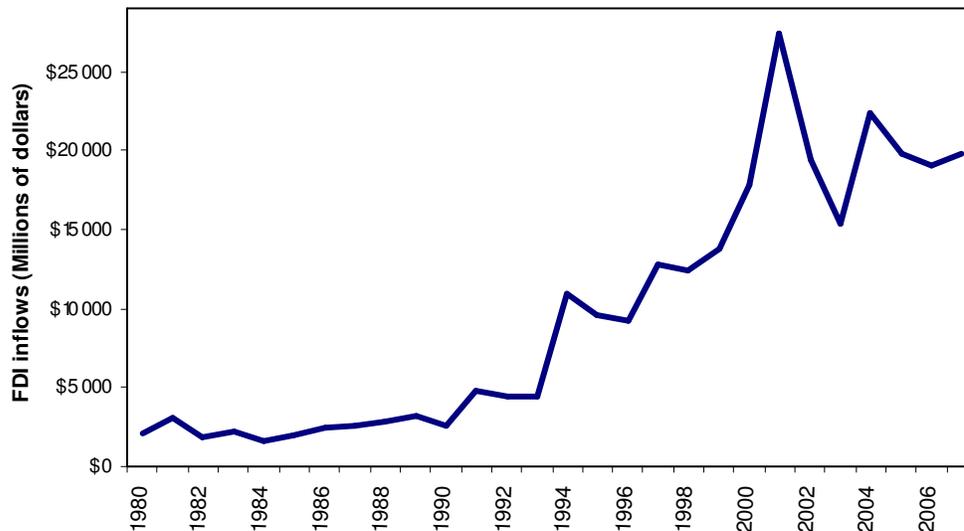
### 3.3 Magnitude of FDI flows in México.

According to the Economic Commission for Latin America and the Caribbean (ECLAC), the rise of gross fixed capital formation is a macroeconomic pillar to settle current account deficit and to increase and encourage exports in the medium term and thus, its participation in GDP. Along with this, FDI has been a determinant factor in the economic growth process with benefits such as technology transfer from Multinationals. As well, the labor force of the host country gains many benefits from MNC's such as training and knowledge (ECLAC, 2000). After the debt moratoria of México and Brazil the scenario in terms of capital inflows for the region was hard. During the 1980s the trend of FDI in México presents low inflows and a flat behavior with a total average growth of 28.7 percent during the period with no many fluctuations as shown in Figure 1. During this decade the average FDI inflow was only \$2.3 billion. The manufacturer and service sector increase its participation whereas the agriculture sector loose participation. At the end of the decade the service sector had a participation of 44.1 percent, followed by industry with 39.3 percent and at the bottom agriculture and mining with 0.77 and 0.33 percent of the total FDI inflows respectively (ECLAC, 2000). According to Figure 1 below, during the 1990s FDI flows reflect the beginning of an important growing stage, with an overall growth in the 1990s of 28 percent and an average FDI inflow of \$8.4 billion compared to the \$2.3 billion average in the 1980s impelled mainly after NAFTA came into effect in the early 1994 which lead in FDI inflow growth of 150 percent from 1993 to 1994 with an historic record of FDI inflows amounting \$10,973 million. Furthermore during the 1989-1993 period, the FDI created 1.3 million of employments (ECLAC, 2000). Later in the crisis years of 1994-1996 the FDI inflows reported downward rates of 13.2 and 3.6 percent for the years 1995 and 1996 respectively marked by the capital leakage before, during and after peso depreciation. However, the FDI inflows as percentage to GDP increase from 1 percent in 1990 to a historical 3.3 percent in 1995, just followed by the 3.2 percent reported in 1997 (UNCTAD, 2007). Although in 1998 FDI inflows fell 3.8 percent due to a loss attractiveness mainly compared to Brazil, the *maquiladora* sector together with profit reinvestment were the main participants reflecting in a 35 percent of the total FDI whereas in a total the manufacturer sector attract 64.3 percent, mainly due to a rapid rise in the *maquiladora* industry in the border with US where MNC's find location advantages as the main benefit to start operations (Dunning, 1977) and to produce one step or level of the overall production in locations with lower wage costs, which perfectly represents and leads in a vertical investment as stated by Caves (1971) related to FDI theory and later by Helpman (1985).

In the same decade but during the 1994-1998 period US invest 55 percent of the FDI which show the strong relationship and dependence from US whereas the European Union represented 23.7 percent (ECLAC, 2000). In an overall picture half of the 1990s México received the biggest amount of FDI in Latin America and was the second recipient country from the 1995-2000 period, just below Brazil. However after the 1990s characterized by the massive acquisition of Mexican enterprises in almost all sectors except for those where a law restraint exist the impact of FDI in Mexico was still far away to solve the main challenges of the Mexican Economy such as Employment, Financing, sustainable economy for the medium and long term. During the following ten years after NAFTA the period of 1994-2004, the sectorial distribution of FDI was mainly

in the following sectors: Manufacture 49.4 percent, Financial Service 24.5 percent, Commerce 10.3 percent. Whereas the country of origin of FDI was 62.8 percent from US, 24.2 percent from European Union, 3.3 percent Canada and 2.5 percent Japan as the most important countries (Ramirez 2000). The automotive industry receive the highest impact because of the fact that in 1994 the total production destined to exports achieve the level of 53 percent whereas for 2002 had increased to 74 percent which leads México as a profitable export platform for US Automotive Industry (UNCTAD 2007).

**Figure 1.** Historic FDI inflows. (1980-2007)



Source: Author processing with data from UNCTAD 2007 and INEGI 2008.

During the 2000s the scene is not completely positive despite the fact that the FDI inflows growth was 29.7 and 54.3 percent in 2000 and 2001 respectively. The later years showed a decrease rate of FDI inflows of -29.5, -20.8, -11.9 and -3.5 percent for the years 2002, 2003, 2005 and 2006 respectively. During the last year 2007, FDI inflows slightly increase 3.6 percent. Despite the downward tendency of FDI inflows the overall average growth is 30 percent for the total period 2000-2007. It must be mention that during 2001 there is a considerable growth of FDI inflow as observed above in figure 1 and it was due to the acquisition of Banamex the biggest bank of México by Citigroup US in a total worth operation of \$12.5 billion which was possible due to policy changes. In 2004 the automotive industry was mainly under US control by owning 64.5 percent of the firms related with the sector (UNCTAD 2007). Later and due to a relaxation of monetary policy in 2006 and oil prices reaching a historical maximum of \$75 a barrel played a determinant role to support the economy and the FDI inflows which were mainly directed to the following sectors: manufacture 61.2 percent, Financial Services 15.4 percent, and 2.5 percent in Transport and Communications. Still the country of origin under dominance is US with 63.7 percent, Holland with 7.9 percent, France 4.8 percent and UK 4.7 percent of the total FDI (Banxico, 2007). On the other hand a low import level as well as a speed down in US economy made 2006 FDI inflows to fall slightly to \$19,037 million with a decrease of 3.5 percent. Nevertheless still remain México as the second largest recipient of FDI in Latin America. Finally, during 2007 the FDI inflows amount

\$19,729 million with a 3.6 percent growth from which 44 percent was due to new investments. The resources were channel through 4,386 Mexican firms by FDI specifically to equity. The sectorial distribution of FDI inflows in 2007 was mainly received by Manufacture Industry with 49.7 percent which is a quite high value, service sector with 33.2 percent, Trade 5.3 percent and Transport and communication with 3.5 percent whereas the agriculture sector received the lowest amount of FDI with a participation of 0.3 percent to total FDI (Ministry of Economy, México 2008). Unfortunately the agriculture sector serve as an indicator to measure the impact of programs that can really improve and reduce poverty in México since the large quantity of poor people live in agriculture sectors. On the other hand the country of origin of FDI last year has not changed as it has historically performed with US at the top with 47.3 percent, followed by Holland and Spain with 15.1 and 9.6 percent respectively. The overall scene leads to an average growth of FDI inflows of 31 percent during the period 2000-2007 (UNCTAD, 2007). In summary, it is observed in the historical facts and trends of FDI inflows in México that the patterns are consistent with some theories presented previously in chapter two of this work about location advantages and vertical investment.

### **3.4 Poverty**

With an overall population of 106.68 million of inhabitants, an infant Mortality rate of 15.2 percent out of one thousand newborn, a 75.1 years of life expectancy at birth (INEGI, 2008) and according to World Bank (2005) over 45 percent of population living in moderate poverty whereas over 18 percent living under extreme poverty and with a total income per capita of \$7310 and a daily average minimum wage of \$4.72 the economic growth in México still faces its weaknesses in social an economic policies that yet are not enough to diminish poverty. One of the main and significant determinant is the percentage of people that still speak a native or indigenous language that nowadays is in the order of 6.7 percent whereas in 2005 illiteracy population with 15 years and over was 8.4 percent (INEGI, 2008). Despite the fact that the employment rate rose from 36 percent in 1991 to 48 percent in 2003, there is a negative issue regarding the increase in youth employment which later is reflected in stop studying and in quit the school which in the future will become a barrier to come out from poverty. On the other hand there are still typical infection diseases such as respiratory infections and diarrhea that appears either in rural or urban poor areas reflecting the poor quality of drinking water and sanitary system. Unfortunately the total expenditure in the health system was just 2.9 percent of the GDP in 2006. This reflects the poor interest of Mexican government to not impel investment in the most important sector in a society which is the health system. Another effect of poverty is migration. The main reasons of migration that push the poorest from rural areas to the biggest cities are the desire and opportunity to get a better job that let them live much better than before. According to World Bank in 2002 the population in urban areas living in extreme poverty was 11 percent whereas 42 percent living in moderate poverty. The urban south regions of the country have the highest incidence of population living in extreme poverty with 32 percent in the South-Pacific and 24 percent in south-Gulf and Caribbean. Although migrants and indigenous face a

level of discrimination once they are in urban areas the equal treatment within the three biggest cities appears to be mostly positive. Even though some indigenous felt discriminated by the way they dress or because of their native language.

Despite the fact that they will earn quite less than average citizens their income is still higher than if they stay at their rural places. Moreover in the rural areas the education, health system, job opportunities as well as justice are scarce. On the other hand the disadvantages of migration from rural areas are the insecurity and environment (World Bank 2005). Nowadays most of Mexican rural areas experience the effect of migration to United States in higher magnitude due to the lower wages, low performance and support from the government agriculture programs *Progreso/Oportunidades* which once established and operating both accounted for just a 6 percent in the income of rural families. This is consistent with the decrease on the income proportion in rural areas depending on agriculture activities for only 34 percent in 2002 compared to a 51 percent ten years before in 1992 which still reflect the great weakness and scarcity as well as social circumstances of México (World Bank 2005). During 2002, the population in rural areas living in extreme poverty reached 35 percent whereas 68 percent living in moderate poverty, which is a high percentage of population suffering from basic deprivation and to whom economic growth has not reached yet.

### **3.5 Current Economic Environment and Growth in México.**

The aim of trade policy during last decade has been to develop the economic liberalization, guarantee access to new markets as well as develop a favorable investment atmosphere. Bilateral trade agreements of free trade as well as the enrollment of México in the World Trade Organization (WTO) have been playing a determinant role in order to achieve a sustainable growth in order to reduce poverty. During the period 1990-2007 the real rate of GDP growth has been 2.8 percent. From 2003 to 2007 the economic growth has been solid with growth rates in the order of 1.4, 4.2, 3, 4.8 and 3.3 percent but far away from striking growth rates in developing countries during 2006 such as in China with 10.7 percent and India with 9.2 percent (Banxico, 2007). In 2006 the public revenues, the internal expenditures and production benefit firstly from a significant increase in oil trade balance which reflected a 22.4 percent growth in oil exports due to high international oil prices with a yearly average price of \$53.04 per barrel which represent \$10.33 USD above the price of the previous year. Secondly, due to family remittances inflows from Mexican citizens living and working in United States amounting \$23,054 million and a growth rate of 15.1 percent.

To show the magnitude of US dollar remittance and its impact in Mexican economy it represents 2.7 percent of total GDP and is the main source of capital after oil revenues. During 2006 remittances exceed the surpluses of both oil revenues and FDI being five states the main recipients of remittances with 43 percent of the total amount. It must be mention that a decline in the growth of remittances was experienced in the last two quarters of 2006 with a drop of 10.6 and 5.5 percent respectively due to the fact that Mexicans find more difficult to get a job due to more strict official controls as well as it turns more difficult to entry into US (Banxico, 2007). Theses facts are mentioned in order

to demonstrate that higher poverty indexes made citizens to emigrate and then, they are the ones who support the economy by means of remittances.

Therefore, there is a need that Mexican Government develops a National program to develop sustainable growth. In this line and according to United Nations (2007) the Human Poverty Index which measure longevity, knowledge and living standards leads México to be ranked 52 out of 177 countries which is higher compared to another developing countries such as Poland or Argentina ranked 37 and 38 respectively. In the same Index the GDP per capita amount \$10,751 whereas the rate of population living below \$2 a day is 11.6 percent.

On the other hand the private consumption expenditure is still the main factor contributor to the GDP which as a determinant factor on internal demand was impelled by a higher availability of financing and partially due to an employment improvement with a 6.24% growth compared to 3.34 percent in 2005. Even though the growth on employment rate does not reflect a positive impact on the unemployment rate which remained without movement at a rate of 3.59 percent compared with 3.58 percent in 2005. The production capacity strengthens with a gross fixed capital formation growth of 10 percent. The expenditures related to machinery and equipment reflected a 12 percent increase whereas the construction expenditures rose to 6.9 percent.

The financing of gross capital formation as a percentage of GDP was 22 percent whereas the internal saving rate results in a 21.8 percent of GDP given a difference of 0.2 percent which was covered by external savings (Banxico, 2007). The inflation rate affected mainly by a striking increase in the prices of basic consumption products such as sugar with 31.93 percent, as a fact the quotation in internal market was overpriced 136 percent in relation with external markets. Maize (corn) which has been affected after NAFTA with an increase of imports from USA reflected a 13.82 percent growth of the price as well as housing. The latter derived by an increase in construction raw material prices linked to higher prices of steel and copper leading to an inflation increase from 3.6 percent in 2006 to 3.8 percent in 2007 which is still quite high compared with the 1.5 percent of China during 2006. Unfortunately according to UNCTAD 2007 the objectives established by México to reduce inflation that often requires a free flotation currency and inflation control by means of interest rates types showed results that have been disappointing leading into high interest rates and unsteadiness as well as a trend on currency depreciation and a decline on Global competitiveness.

The Mexican peso has shown less volatility against dollar moving from \$10.85 on December 2006 to \$10.86 on December 2007. Since then a slightly appreciation has been shown until the end of March 2008 with an exchange rate of \$10.73. At the end of 2006 the International reserves amount \$67,680 million (Banxico, 2007). During 2006 the trade balance show a deficit of \$6,133 million an amount below the \$7,587 shown on 2005 with a total exports growth of 16.7 percent mainly driven by oil exports growth of 15.7 percent and a 15.7 percent growth of non-oil exports. The manufacture exports show a growth of 15.8 percent, which according to UNCTAD (2007) is based on labour-intense processes as well as low-skilled labour. On the other hand the import demand increased 15.5 percent. The deficit was mainly affected by trade exchange with China which nowadays is the second supplier of merchandise and with whom México has the highest bilateral trade deficit. On the other hand the exports to US increased 16.6 percent with a total participation of 10.7 percent on the total US imports (Banxico, 2007).

In 2006 two important structural reforms came into effect. The first was a fiscal reform in which the taxation percentage to national oil company Pemex was reduced. This was done in order to realize resources to investment in oil production and exploitation within the firm and the second to establish the rules of allocation decision for the oil surplus revenues as well as the deadline to pass the tax package.

On the other hand and regarding financial sector the stock market index in Mexico (IPC) reflect a return of 47.2 percent in US dollars which represents one of the highest performance in the World compared for example to Brazil with a return of 45.2 percent, US S&P 13.6 percent, Germany 35.9 percent, France 30.9 percent and UK with 25.9 percent among others. In the evaluation of the Mexican economy by the IMF and World Bank during 2006 it is stressed the important contribution to proper macroeconomic management with a favorable external environment to strengthen the ability of the financial system to face adverse situations. The trend to the creation of a higher internationalized financial market, the progress in terms of bank crisis solution, the improvement on safety process in payment systems and great progress in fulfillment of Basel Accord for an appropriate Bank supervision. On the other hand the main challenges stated among others are to give autonomy to supervision agencies as well as to keep the housing and commercial credit under surveillance of institutions and procedures in order to maintain and consolidate the financial market stability. As well to encourage the need of structural reforms related to development banks and to promote and enhance the transparency and competition trough a consolidation of the institutions (Banxico, 2007).

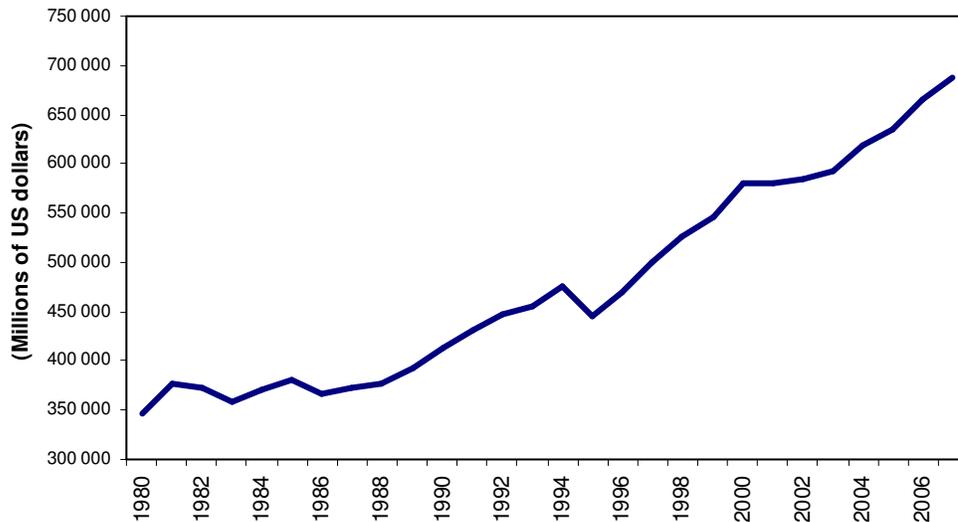
### **3.6 Factors that impact the Economic Growth in México.**

It would be expected that after NAFTA came into effect the positive impact could be reflected on an accelerate growth on Mexican economy that allow to face the challenge of poverty reduction. After NAFTA the GDP growth has been steady with the highest growth rate in 1997 of 6.8 percent followed by 2000 with 6.6 percent. Nevertheless the following years the growth rates have been flat in the range of 3 percent and 4.2 percent, the former for year 2005 and the latter for 2006. In Figure 2 it can be seen the effect of peso devaluation in 1994 after which followed the deep crisis of 1995 leading to a plunge of the GDP. The main determinants of GDP growth during 2006 were specifically the growth rate of three specific sectors: the industrial sector with a growth rate of 5 percent impelled by manufacture and constructor sectors with 4.7 and 6.9 percent respectively. The service sector with 4.9 percent impelled mainly by retail industry through MNC's such as Wal-Mart Stores with high share of the Mexican market and finally the agricultural sector with 4.8 percent growth which is the highest rate in the last fifteen years due to an increase in the production of bean, maize, cotton, rice, avocado, mango, and pineapple. The agricultural growth in 2006 reflects as well the bad weather conditions on 2005 due to hurricanes "Stan" and "Wilma"(Banxico, 2007).

The performance on exports is a determinant on total GDP in Mexican economy. The export sector is basically impelled by the oil industry which has had a striking performance due to international high prices reflecting a growth rate of 22.4 percent and the manufacture sector with an export growth rate of 15.8 percent specifically the

*maquiladora* industry with a growth rate of 14.8 percent as well as the automotive industry exports.

**Figure 2.** Historical Real GDP. (1980-2007)



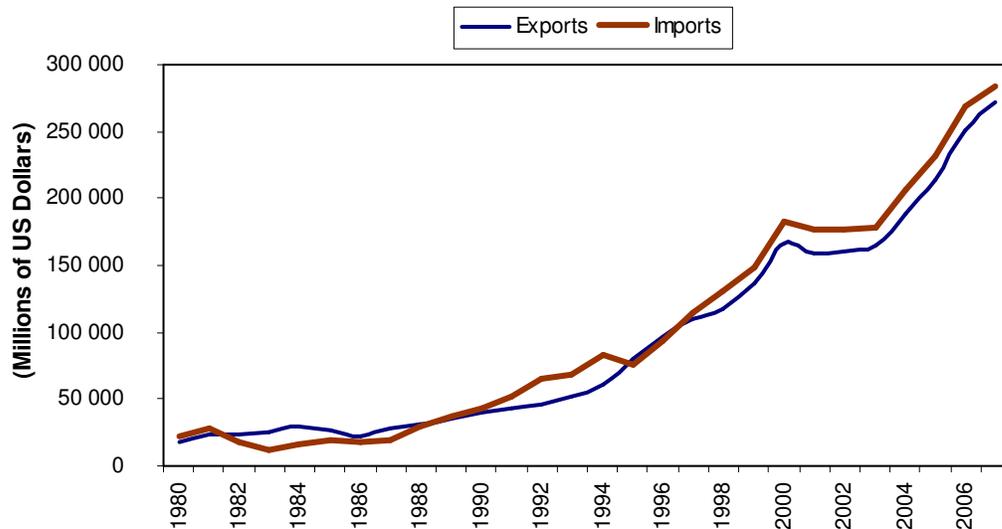
Source: Author processing with data from World Bank 2008. Real GDP at 2000 US dollars.

Since 1993 and in order to improve and enhance exports 94 percent of total exports are free from tariffs in the world which definitely will positively impact the export performance, the investment and the economic growth. The exports and FDI have been the main sources of employment. In the sectors where exports represents over 60 per cent of its production are paying 39 per cent more than the rest of the economy. Furthermore the manufacture companies pay 3.5 times much better wages than the minimum salary in México (Word Trade Organization, 2002), leading the manufacture sector as a determinant factor on exports performance. Moreover, the *maquiladora* industry from the period 1994-2006 showed a growing rate of 12.6 percent. During the same period the *maquiladora* share was in the order of 45 percent to total exports which clearly reflects a labor and resource intense process linked with low skilled and low cost labor which is used only on assembly jobs and later once the product is finished is sent back to US. The wages in Mexico according to UNCTAD (2007) are just 17.3 percent of the nominal wage in the United States in manufacture sector proving the reasons why the *maquiladora* activity is highly intense in the border of México which according to Chiquiar (2008) in 1999 represented 60 percent of total manufacture employment being located in the Mexican Border. Thus, it can be observed that because of the strong dependence on the US economy makes Mexican economy vulnerable to what could happens in the United States. Despite the fact that the total trade balance with US was positive by \$16,473 millions during 2006 with a total exports growth rate of 15.4 percent compared to the import growth rate of 10 percent. On the other hand the weighted average tariff on imports diminished to 3 percent in 2000 between the countries to which there is a bilateral agreement and countries to which Mexico has no agreement the import

tariffs diminish to 7 percent. The imports are mainly high-skilled and high-technology intense goods as well as electronic items.

Unfortunately as can be seen below in figure 3 the import performance is increasing the gap to exports in the last seven years leading to a negative trade balances for México since 1998.

**Figure 3.** Trade Balance. (1980-2007)



Source: Author processing with data from UNCTAD 2007 and Bank of México 2008.

The biggest challenge that Mexican Government faces is to be capable of carry out the structural reforms in Energy and Fiscal sectors as well as to strengthen institutions and not to strongly depend on the manufacturer and automotive industry exports in order to impel economic growth as well as to achieve a positive trade balance.

## 4. Methods and Empirical Analysis.

### 4.1 Theoretical Models.

The aim of this section is to present some of the models that are available in the literature and that have been applied by some authors in previous studies. As well, the model to be applied in this work is presented in order to measure the impact of FDI and its relationship with GDP.

Borensztein et.al. (1997) based on a Cobb-Douglas production function of the form:

$$Y_t = AH_t^\alpha K_t^{1-\alpha} \quad (1)$$

Where  $H$  represents human capital,  $K$  denotes physical capital and  $A$  is a positive constant that represents the level of technology, as well could represent the state of environment which reflects policies and control variables that might influence the productivity growth in any economy. Borensztein (1997) mentioned that the physical capital is equal to the stock of capital which is the sum of all varieties of capital goods. Therefore, by direct investment national firms and foreign firms are the ones that produce capital goods in the economy. In the model, Borensztein assumes: fixed setup costs for foreign firms when starting investing in the host country; constant costs of production and finally, since there is the presence of foreign firms and it is not a closed economy, the model do not introduce neither exports nor imports which could denote international trade.

On the other hand it is mentioned the important role that the stock of human capital plays in the impact on economic growth. Under these assumptions and in order to measure empirically the impact of FDI on GDP, Borensztein (1997) applied the following equation:

$$g = c_0 + c_1 FDI + c_2 FDI * H + c_3 H + c_4 Y_0 + c_5 A \quad (2)$$

Where  $g$  denotes the annual growth rate of per capita GDP,  $FDI$  is foreign direct investment measured as a ratio of GDP ( $I/Y$ ), similar form to measure FDI was mentioned as well in Van Den Berg (1997). The FDI was measured in terms of FDI inflows. Variable  $H$  denotes the stock of human capital which is represented by the male secondary school attainment since according to Barro and Lee (1994) is the best method to represent human capital stock;  $Y_0$  represents GDP per capita and  $A$  variable denotes all other variables that might affect GDP and these could be government consumption, country risk levels, inflation rate, corruption levels as well as the strengthen of institutions among others. For the variables of human capital denoted as ( $H$ ) and other variables denoted as ( $A$ ), Borentsein took the data from the tables created by Barro and Lee (1994). The results of the regressions appear as good bases to conclude that FDI is positively related to economic growth but strongly depends on the capability of the human capital stock of the recipient country to absorb the knowledge, by learning-by-watching or learning-by-doing, from the technology and know-how that MNC's bring with their investment into the host country. However, it is mentioned that low levels of human capital will lead to a negative impact of FDI (Borensztein, 1997).

Along the lines of De Mello (1997) and in order to measure the real effect of FDI on economic growth, Ramirez (2000) used as well an augmented Cobb-Douglas production function of the form:

$$Y = Af[L, K_p, E] = AL^\alpha K^\beta E^{(1-\alpha-\beta)} \quad (3)$$

Where  $Y$  denotes real output,  $K_p$  is the private capital stock,  $L$  is labor and  $E$  denotes the externalities to FDI stock. Variable  $\alpha$  represents the share of domestic labor and variable  $\beta$  is the share of private capital, and variable  $A$  denotes the production efficiency. The externality, represented by variable  $E$  is denoted by a Cobb-Douglas function such as:

$$E = [L, K_p, K_f]^\theta \quad (4)$$

Where  $\gamma$  is the marginal elasticity of substitution between private and foreign capital and  $\theta$  is the intertemporal elasticity. Then by combining equation (3) and (4) as well as by taking time derivatives and logarithms, Ramirez (2000) obtained a modified growth model based on a general dynamic production function, the following equation:

$$\Delta y = \alpha + \beta_1 \Delta 1 + \beta_2 \Delta k_p + \beta_3 \Delta k_f + \beta_4 \Delta c_g + \beta_5 \Delta x + \beta_6 D_1 + \beta_7 D_2 + \beta_8 T + \epsilon \quad (5)$$

Where  $\Delta$  is the difference operator and as well represents natural logarithms for each variable. Only the variables of coefficients  $\beta_6, \beta_7$  and  $\beta_8$  are not in natural logarithms as will be described below in this text. Variable  $y$  denotes the natural logarithm of real GDP; variable 1 represents natural logarithm of labor force;  $k_p$  is the stock of private investment;  $k_f$  is the stock of FDI;  $c_g$  is real government consumption expenditures;  $x$  denotes total real exports;  $D_1$  is a dummy variable equal to 1 that was used by Ramirez in order to represent the crisis of the years 1976, 1983, 1983, 1987 and 1995, the value of dummy one for the remaining years is zero. Dummy 2 represents oil led expansion from 1978 to 1981 and equals 1; variable  $T$  denotes a time trend and finally the error term which includes all the possible factors that might affect the model and economic growth but that are not included in this model, it is represented by  $\epsilon$ .

The conclusions after the application of the model were that all the variables, despite the fact that are non-stationary and clearly trending upward, they remain stable and showed the same proportion of variation one to the other in the long run. It is important to point out what Ramirez (2000) mentioned regarding the fact that most of the researchers used population data instead of labor force as well as using investment as proportion of GDP instead of capital stock data. The former is consistent with the model shown below in equation (11) mentioned by Van Den Berg (1997) where the population growth rate is applied replacing labor force. These facts will let this work to apply either labor force or population data as alternatives to represent labor force or human capital when applying the regression. It must be pointed out that his model was applied by Ramirez (2000) for the case of México for the 1960-1995 period and it is a good guide for the purpose of this

work since it gives a clear description of the variables and how to manage them. As well, it gives theoretical foundation for the application of the model.

Another example in the literature that shows a different way to measure the determinant factors of foreign direct investment is the study made by Bengoa and Sanches-Robles (2003) where it is mentioned that when neo-classical models are applied, FDI only has a little effect on the GDP per capita. Thus, the real effect of FDI is not reflected in changes in economic growth rates. The impact of FDI is too low to be noticed as a change in the growth rate on GDP. Therefore, they conclude that under the framework of neo-classical model and following the lead of Solow (1956) it can not be considered that FDI cause or enhance economic growth. The latter measured in terms of GDP. However, Bengoa and Sanches-Robles (2003) state that by applying new theory of economic growth FDI could reflect a real impact on the growth rate of per capita output (GDP). They measured the relationship among economic growth, economic freedom and FDI in a sample of 18 countries in Latin America for the period 1970-1999, using two simple regressions. México was included in the sample analyzed. The first regression applied in order to measure the relationship between economic freedom and FDI was the following:

$$FDI / GDP_{i,t} = \gamma_0 \text{Intercept} + \gamma_1 X_{i,t} + \varepsilon_{i,t} \quad (6)$$

$FDI / GDP_{i,t}$  denotes the FDI inflows as percentage of GDP,  $i$  and  $t$  denotes the country and the year respectively,  $X$  represents different variables that have effect on FDI such as human capital, market size, economic freedom and other economic variables. It must be mentioned that this model applied by Bengoa and Sanches-Robles (2003) seems to be too flexible since they assume many variables as alternatives to run the regression, which means that it is possible to add many variables as determinants of FDI. The economic freedom was taken from Heritage Foundation which assesses different areas in a country such as trade openness; strengthen of institutions, ease of doing business, fiscal freedom, investment freedom, freedom from corruption and property right protection among others. The results were that the index of economic freedom has a positive effect on FDI. As well they used the level of GDP as another variable and it was found positively related to FDI. As well, they added inflation; the correlation to FDI was negative and significant as it can be expected. It is known that a country with high inflation will no be attractive to investors.

The second regression applied in the same study by Bengoa and Sanches-Robles (2003) with the aim to measure the relationship between economic growth and FDI and following the lead of De Gregorio (1992) was of the form:

$$\text{Rate of real per capita growth}_{i,t} = \gamma_0 \text{Intercept} + \gamma_1 Z_{i,t} + v_{i,t} \quad (7)$$

In equation (7) above, the variable  $Z_{i,t}$  denotes all possible variables that could have an effect on FDI. They used  $FDI/GDP$  ratio as one variable in the regression. The results showed that FDI is positively and significantly correlated with the rate of real per capita growth (real GDP per capita growth rate), as well the economic freedom index still remains positively related to economic growth.

Another variable added in the regression was the human capital, measured as primary and secondary school attainment with positive and significant correlation. Inflation again appeared to be negative and significantly correlated with GDP per capita. It must be pointed that that Bengoa and Sanches-Robles (2003) did not add the private investment as another variable in the regression in order to avoid correlation with FDI. They mentioned that FDI is already included in total private investment.

In summary, the work done by Bengoa and Sanches-Robles (2003) is quite significant, showing that FDI is an important variable with high effect on economic growth, in this case measured as the growth rate of real GDP per capita, as well the human capital is an important determinant to impel economic growth in a country, specifically in Latin America.

On the other hand, regarding the empirical analysis of the factors and determinants that have an impact on economic growth and fortunately in a study related to Mexico as a case of study, Elias (1992) applied the Cobb-Douglas production trying to explain and to measure the sources of economic growth in México using data for the 1955-1974 period. In the study of Elias (1992) the following regression represents the Cobb-Douglas production function:

$$\ln Y_i = \psi_1 + \psi_2 \ln X_{2i} + \psi_3 \ln X_{3i} + u_i \quad (8)$$

Where, all variables were transformed in natural logarithms,  $Y_i$  denotes the real GDP at 1960 Mexican pesos as the output. Variable  $X_{2i}$  represents labor input measured in terms of employment in thousands of people and finally  $X_{3i}$  represents the capital input that was measured by the stock of fixed capital in millions of 1960 pesos as well. Elias (1978) states that the capital input can be divided in different types such as private and public capital; domestic and foreign capital, both of them are included in the stock of capital; domestic sector, firms and households. The results of this model showed a positive and significant relationship between labor input and GDP in México with a coefficient of 0.3397 in labor input which could be explained as a unit percent change in labor input leads on average to a 0.34 percent increase on real GDP. As well, the coefficient of capital input showed that an increase of one percent in capital leads to an increase of 0.85 percent of GDP. The result for the coefficient of determination was high with an  $R^2$  of 0.995. In summary, the study of Elias (1992) and its results suggest that the impact of capital seems to be higher than the impact of labor force in the case study for México during the period 1955-1974.

There are many econometric models that have been applied by researches in the literature trying to explain the relationship between economic growth, foreign direct investment and trade as macroeconomic variables. The models applied by researches are many and with different variables as possible alternatives to predict and measure the real impact on economic growth using historical time series data. In a study made by Van Den Berg (1997) the application of many simultaneous equations as well as single equations confirmed a significant and positive relationship among exports, the ratio of FDI to real GDP and the real GDP growth rate.

Van Den Berg (1997) points out that the most common simple linear econometric model used by researchers and which is derived from the neoclassical production function:

$$GY = GTFP + \alpha GK + (1 - \alpha)GL \quad (9)$$

In which the growth rates of total output, capital, labor and total factor productivity are represented by  $GY, GK, GL$ , and  $GTFP$  respectively, with  $\alpha$  and  $(1 - \alpha)$  represented income share of capital and labor. The neoclassical production function leads to a common linear econometric model of the form:

$$GGDP = a_0 + a_1GCAP + a_2GLAB + a_3Trade \quad (10)$$

Where  $GDP, GCA$  and  $GLAB$  are the growth rates of real  $GDP$ , capital stock and labor force. Van Den Berg (1997) mentioned all the possible variables that can be substituted in equation (10) in case of availability and these are: the ratio of Investment to GDP (output),  $I/Y$ , is more commonly used instead of Capital (GCAP). Labor force could be replaced by Population growth (GPOP) and Trade could be replaced as well by Exports (GREX), leading to the following equation:

$$GGDP = a_0 + a_1(I/Y) + a_2GPOP + a_3GREX \quad (11)$$

Van Den Berg (1997) mentioned all the previous authors that have applied models such as equation (11), among them are: Dollar (1992), Edwards (1988), Feder (1982), Greenaway and Nam (1988), Greenaway and Sapsford (1994), Kavoussi (1984), Moschos (1989), Ram (1985,1987), Salvatore and Hatcher (1991), Sheehey (1992), Tyler (1981), and Van Den Berg and Schmidt (1994).

Finally the study made by Thomas and Grosse (2001) in which the factors from the country of origin that may have an impact and some effect on FDI into the recipient country were measured. The importance of this study is that the empirical test was done using Mexico as the country to carry out the case study. The period analyzed was from 1980 to 1995 with 11 countries that in total have a share of 92 percent of the total FDI inflows into México. Thomas and Grosse (2001) without explaining any theoretical economic model used a model of the following form:

$$FDI \text{ in México} = B_0 + B_1(Trade) + B_2(Wage) + B_3(Geodistance) + B_4(Culturaldistance) + B_5(GDP) + B_6(Risk) + B_7(Prime) + B_8(Exrate) \quad (12)$$

Where  $FDI$  variable was measured using nominal annual inflows. It must be pointed out that in this study the FDI inflows were not in real values. This assumption leads to another alternative when making decisions to apply FDI inflows it could be either in real or in nominal terms.  $Trade$  denotes the total bilateral trade between México and each country analyzed.  $Wage$  variable represents the average cost per hour for workers in the production sector in each country of origin.

Using a simple distance locator, the *geographic distance* variable was measured by the distance from México City, the Mexican capital to each country of origin capital. The *cultural distance* was measured by four variables: power distance, uncertainty avoidance, individualism/collectivism, and masculinity/femininity. The market size is denoted by the *GDP* of each country of origin. *Risk* denotes the riskiness of each country for direct investment and it is measure in a scale from A+ to D-. In the regression this values were transformed to numerical values. *Prime* represents the borrowing rates, in terms of the average monthly prime rates of each country of origin. Finally *Exchange rate* was measures using country of origin's currency average exchange rate to Mexican peso.

The main results of this model showed a high correlation of 0.92 between Trade and FDI, which clearly reflects and is consistent with the eclectic theory developed by Dunning (1977), where it is stated that MNC's in the expansion stage start to export to big markets such as México, later the firms decide to establish operations in the country to which they have had trade since they can take advantage of low costs in wages and location advantages leading to FDI occurs. As well the geographic distance variable result to be highly uncorrelated with FDI and Trade as it would be expected, the longer the distance the less attractive an the more costly to invest abroad. According to the model shown above in equation (12), the variations in FDI are explained in high proportion by the model since the coefficient of determination  $R^2$  was 0.89. This result is highly significant since the model introduced eight independent variables into the multiple regression analysis, explaining most of the variation in FDI. On the other hand the borrowing rates or prime rate is negatively correlated. The lower borrowing costs the higher the FDI inflows.

The most important conclusion and that it must be pointed out regarding the work of Thomas and Grosse (2001) is the one in page 72 of the paper, where it is mentioned that some of the variables did not show the expected results. They mentioned that the results relate to the variable GDP was -0.00005 and only significant for one model. Thus, the results were not consistent from one model to another, since one model showed a negative relation of GDP to FDI which is contrary to the expectations. As well *Wage* variable was not significant.

## 4.2 Model application and Empirical Analysis.

In order to measure the determinant factors that have some effect on economic growth, the model to be applied in this work is based on the augmented Cobb-Douglas function and following the lead of Elias (1992) lead me to the following model of the form:

$$Y = Af[L, K_p, E] \quad (13)$$

Where  $Y$  is real GDP at 2000 US dollars (real output);  $L$  stands for labor force, as mentioned in Elias (1978) and Ramirez (2000) the variable of labor input could be measured as well by total labor force as a better variable to labor input. Data for Labor force was collected from World Bank Development Indicators (WDI) and it is expressed in thousands of people. Finally  $K_p$  denotes private capital stock. Since FDI is part of the

capital input as mentioned in Elias (1978), the FDI stock will be used as the capital input variable applied by Elias (1992) in the multiple regression in equation (8) shown above. In order to generate the FDI capital stock and according to Ramirez (2000) the model to be applied is of the following form:

$$K_t = K_{t-1} + I_t - \delta K_{t-1} \quad (14)$$

Where  $K_{t-1}$  denotes the stock of FDI at time  $t-1$ ,  $I_t$  is the flow of foreign direct investment (FDI) during time  $t$ , and finally  $\delta$  is the rate of depreciation in time  $t-1$  for the FDI capital stock which is commonly measured by the GDP deflator of inflation rate of the year at time  $t-1$ . After the generation of the FDI stock and based on the Cobb-Douglas function, the multiple regression to be applied is of the following form:

$$\ln GDP = \alpha_0 + \alpha_1 \ln Laborforce + \alpha_2 \ln FDI + \epsilon \quad (15)$$

Where  $GDP$  stand for real GDP at 2000 US dollars,  $Labor\ force$  is measured in terms of thousands of people, and  $FDI$  denotes the FDI stock measured as stated in equation (14) above. The error term  $\epsilon$  represents all variables that have an impact or an influence but are not included in the model and it could be for example level of corruption, country risk, unemployment rate, exchange rate, wages, among others. As well the error term may represent errors of measurement, for example if the data might be rounded. A summary of the model applied above is shown in the table 4.1 below.

## 5. Results.

First, the data is analyzed and tested using SPSS software in order to run the multiple regression analysis. The results obtained by running the equation (15) above, show that the impact of FDI is positively and significantly related to GDP.

Table 5.1

Regression number			
1			
Independent variable	Coefficient (standard error)	T	Sig (p-value)
(Constant)	7.746 (0.0044)	5.955	0.000
Labor Force	0.434 (0.148)	2.936	0.007
FDI	0.088 (0.028)	3.161	0.004
R <sup>2</sup> -adjusted	0.927		

According to the coefficient results shown in table 5.1 above and as it is the focus of this work to measure the impact of FDI on GDP. It can be derived that one unit growth in FDI leads on average an increase of about 0.088 percent in Real Gross Domestic Product in México. The results are positive and statistically significant. However, the coefficient result for FDI is below the expectations of this work. The results indicate that FDI inflows in México are still not too significant. It might be that FDI inflows are not channelled to the correct sectors that might produce a real impact on the economy.

The *t*-value shows that for (FDI) variable the probability of obtaining a *t* value such as more than 3.161 is smaller than 0.005 with 27 degrees of freedom. Therefore, the null hypothesis of no relationship between  $\ln(\text{FDI})$  and  $\ln(\text{GDP})$  can be rejected. All this values has been taken and compared from the *t*-distribution table. As can be seen as well and fortunately the FDI coefficient has a *p*-value of 0.004 (in table 5.1 above shown as “sig”) which means that the null hypothesis that FDI is not significant can be rejected since the value is far below the standard *p*-value of 0.05.

The coefficient of determination  $R^2$  shown in table 5.1 above indicates the strength of the relationship between the model and the dependent variable. Thus, the proportion of the total variation of GDP that is explained by the proposed model in equation (14) applying Labor force and FDI is about 92.7 percent with both variables statistically significant. The result of 0.927 in the coefficient of determination  $R^2$  indicates the goodness of fit of the regression.

Table 5.2

ANOVA				
Model	Sum of squares	Degrees of Freedom	F	Sig. ( <i>p</i> -value)
Regression	1.167	2	157.638	0.000
Residual	0.93	25		
Total	1.260	27		

As can be seen above in the analysis of variance table 5.2 and in order to test the joint hypothesis that FDI and Labor Force have no impact on GDP, being the null hypothesis of the form  $H_0: \beta_1 = \beta_2 = 0$  and due to large *F* values such as 157.638 with zero level of significance, it is an evidence to reject the null hypothesis that both FDI and Labor force Exports have no impact on GDP. The null hypothesis of a non explanatory model can be rejected at every significance level in both cases. As well the null hypothesis that the independent variables have the same variance can be rejected. Therefore, the variances of the variables are not the same. Finally, the low value of 0.93 in the Residual Sum Squares (RSS) shows the goodness of the model.

The results indicate that there is a positive relationship between FDI and Labor force with economic growth measured in terms of Real Gross Domestic Product. However, the impact of FDI is not what it was expected. The low coefficient of FDI shows that despite that the FDI inflows in México has been increasing in high proportion, it might be that the amounts and the quality of the investment are still not enough to have a real impact in the Mexican society. As well it might be that the human capital in México is not capable to absorb the spillovers of knowledge and technology that multinationals bring to the host country as it is stated by Borensztein (1997).

On the other hand and in order to test whether an opposite causal relationship exists as stated by Blomström (1994), where the hypothesis that the growth of GDP is what really matters and what really has an impact on FDI. An alternative regression is applied and tested. This theory suggests that when GDP shows a consistent growth rate from one year to another will be definitely a good indicator for investors. Therefore, the performance of GDP growth rate will encourage FDI flows into the host country, in this case México. Following the lead of Thomas and Grosse (2001), the equation to be applied is similar to equation number (12) above but with six variables removed from the real model due to poor availability of data for México. Thus, the variables removed are: *Cultural distance*, *Geographic distance*, *wages*, *risk*, *prime and exchange rate*, leading to a model of the form:

$$FDI = B_0 + B_1 (GDP) + B_2(Trade) \quad (16)$$

Where FDI is real FDI inflows. Thomas and Grosse (2001) used FDI nominal values which are not adjusted for inflation. GDP denotes real gross domestic product. Trade is measured in real exports. The summary of the results for the regression is given below.

Table 5.3

Regression number					
Independent variable	I Coefficient (standard error)	T	Sig (p-value)	F	Sig (p-value)
(Constant)	6.99 (0.035)	3.467	0.021	106.578	0.000
Real GDP	0.065 (0.026)	2.473	0.021		
Exports	0.010 (0.036)	0.289	0.775		
R <sup>2</sup> -adjusted	0.887				

The results indicate that the market size of México is an important factor to attract MNC's to invest in México. An increase of one percent in GDP leads on average an increase of 0.065 percent in FDI. The null hypothesis that GDP has no relationship with FDI can be rejected since the probability to obtain a *t-value* such as more than 2.473 is smaller than 0.001. As well the *p-value* of 0.021 is below the standard value of 0.05. Thus, the null hypothesis that GDP is not significant can be rejected. On contrary, the exports variable shows a positive coefficient but is not statistically significant in the variation of FDI inflows in México as it was expected. It would be expected that the coefficient of exports would be negative, since it is clear that exports neither has an impact on FDI nor impel FDI growth. Therefore, the null hypothesis of no relationship between FDI and exports can not be rejected since the *p-value* is above the standard value of 0.05. The R<sup>2</sup> indicates that 88.7 percent of the variation in FDI is explained by the model.

## 5.1 Unit Root Test.

In order to test each time series for unit root the Dickey-Fuller (DF) test is applied using J-Multi software. The Time series data employed in this work using macroeconomic variables lead us with a non-stationary time series or as Granger (2004) states should be called as integrated time series. A nonstationary series is said to be integrated of order one  $I(1)$ ,  $[Y_t \sim I(0)]$  and it will become stationary, integrated of order zero  $I(0)$  after being differenced one time. Firstly each Time Series data is graphed in log levels. By looking at Figures 1, 2 and 3 in Appendix B it's clear that Log(GDP), Log(FDI) and Log(Exports) time series are trending upward, nonstationary and therefore equations (5.1), (5.2) and (5.3) are not true since the upward trend make the mean and variance not to be constant over the time. Therefore there is a need to transform the current time series data from nonstationary into a stationary time series and test if after being differenced a unit root exists in order to obtain:

$$\text{Mean } (y_t) = \mu \text{ constant for all } t \quad (5.1)$$

$$\text{Variance } (y_t - \mu)^2 = \sigma^2 \text{ constant for all } t \quad (5.2)$$

$$\text{Covariance } (y_t, y_{t-1}) = E[(y_t - \mu)(y_{t-1} - \mu)] \text{ constant for all } t \quad (5.3)$$

It can be stated that econometric models of regression analysis such as equation (16) as above in which each variable are nonstationary will lead in a spurious regression without any relationship among FDI, GDP and Exports (Gujarati, 2006). Unit root test is applied in order to avoid the problem of spurious regression that means that if the variables analyzed in this work contain a unit root then they are nonstationary and then they can be combined to form a stationary combination by first difference. Using the Dickey and Fuller (DF) approach to test the null hypothesis that the time series of GDP, FDI and Exports contain a unit root meaning that all variables are non-stationary against stationarity and according to Dickey and Fuller (1979) the model to be applied is of the following form:

$$Y_t = \alpha + \rho Y_{t-1} + \varepsilon_t \quad (5.4)$$

Where  $\varepsilon_t$  are independent random variables with mean 0 and variance  $\sigma^2$ ,  $[\varepsilon_t \sim NI(0, \sigma^2)]$ . Equation (6) is said to have a unit root if the following null and alternative hypothesis is fulfill:

$$H_0 : (\alpha, \rho) = (0, 1)$$

$$H_a : \rho < 1$$

The time series will be stationary if  $\rho < 1$ ; if  $\rho = 1$  it will be nonstationary; whereas if  $\rho > 1$  still is nonstationary but the variance increases exponentially as  $t$  increases and therefore this null hypothesis will let this work to use first difference in order to transform each time series to stationarity and test again for unit root (Dickey and Fuller, 1979).

In order to test that the estimated value of  $\rho, (\rho^{\wedge})=0$  the  $\tau$  (tau) statistic is used since the time series analyzed in this work are nonstationary it is not possible to use the student *t-test*. The critical values of the Dickey Fuller test were computed by Fuller (1976, pp.371-373) leading in the  $\tau$  (tau) critical values based on Dickey and Fuller distribution where  $t(1) = [(\rho - 1) / SE(\rho)]$ . If the computed  $\tau$  (tau) value is smaller in absolute terms than the critical values then the null hypothesis that the time series are nonstationary will not be rejected whereas if the value computed is greater than the critical values for  $\tau$  (tau) the null hypothesis must be rejected.

Thus, the first step is to test each variable in Log levels, Log(GDP), Log(FDI) and Log(Exports) for nonstationarity that means without first differences.

The second step is to repeat the first step mentioned above but by applying first difference, that means that  $\Delta Y = Y_t - Y_{t-1}$  for each time series leading in the following:

$$\begin{aligned} \Delta \text{Log}(FDI) &= \text{Log}(FDI_t) - \text{Log}(FDI_{t-1}) \\ \Delta \text{Log}(GDP) &= \text{Log}(GDP_t) - \text{Log}(GDP_{t-1}) \\ \Delta \text{Log}(Exports) &= \text{Log}(Exports_t) - \text{Log}(Exports_{t-1}) \end{aligned}$$

The Dickey Fuller tests results on the variables in log levels are shown in first column in table 5.4 below which reflects the low levels of the estimations for the 3 variables being under the critical values and therefore the null hypothesis that GDP, FDI and Exports are non-stationary, integrated of order one  $I(1)$  can not be rejected. Thus, it can be concluded that the three variables analyzed in this work are integrated of first order.

Table 5.4  
Unit Root Test for Stationarity. Sample period 1980-2007.

Variables	Log levels	First difference	5% Critical Value <sup>1</sup>	1% Critical Value <sup>2</sup>
ln(FDI)	-1.66	-6.59	-3.00	-3.75
ln(GDP)	0.82	-3.99	-3.00	-3.75
ln(Exports)	0.16	-3.49	-3.00	-3.75

<sup>1-2</sup>Critical values for Dickey and Fuller Test. Source (Fuller 1976)

The second column in table 5.4 above show the results of the DF test after first difference and it can be seen clearly that the null hypothesis of non-stationarity can be rejected since the computed values for all the variables are over the critical values. For GDP and FDI the null hypothesis can be rejected at the one percent level and for Exports at the five percent level of significance. Thus, it can be concluded that all the variables after first difference are integrated of order zero  $I(0)$ . Once each time series has been tested for its order of integration using unit root test it can be assumed that they might be co-integrated which means that it might exist a stable relationship among the variables and therefore the regression and times series used in this work are not spurious or without economic sense.

## 6. Conclusions.

This study examined the impact of FDI and Labor Force on GDP in México based on data for the 1980-2007 period. The findings are consistent with the economic theory regarding the impact of FDI, human capital stock and trade in economic growth. Evidence suggest that FDI flows in México started consistently and in high proportion since 1994 when the NAFTA agreement came into effect leading in higher participation and investment mainly from United States into the Mexican economy. The result in a multiple regression analysis indicates that an increase of one percent in FDI leads to a 0.08 percent increase in GDP. Despite that the amount of FDI inflows in México is quite high it is not yet significant in magnitude to have a real impact on the Mexican economy. Therefore, policymakers should work on improving the relevance and extent of the structural reforms mainly in the Fiscal and Energy sectors. The latter is the reform that nowadays appears as the principal issue on the Government agenda at the congress. This will allow private investments to be made in the oil and energy sector. The problem goes further far if México would like to have a sustainable growing economy. Thus the change would rely more on the policy changes, strengthening of institutions, levels of country risk as well as the reduction of corruption levels as it was mentioned in chapter three. México must work on these reforms in order to achieve the so longed sustainable economic growth.

The linkage among Political instability, property rights, investment and economic growth tend to be always inversely related according to Barro (1991). MNCs will not be confident to invest in a country like México, where an atmosphere of political instability exists, due to the uncertainty and the risk to lose its investments. Another reason why the FDI has not been having a real impact on GDP is that as Romer (1990) states, the human capital in a host country is more important. No matter how high the FDI inflows are, it cannot be transformed into value, if there is no human capital capable to use the spillovers of FDI, such as the ability to acquire knowledge from using new technology and benefit from training granted by MNC's.

On the other hand and as Blomström (1994) states, the growth rate of GDP attracts MNC's and therefore causes FDI in México. Thus, there might be an opposite causal relationship. The results in a multiple regression are consistent with Blomström (1994) showing a slight increase of 0.065 percent in FDI inflows per one unit growth in real GDP. Another cause is that in the case of México with high unemployment rates, the employees value more their jobs and therefore they are disposed to work for very low wages in order to keep their jobs. Therefore, the high unemployment rate as it is in México could be a determinant factor to attract FDI (Habib, 2002). On the other hand Labor force reflects a real impact on and a strong relationship with GDP as expected. Basically, due the fact that the high proportion of the labor force in México is low skilled and labor intense which makes México to be a low cost labor market for multinationals. The latter is a main determinant for MNC's to invest in México and reduce total production costs of final goods.

Structural reforms in investment and trade policies, policy changes in order to facilitate the ease of doing business, protection of property rights, transparency in government and fundamental institutions as well as government and macroeconomic stability are the most important determinants to attract investments (Obwona, 2001). México has made several

structural reforms and the current reforms that are in the process of being accepted by the congress in México will take some time to have the desired effect, concerning leading México into sustainable growth of competitiveness and thus enable the development of the Mexican society. This transformation must be reflected in the reduction and elimination of poverty.

This work can be improved by analyzing for example which are the main sectors in the Mexican economy and the main states that attract FDI to México. As well, future research should focus on analyzing which are the firm specific factors that investors look at when making investment decisions specifically in México. However, this work focuses mainly on analyzing the impact of FDI, labor force and exports on economic growth through historical data.

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## Appendix A

Figure 1. Log(GDP)

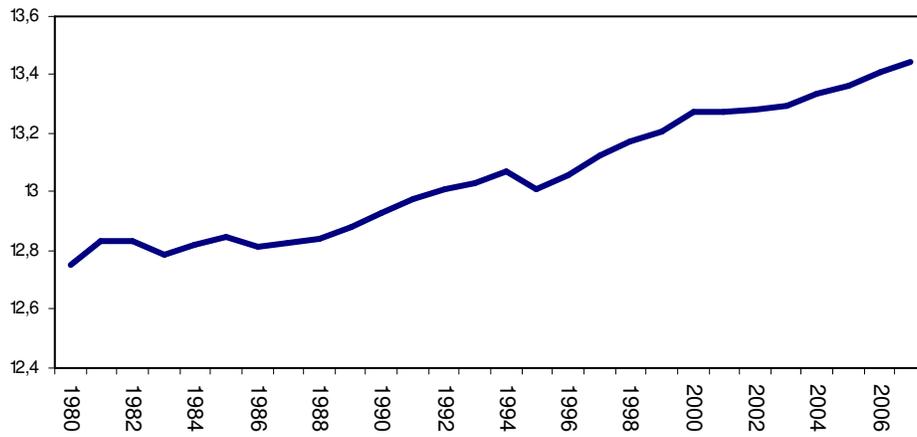


Figure 2. Log(FDI)

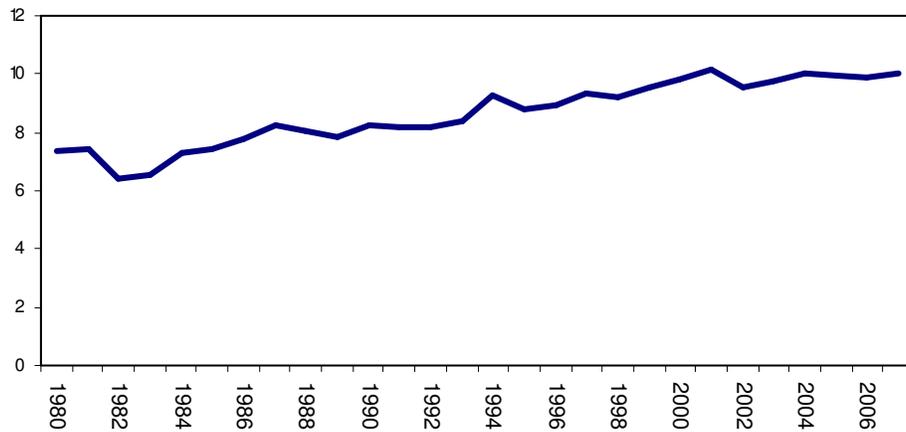


Figure 3. Log(Labor force)

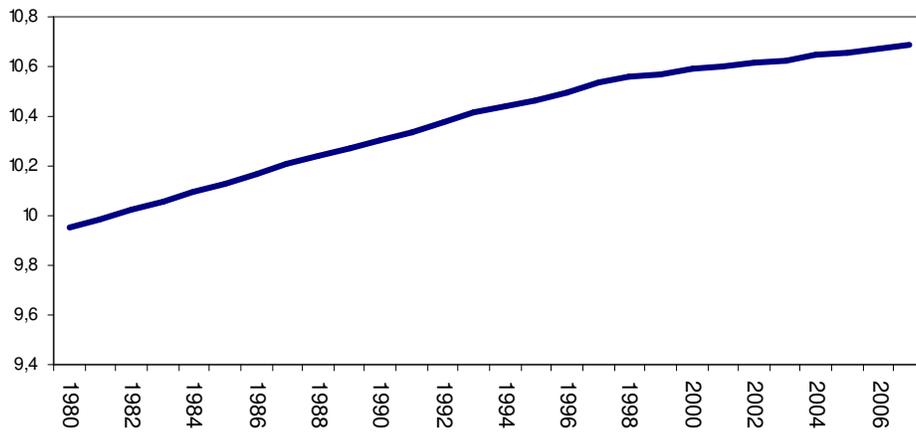


Figure 4. Log(Export)

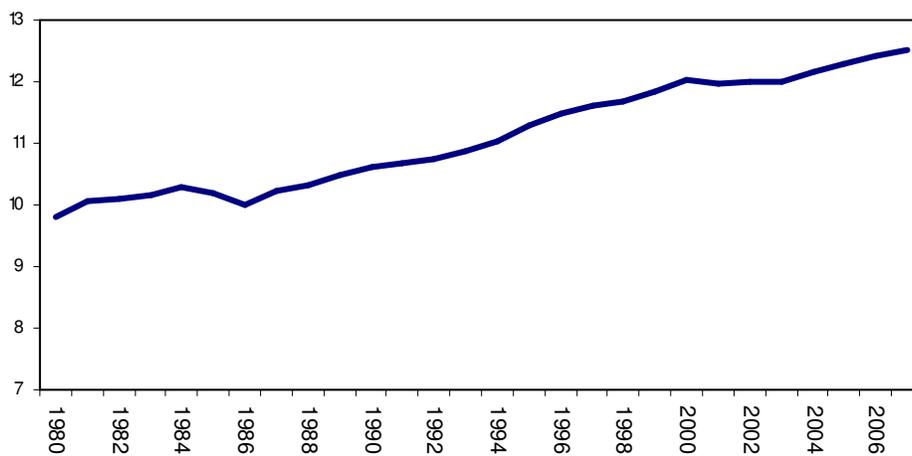


Figure 5. First Difference of Log GDP

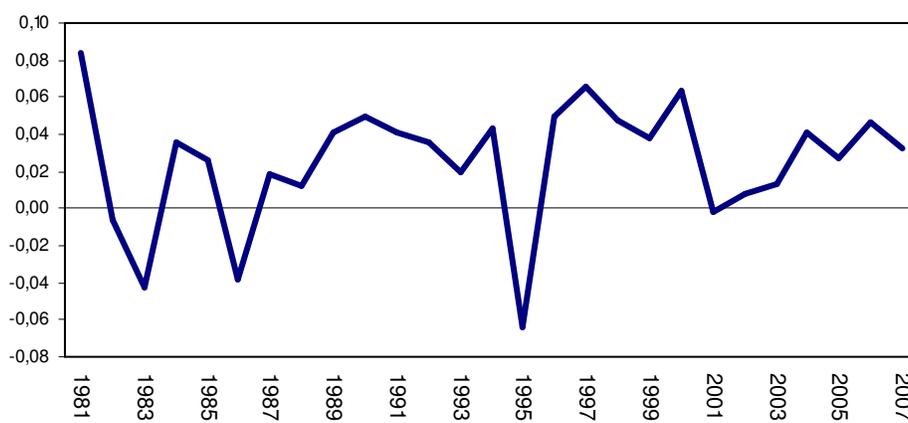


Figure 6. First Difference of Log(FDI)

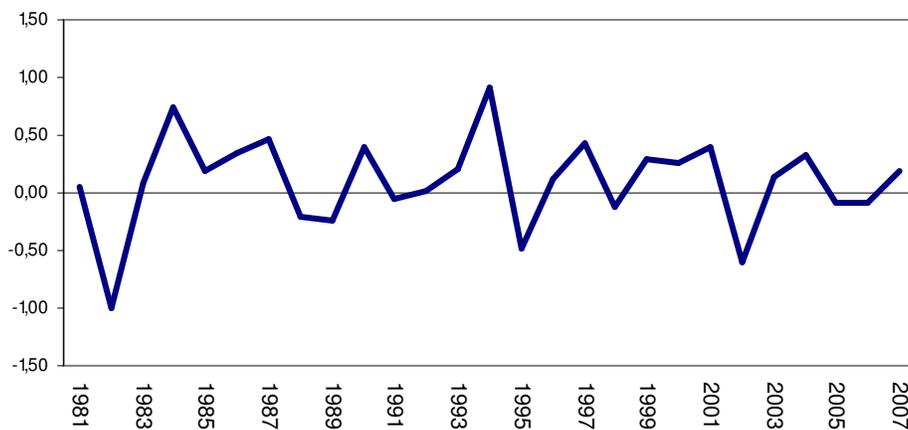


Figure 8. First Difference of Log(Export)

