Determinants of Foreign Direct Investment in an Emerging Market Economy: Evidence from India

Carlos Resende Jr. [1]
Bryant University

ABSTRACT:

Over the past few years, India has recorded a substantial increase in the level of annual foreign direct investment (FDI) inflows. This paper examines the relationship between foreign direct investment and domestic investment, while using the ordinary least squared technique, and a time series analysis from the period 1979-2008. Building on the prior literature, this paper provides an empirical analysis of domestic determinants of FDI such as size of market, openness to trade, infrastructure, attractiveness to domestic market, and exchange rate instability. In addition, this paper will include technology growth and specific variables to examine local determinates of FDI in India. In conclusion, this paper finds the size of domestic market, attractiveness of domestic market, and technology growth are statistically significant in determining FDI in India.

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Keywords: Foreign Direct Investment, FDI, domestic investment, India

[1] Bachelor of Science in Applied Economics, Bryant University, 1150 Douglas Pike, P.O. Box 1516. Smithfield, RI 02917. Email: cresende@bryant.edu

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1.0 INTRODUCTION

In the early 1990s, India began its transition from a closed economy to an open economy. The government implemented aggressive market-oriented reforms, such as privatization and trade liberalizations to help solve the balance of payment crisis. Foreign direct investment (FDI), which is defined as capital inflows from other countries that invest in the production capacity of the host economy, was the most beneficial policy implicated to aid the crisis. FDI served as a source of economic development, renovation, and employment generation. The stock of FDI in India soared from less than US$ 2 billion in 1991, to almost US$ 39 billion in 2004 (Chakraborty and Nunenkamp, 2006). Today, India has emerged as the second most attractive destination for FDI after China and ahead of the United States (US), Russia, and Brazil (Rajan et al., 2008). There are many factors that may explain the growth rate of FDI in India. This paper will examine the domestic determinates of FDI that help sustain high levels of FDI in India.

The objective of this research is to fully understand the effects local factors have on the FDI in India. Many studies have examined the correlation between high FDI and high economic growth using economic factors. Unlike previous studies, this research will also include time series data, urban population, and technology growth. This inclusion may allow researchers to get a better understanding of local determinants in FDI.

India receives far less FDI than China and much smaller economies in Asia, like Hong Kong. Not surprisingly India's growth strategy has depended predominantly on domestic enterprises and domestic demand as opposed to FDI and export demand (Rajan et al., 2008). Studies have found there to be a nexus between FDI and economic growth. The positive link between FDI and economic growth caused many critiques such as causality. Does FDI lead to

greater economic growth, or vice versa? This study will examine the domestic and economic factors in regards to FDI, which may help reduce causality.

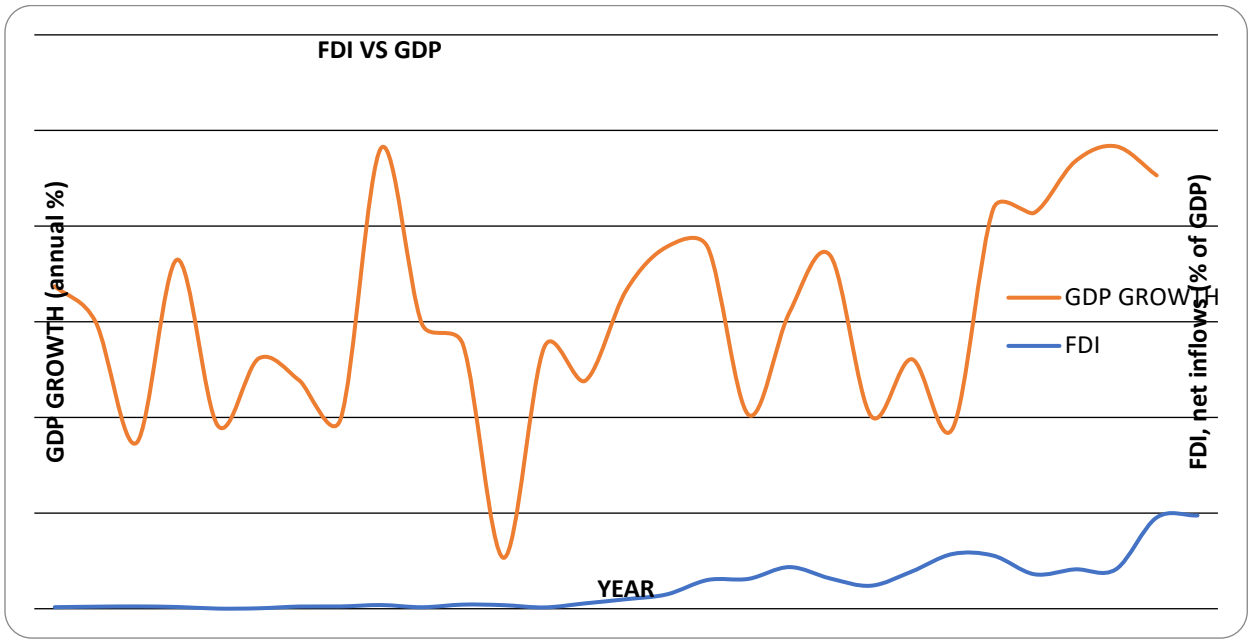
The domestic factors found to influence FDI in a host country are as follows: size of domestic market, openness to trade, infrastructure, attractiveness of domestic market, and exchange rate instability. However, this study looks at these factors but implements different measuring variables with the addition of technological growth. The size of the domestic market will be measured by the urban population. Openness to trade will be measured by the ratio of exports to imports as a percentage of the GDP. Infrastructure will be measured by the investment in energy, transportation, and telecommunication with private participation. Attractiveness of domestic market will be measured by the domestic credit provided by the banking sectors and domestic credit provided to the private sectors. The exchange rate instability will be measured by the local currency unit per US$ for the period average. Technological growth will be measured by the number of patent applications from the residents of India. With the use of a time series data from 1979-2008, the results will incorporate pre-reform and post-reform periods to implement long term growth in India. The aim of this paper will be to answer how the chosen determinates will affect FDI in India.

The rest of the paper is organized as follows: Section 2 examines the recent trends of FDI in India. Section 3 is a brief literature review on previous studies on this area. Section 4 displays the data and empirical methodology. Section 5 states the empirical results of this research. Section 6 will conclude this study and also suggest policy implications from the results of this paper.

2.0TRENDS

Prior to the economic reform in 1990, the FDI into India was relatively low. In 1979 FDI was estimated to be 0.032% of the GDP. The reason why FDI was so low is because India was a closed economy. After the 1990 reform, the FDI in India rose to roughly 2% of the GDP. The main question is whether GDP growth causes high FDI or vice versa. Figure 1 will help view the correlation between FDI and GDP growth in India. As you can see, GDP growth in 1979 was 6.74% which is greater than FDI experienced within that same year. The GDP growth began to fall drastically around 1983 as India began to experience its financial crisis. After 1990, the GDP growth began to increase. Though we cannot say FDI increased GDP growth we can see that GDP and FDI seem to have a positive correlation.

Figure 1: Trends in FDI and GDP 1979-2008

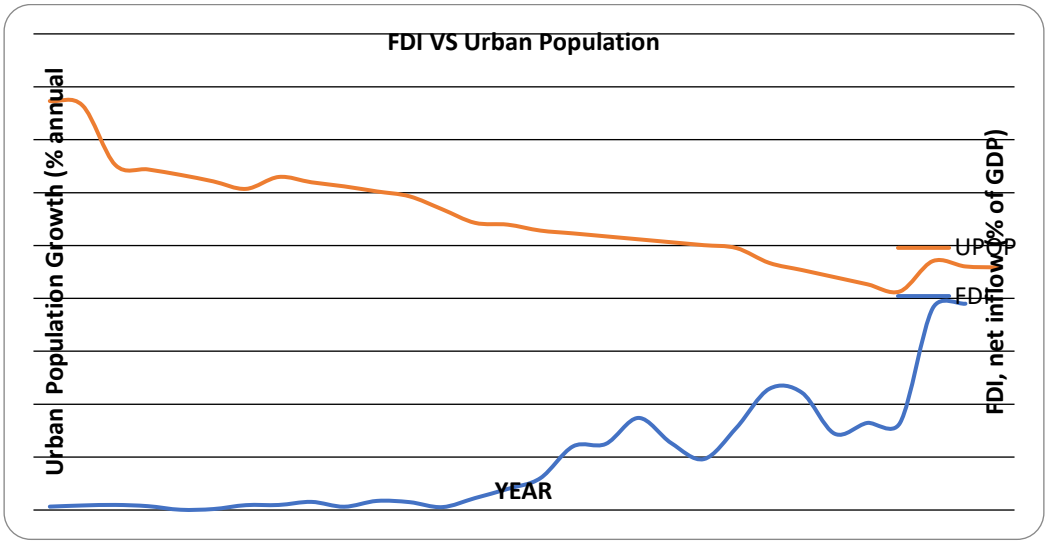


Source: *Authors' compilation using World Development Indicators data*

As for purpose of this paper, we will also examine the urban population growth in relations with FDI. The main focus of many foreign investors when investing into India is the urban areas. The urban areas are the most developed areas which make starting a business easier

for an investor. Figure 2 illustrates the urban population growth compared to FDI. As you can see, the population growth within the urban areas has been declining while FDI increases. Urban population growth dropped from 3.87% in 1979 to 2.29% in 2008. The decrease in urban population may be due to the newly built infrastructures which has made the urban areas more of a business place than a living place.

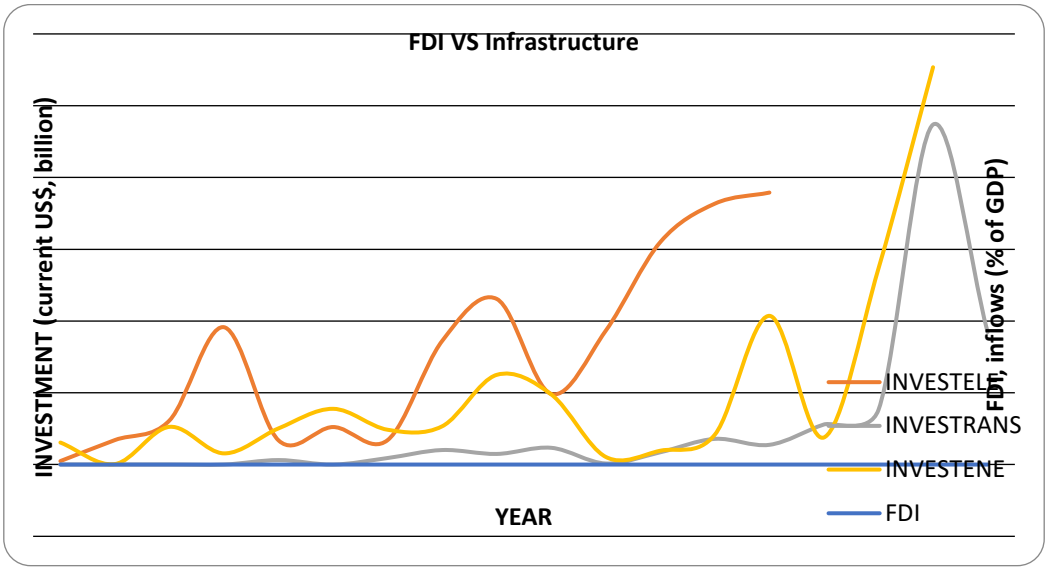
Figure 2: Trends in FDI and Urban Population 1979-2008



Source: *Authors' compilation using World Development Indicators data*

Figure 3 illustrates the investment in infrastructure within India. Prior to 1990, there was little to no investment in infrastructure according to World Development Indicators (WDI); therefore, the relationship with FDI began post 1990. As you can see, investment in infrastructure and FDI have a positive correlation. Telecommunication received the highest investment between 1990-1995. As of 2005, India has began to invest mostly in transportation and energy to improve their overall quality. To sustain high levels of FDI, the amount of investment in infrastructure will have to reamain high.

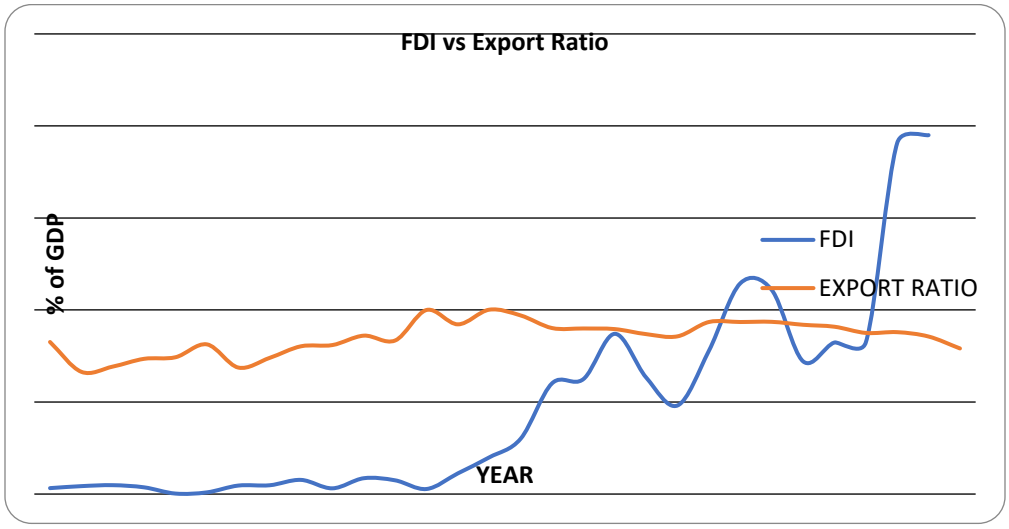
Figure 3: Trends in FDI and Infrastructure 1990-2008



Source: *Authors' compilation using World Development Indicators data*

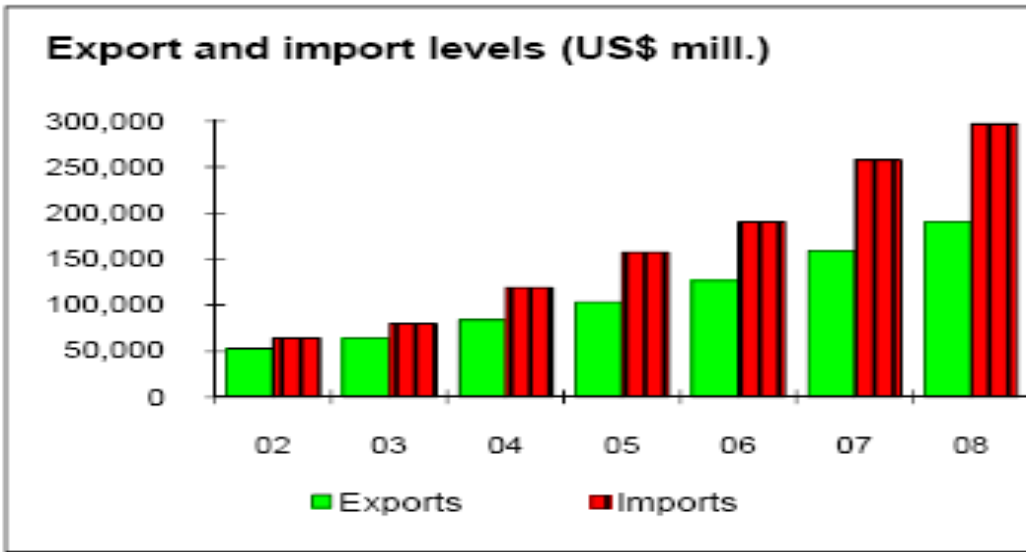
In Figure 4a, export ratio is compared to FDI. As you can see, export ratio has reamained pretty constant from 1979-2008. The results show that India's imports are higher than their exports as expressed in Figure 4b. Basically this means that India is buying more goods than they are selling finished products. When you buy more than you are selling this equates to an account deficit which will not sustain economic growth. The increase in FDI, may suggest that with the open economy, India may be trying to improve the quality of the country by importing for other countries. The lack of infrastructure such as transportation which is the main determinate of exports may be the reason why India has experienced constant export import ratio throughout the years.

Figure 4a: Trends in FDI and Infrastructure 1990-2008



Source: *Authors' compilation using World Development Indicators data*

Figure 4b: Trends in FDI and Infrastructure 1990-2008

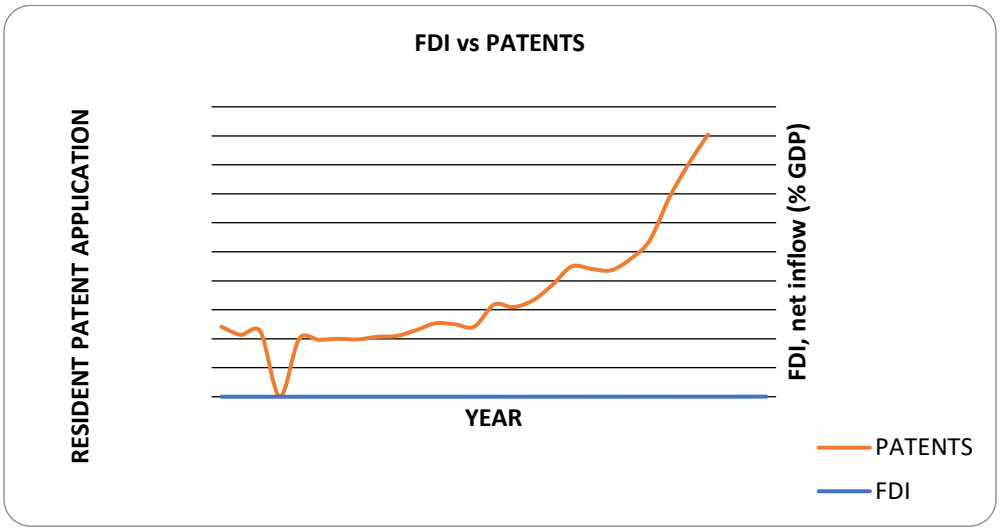


Source: *This table was produced from the Development Economics LDB database.*

To sustain economic growth, a country must have high technology growth. In figure 5, the number of patents registered by the residents of India was pretty constant around 1000 a year. After the economic reform in 1990, the number of patents began to have a positive correlation

with FDI. By 2008, there were estimated to be about 5,000 applications from residents. Whether the resident application was do to FDI technology spillover, it is unclear, but the local residents are beging to experience technological growth.

Figure 5: Trends in FDI and PATENTS 1979-2008



Source: *Authors' compilation using World Development Indicators data*

3.0 LITERATURE REVIEW

There have been many researches done to determine what the main determinants of FDI in a host country are. This paper will look at domestic determinates with the addition of technological growth, which differs from other papers written on this topic. Although prior research may differ, they all provide valuable information in determining FDI in a host country and should not go without being mentioned.

Erdal and Tatoglu (2002) have done similar research to this paper, with evidence in Turkey instead of India. The data they use is from 1980-1998 and find that "while Turkey offers several location advantages to foreign investors in terms of market size, infrastructure, openness of the economy and market attractiveness, the lack of exchange rate and economic stability has

hindered its efforts to harbor much higher volume of FDI." As a policy implication, they suggest Turkey should improve on their basic infrastructure, which would attract higher levels of FDI.

Rajan et al. (2008), also agrees that infrastructure is key for high levels of FDI. In their studies from 1990-2007, they look at different determinates of FDI in India, which include a sector evaluation, country sources of FDI, and the distribution of the FDI. Their results stated that "India needs massive investments to sustain high-quality economic growth, particularly in the energy and infrastructure sectors (both physical and social)."

Many studies have found a positive link between FDI and growth, but Blomstrom and Kokko (2003) find that FDI appears less positive in less developed economies, suggesting the existence of a "threshold level of development." Chakraborty and Basu (2002) seek out to determine the causality between high growth rates and high levels of FDI. In their study they use aggregate data from 1974-1996, and find that causality is more evident from GDP to FDI. They also find that FDI is positively related to GDP and openness to trade in the long run, but is not significant in the short run adjustment process of GDP. Contrasting from previous studies, Agrawal (2005) pooled data for five South Asian host countries from 1965-1996, and the GDP coefficient was negative in relation with FDI prior to the 1980's. The switch from negative to positive correlation occurred in the late 1980's when many countries began to open their borders for trade.

Sharma (2000) uses annual data in India from 1978-1998 to assess the determinants of export performance in India in a simultaneous equation framework. Results suggest that demand for Indian exports increases when its export prices fall in relation to world prices. Also, her research concluded that FDI has a positive coefficient but it is not statistically significant in relation to export performance.

4.0 DATA AND EMPIRICAL METHODOLOGY

4.1 Definition of Variables[2]

The model for this paper is based on a model used by Erdal and Tatoglu (2002), with the omission and addition of variables specific to India, specifically technology growth, where research is limited. All variables are expressed in logarithms. For variable description and data source refer to appendix A. For expected signs refer to appendix B. The model chosen is as follows:

$$\mathbf{FDI = \beta 0 + \beta 1UPOP + \beta 2INVESTELE + \beta 3INVESTRANS + \beta 4INVESEN + \beta 5DCB + \beta 6\ DCP + \beta 7\ EXCR + \beta 8\ EXPR + \beta 9PATRES + \varepsilon}$$

FDI, the dependent variable, is measured in terms of net inflows. FDI is the net inflows of investment to acquire a lasting management interest in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. The FDI figures used in this study are net inflows in the reporting economy divided by GDP.

This study includes eight independent variables: urban population, investment in telecommunication, investment in transportation, investment in energy, domestic credit provided by banking sectors, domestic credit provided by private sectors, exchange rate, and resident patent application.

Urban population is the midyear population of areas defined as urban in each country and reported to the United Nations. Investment in telecom and transportation projects with private participation covers infrastructure projects in telecommunications and transportations that have reached financial closure and directly or indirectly serve the public. Investment in energy

[2] Variable definitions according to World Development Indicators Online

projects with private participation covers infrastructure projects in energy (electricity and natural gas transmission and distribution) that have reached financial closure and directly or indirectly serve the public. Movable assets are excluded. All investment data are in current U.S. dollars.

Domestic credit provided by banking sector is measured as a percentage of GDP and is defined as all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The banking sector includes monetary authorities and deposit money banks, as well as other banking institutions where data are available (including institutions that do not accept transferable deposits but do incur such liabilities as time and savings deposits). Examples of other banking institutions are savings and mortgage loan institutions and building and loan associations. Domestic credit to the private sector, is also measured as a percentage of GDP, and is defined as financial resources provided to the private sector through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment.

Official exchange rate refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual average based on monthly averages (local currency units relative to the U.S. dollar). The export ratio is simply the ration of export to imports as a percentage of GDP.

Patent applications are applications filed with a national patent office for exclusive rights for an invention--a product or process that provides a new way of doing something or offers a new technical solution to a problem. A patent provides protection for the invention to the owner of the patent for a limited period, generally 20 years.

4.2 DATA

This study uses annual data from 1979-2008 provided by the World Bank Indicators Online. The number of total observations may differ for some variables as the data in some years were missing. Summary statistics for the data are provided in Table 1.

Table 1: Summary Statistics

Variable	Observation	Mean	Standard Deviation	Minimum	Maximum
FDI	29	-1.932796	1.723991	-5.944126	.6458815
UPOP	29	19.2312	.2367785	18.8061	19.59006
INVESTELE	14	21.34392	1.233753	18.38712	22.74861
INVESTRANS	13	19.74902	2.142572	14.45736	22.97169
INVESTEN	17	20.6474	1.493658	16.41076	23.12767
DCB	29	3.914392	.1321123	3.598325	4.148127
DCP	29	3.318219	.1741258	3.108303	3.805624
EXCR	29	3.08497	.6674511	2.062161	3.883836
EXPR	29	-0.1594508	0.1129554	-0.4093339	0.0017194
PATRES	25	7.373087	.4669403	6.889591	8.416489

5.0 EMPIRICAL RESULTS

The primary objective of this particular study was to find out which specific variables greatly affect FDI in India. The empirical results of this study offer compelling information into determinates of FDI in India. Table 2 contains the regression results for FDI in India. Of the eight variables, five variables were found to be statistically significant. Urban population and

patent applications were found to be significant at the 1% level. Domestic credit provided by banking sectors and by private sectors was found to be significant at the 5% level. Investment in energy was found to be significant at 10% level. Furthermore, investment in telecommunication and transportation, and the exchange rate were found to be statistically insignificant.

As the size of the domestic market increases, so does the number of customers and opportunity. As expected, urban population was found to have a negative coefficient with relations to FDI but was statistically significant at the 5% level. According to the results from the regression, using urban population as a measure of domestic size of the market, it negatively impacts FDI in India. Urban population may not be the best variable to describe the FDI growth in India. Investors may be looking towards investing in the rural areas of India as an alternative. Real GDP may have been a better variable to use in this situation, because real GDP will incorporate the entire country's size of market and opportunity. India does have the second highest population in the world. With a growing population, it may be possible that India is experiencing capital dilution. According to Thomas Malthusian (1798), high population would be unsustainable because of the decrease in production, which in turn means lower income, and ultimately meaning poverty for the country. The Solow Model for economic growth also states that a decrease in population and depreciation positively effects economic growth. Therefore, the findings with this variable are consistent with many other researches.

Table 2: Regressions Results for Variables Impacting Foreign Direct Investment in India

Variable	Coefficient	T Score	Probability
Constant	1206.85 (245.899)	4.91	0.016
UPOP	-75.625** (15.008)	-5.04	0.015
INVESTELE	0.572 (0.297)	1.92	0.150
INVESTRANS	-0.292 (0.281)	-1.04	0.376
INVESTEN	-0.370 (0.235)	-1.57	0.214
DCB	119.404** (31.419)	3.80	0.032
DCP	-85.159** (23.348)	-3.65	0.036
EXCR	0.889 (2.181)	0.28	0.798
EXPR	2.573 (3.168)	0.81	0.476
PATRES	76.401** (1.803)	4.91	0.016
R Squared	0.9667		
F Statistic	9.69		

Note: ***, **, and * denotes significance at the 1%, 5%, and 10% respectively. Standard errors in parenthesis.

Most FDI comes in the form of physical investment. Therefore, many investors are interested in the country's infrastructure. Investments into infrastructure are expected to have a positive coefficient. Investment in telecommunication had a positive coefficient as expected, but investments in transportation and energy had a negative coefficient. Telecommunication has been a growing sector for India since the beginning of the economic reform. Since the telecommunication sector has been already established, India's government may be looking towards other infrastructure investment to boost economic growth. Telecommunication is a little bit over the 10% significant level meaning that it is not contributing greatly to FDI in India. Investment in energy and transportation had a negative coefficient but were found insignificant as a determinate of FDI. This finding is inconsistent with many other findings. Infrastructure is supposed to positively affect FDI into a host country. The reason why infrastructures in transport and energy have a negative coefficient may be because the infrastructures in India may be old and outdated and require a lot of upgrade that should have been done a long time ago. According to the World Bank, "the sector[s] has not been able to keep pace with rising demand and is proving to be a drag on the economy. Major improvements in the sector are required to support the country's continued economic growth and to reduce poverty."

The variables used to measure the domestic attractiveness, domestic credit to the private sector and domestic credit provided by the banking sector, were both found to be statistically significant at a 5% level. Credit provided by the banking sector had a positive coefficient as expected. With credit provided by the banking sector having a positive correlation demonstrates the overall good standing with India's local businesses. Local businesses within India are growing and using bank loans to do so; which points out that business opportunity is great in India. If the local businesses are doing well, it will serve as an indication of strong market

potential for foreign investors. On the other hand, credit to private sectors has a negative coefficient when it was expected to be positive. Since credit to private sectors is significant in determining FDI, a negative coefficient indicates that credit to private sectors hurts FDI in India. The Indian government has assigned many of the basic and capital goods industries to the public sector, while the private sectors are on the back burner. One reason that the private sectors do not positively correlate with FDI in India may be because government regulations that delay regulatory structure.

The exchange rate instability was expected to have a negative effect on FDI. The results found India's exchange rate to have a positive coefficient. A positive coefficient many indicate that India has a low volatile currency which may encourage foreign investors. Unfortunately, India's currency was statistically insignificant in this paper. A low volatile currency may encourage foreign investors to invest in India.

Openness to trade had a positive coefficient as expected. If a host country is open to trade, it makes it easier to import goods for the investment and export the finished goods. After the economic reform in 1990, India has become an open economy. Unlike other results, the export ratio is statistically insignificant in this paper. The reason may be due to India's high import ratio. India is buying more than it is selling which will affect the FDI in India. Low export ratio may deter foreign investors from India.

Finally, the technology growth from the residents had a positive coefficient as expected. Patent application for residents is statically significant at a 5% level. Technology is the key to economic growth and the number of patents has increased in India. Even though the technology growth in India is due to FDI technology spillover, there are still a vast number of resident

patents; which will serve as a good indication for foreign investors. If residents are increasing the number of patents, foreign investors will be willing to work with locals which will increase FDI in India.

6.0 CONCLUSION AND POLICY IMPLICATION

The aim of this paper was to determine how the different variable would affect FDI in India. The results of this paper showed investment in telecommunication, domestic credit provided by the banking sectors, exchange rate instability, openness to trade, and technology growth had a positive effect on FDI. Urban population, investment in transportation and energy, and domestic credit to private sectors had a negative effect of FDI. Statistically, the size and attractiveness of the domestic market significantly affected FDI in India. The increase in population negatively affected FDI which differs from many findings. Increase in population was specific towards the urban population, while many other studies choose to use Real GDP. By using urban population, the lack of infrastructure may contribute to the negative correlation. Credit to the private sectors also had a negative correlation with FDI due to the lack of government regulations. Credit provided by the banking sectors positively affect FDI.

The addition of technology growth, to distinguish this study from others, provided a positive and significant result in affecting FDI in India. Therefore, the technological advances within India do explain the high levels of FDI in India. The technological spill over from previous investment has greatly affected the resident of India. This is a good sign as the people of India are learning from the foreign investors and implementing their own technology which may help with greater FDI in India.

Policy implications, as suggested by Rajan el al (2008), include boosting export competitiveness, generating employment and strengthening the skills base, enhancing technological capabilities (transfer, diffusion and generation of technology), and increasing financial resources for development. Boosting export competitiveness will help with the openness to trade which will positively affect FDI, generating employment and strengthening the skill base will help with low education attainment level in India, enhancing technological capabilities will establish long term growth, and increasing financials resources for development will help the poor infrastructure in India. In addition, by expanding FDI into sectors like agriculture, which accounts for most of the country's GDP, India may experience higher levels of FDI.

Appendix A: **Variable Description and Data Source**

Acronym	Description	Data Source
FDI	Foreign direct investment, net inflows (% of GDP)	WDI
UPOP	Urban population	WDI
INVESTELE	Investment in telecoms with private participation (current US$)	WDI
INVESTRANS	Investment in transport with private participation (current US$)	WDI
INVESTEN	Investment in energy with private participation (current US$)	WDI
DCB	Domestic credit provided by banking sector (% of GDP)	WDI
DCP	Domestic credit to private sector (% of GDP)	WDI
EXCR	Official exchange rate (LCU per US$, period average)	WDI
EXPR	Export Ratio (% of GDP)	WDI
PATRES	Patent applications, residents	WDI

Appendix B: **Variables and Expected Signs**

Acronym	Description	Expected Sign
FDI	Foreign direct investment	
UPOP	Urban population	**-**
INVESTELE	Investment in telecoms	**+**
INVESTRANS	Investment in transport	**+**
INVESTEN	Investment in energy	**+**
DCB	Domestic credit provided by banking sector	**+**
DCP	Domestic credit to private sector	**+**
EXCR	Official exchange rate	**-**
EXPR	Export Ratio	**+**
PATRES	Patent applications, residents	**+**

BIBLIOGRAPHY

Agrawal, P. (2005). Foreign Direct Investment in South Asia: Impact on Economic Growth and Local Investment. In: E.M. Graham (ed.), *Multinationals and Foreign Investment in Economic Development.* Basingstoke (Palgrave Macmillan): 94-118.

Blomstrom, M. and A. Kokko (2003). "The Economics of Foreign Direct Investment Incentives", Working Paper No.9489, NBER.

Chakraborty, Chandana, and P. Basu (2002). Foreign Direct Investment and Growth in India: A Cointegration Approach. *Applied Economics* 34: 1061-1073.

Chakraborty, Chandana and Peter Nunnenkamp. (2006). "Economic Reforms, Foreign Direct Investment and its Economic Effects in India." *The Kiel Institute for the World Economy Duesternbrooker Weg*. 1-45.

Erdal Fuat, Ekrem Tatoglu. (2002)."Locational Determinants of Foreign Direct Investment in an Emerging Market Economy: Evidence in Turkey." *Multinational Business Review*

Malthus, Thomas. (1798)."An Essay on the Principle of Population." *London: J. Johnson, in St. Paul's Church-yard.*

Ragan, Ramkishen S., Sunil Rongala, and Ramya Ghosh. (2008): "Attracting Foreign Direct Investment (FDI) to India." 1-29.

Sharma, Kishor. (2000)"Export Growth in India: Has FDI Played a Role?" *Economic Growth Center Yale University:* 1-21.

World Development Indicators Online, World bank.