The Determinants of Foreign Direct Investment: Evidence from Latin America and the Caribbean

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Abstract:

This paper investigates the impact of determinants on the inflows of FDI to the Latin American and Caribbean region. The study incorporates cross-country information to describe incentives influencing flows of FDI into the region from 1992 - 2008. Factors are modeled using a least-squared regression model and are determined as significant. The results from the research and tests performed emphasize the correlation between specific economic indicators and flows of FDI. Using macro – level data from various sources, the results generally suggest that factors such as degree of openness and market size have a positive correlation with FDI flows; whereas, current account balance and unemployment negatively impact FDI flows to the region.

JEL Classification: F43, F23

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1.0 INTRODUCTION

FDI (FDI) has played a key role in the advancement of the Latin American and Caribbean countries. As developing nation's transition into the world economy, attracting FDI is vital to facilitate the restructuring of closed economies experiencing prolonged periods of stagnation. The inflow of foreign capital provides substantial incentives for foreign companies to enter previously untapped demographics with the goal of stimulating the host country, spurring dynamic growth, and enhancing economic development.

In 2008 inward FDI in Latin America and the Caribbean rose to a new record high in 2008: receiving US$ 128.301 billion surpassing that of 2007 by nearly 13% during which FDI shrank by 15% worldwide (ECLAC). The growth rate of FDI to Latin America and the Caribbean was above the world average; however, despite FDI flows to South America climbing 24% to US$ 89.862 billion, flows to Mexico and the Caribbean region fell 5% to US$ 38.438 billion (ECLAC). Brazil in particular received significantly large amounts of FDI becoming the largest recipient in the region.

The effects of the international crisis on FDI have varied; however, with the slowdown in the United States economy, the main destination for Latin America and Caribbean exports has caused the manufacturing industries in the region to become stagnant. The international crisis may encourage companies to shift production to developing countries offering lower costs ultimately stimulating FDI, but that is more likely a long term solution (ECLAC).

This study aims to enhance understanding of the determinants of FDI in the Latin American and Caribbean region. From a policy perspective, this analysis is important because the determinants of FDI are widely disputed and evidence supports many

independent factors as the main causes of attracting foreign capital. The relevance of this study is that it includes widely used variables such as the inflation rate and GDP growth in addition to the exchange rate and worker's remittances figures from the region.

This paper was guided by research objectives that differ from other studies: First, it investigates the interdependence between FDI flows to the Latin American and Caribbean region using panel data gathered from the World Development Indicators Database and the Economic Commission for Latin America and the Caribbean (ECLAC) Statistical Annual Report; Second, it incorporates variables from several previous studies aimed to analyze the determinants of FDI in the region; Last, it includes unique variables found to significantly impact FDI in developing nations. There is little work done to compare these unique variables to FDI flows into the Latin American and Caribbean region from 1992-2008.

The rest of the paper is organized as follows: Section 2 outlines the recent trends of FDI to region. Section 3 gives a brief literature review. Section 4 outlines the empirical model. Data and estimation methodology are also discussed in section 4. Finally, section 5 presents and discusses the empirical results. This is followed by a conclusion in section 6.

2.0 FDI TRENDS

Since the 1990's, FDI has become a major source of foreign capital in the Latin American and the Caribbean region. Previously, FDI flows to the region made up a fraction of financial flows to developing countries. From 1990 to 1998, the proportion of long-term net resource inflows by FDI doubled; however, industrialized nations still remain the major recipient of foreign capital. Latin America, the Caribbean, East Asia and the Pacific captured a significant portion of the increased investment leaving

relatively insignificant flows to Sub – Saharan Africa, the Middle East and Northern Africa.

According to the ECLAC FDI and transnational corporations in Latin America and the Caribbean report (2008), FDI in 2008 was below the rate witnessed in 2007. The financial and economic crisis brought the peaking boom of FDI flows to a halt in 2008 leading to the depletion of global liquidity. The negative impact of the international crisis on FDI flows worsened the prospects for economic growth, limited access to resources to finance investments, and raised perceptions of risk and uncertainty. The positive outlook of FDI flows to the region hinges on the impact of measures taken by countries to combat the crisis, to establish asset prices encouraging mergers and acquisitions, and the ability to restructure sectors and companies to invoke further investment.

Figure 1: Remittance Flows to Developing Countries

	2002	2003	2004	2005	2006	2007	2008e
All developing countries	115.5	144.3	164.4	194.8	228.7	280.8	305.4
as % of GDP	*1.9*	*2.1*	*2.0*	*2.0*	*2.0*	*2.1*	*1.9*
By region							
East Asia and Pacific	29.5	35.4	39.2	46.7	53.0	65.3	69.6
Europe and Central Asia	13.7	15.5	22.2	31.2	38.3	50.4	53.1
Latin America and the Caribbean	27.9	36.6	43.3	50.1	59.2	63.1	63.3
Middle East and North Africa	15.2	20.4	23.0	24.3	25.7	31.3	33.7
South Asia	24.1	30.4	28.7	33.1	39.6	52.1	66.0
Sub-Saharan Africa	5.0	6.0	8.0	9.4	12.9	18.6	19.8

Source: The World Bank Staff Estimates, IMF Balance of Payments Manual

Figure 1 describes the significant increase in remittance flows to developing countries nearly doubling since 2002. Latin America and the Caribbean region have experienced steady growth since 2002 from 27.9 to 63.3 US$ billion increasing nearly threefold. Despite experiencing positive growth, the current economic crisis is affecting

the countries from which remittances originate and therefore could result is declining numbers in the future.

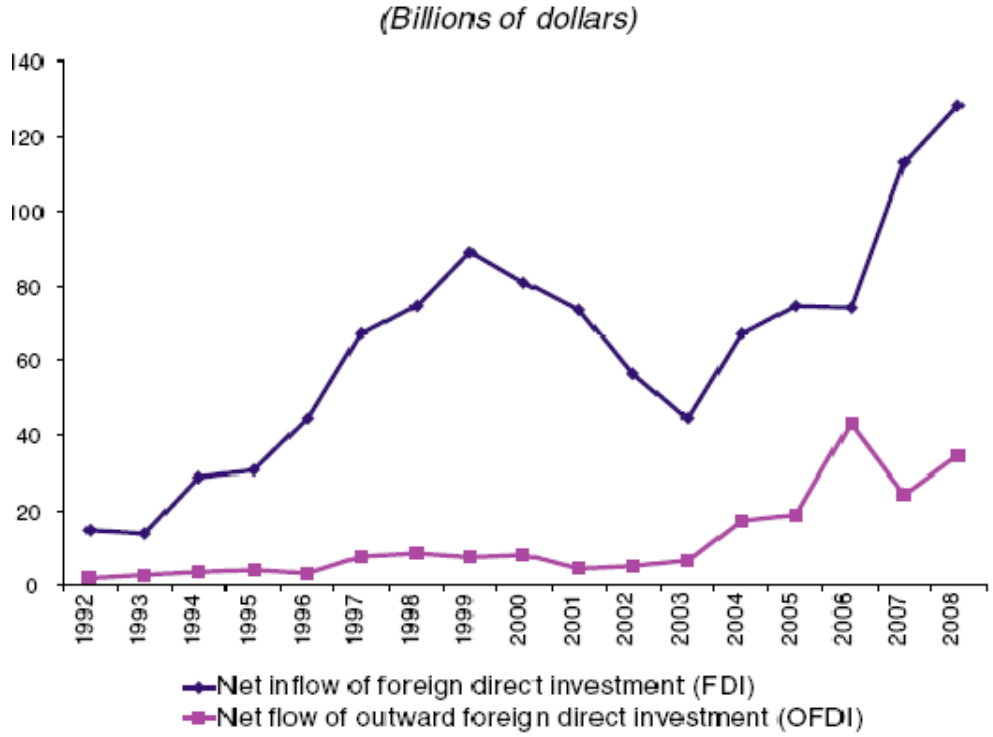
Figure 2: Flow, Growth, and Distribution of Net FDI Flows

	Foreign direct investment flows (millions of dollars)		Interannual change (percentages)		Share (percentages of total)	
	2007	2008 [a]	2007	2008 [a]	2007	2008 [a]
World	1 940 900	1 658 500	38	-15	100	100
Developed countries	1 341 800	1 001 800	43	-25	69	60
Developing countries	512 200	549 100	24	7	26	33
Latin America and the Caribbean [b]	127 300	139 300	37	9	7	8
Africa	53 500	72 000	17	35	3	4
Asia and Oceania	331 400	337 800	21	2	17	20
South-Eastern Europe and the Commonwealth of Independent States	86 900	107 600	52	24	4	6

Source: Economic Commission for Latin America and the Caribbean (ECLAC) on the basis of official figures; United Nations Conference on Trade and Development (UNCTAD) World Investment Report 2008. Transnational Corporations and the Infrastructure Challenge, Geneva 2008. United Nations Publication – IMF Balance of Payments Manual

Figure 2 above highlights FDI flows in the Latin American and Caribbean region which have increased from 2007 to 2008. The percentage of FDI as a portion of the total inflows have increased from 7% to 8% from 2007 to 2008 are expected to continue to rise into 2009 and early 2010. In comparison, flows to developed countries have decreased dramatically while flows to Africa, Asia, and South – Eastern Europe have all increased since 2008.

Figure 3: Inward and Outward FDI



Source: Economic Commission for Latin America and the Caribbean (ECLAC) estimates made on the basis of official figures as at 15 May 2009.

Figure 3 highlights the rapid increase in net inflow of FDI experienced in the Latin American and Caribbean region since 1992. The net inflow of FDI peaks in 2008 while net flow of outward FDI peaks in 2006 despite steadily rising since then.

3.0 LITERATURE REVIEW

The determinants of FDI vary from one developing country to the next. Past studies analyzing the determinants of FDI have found export orientation as the single most important determinant of FDI flows. Singh and Jun (1997) reinforce this finding, however, they acknowledge that the question remains whether export – oriented economies attract FDI flows or whether the foreign investment encourages high exports

which was found to vary depending on the country in question. The relative size of the export market is found to have a significant effect on the impact of exports on FDI flows. Singh and Jun (1997) determine countries that have historically high or low FDI flows are structurally different which may explain why tests on determinants of FDI have been mixed and inconclusive in past studies. Therefore Singh and Jun (1997) conclude that exports are not a significant determinant of FDI flows for low – FDI countries. Since FDI operations in the low – FDI region is likely to be labor intensive therefore stressing the importance of labor relations, Singh and Jun (1997) provide a strategy for these countries to stabilize labor relations and the working environment in order to attract more FDI flows. In addition, Singh and Jun (1997) urge countries with high - FDI flows to place a strong emphasis on political stability to maintain stable flows in the future.

Chang (2007) concludes that the unemployment rate and FDI flows have a weak relationship while the degree of openness has a positive effect on FDI inflows in a study of Taiwan. Chang (2007) emphasizes the fact that there is no correlation between economic growth and unemployment to FDI flows in the short run. Since the shock of a new economic structure has a positive effect on the degree of openness and the impact of degree of openness has an effect on economic growth, Chang (2007) suggests providing incentives for economic growth as an appropriate development strategy.

Cuadros et al. (2001) echoes the finding of a significant impact of FDI on economic growth in developing countries and suggests that the relationship between FDI and export growth varies depending on the country in question. Cuadros et al. (2001) finds that the growth of exports has a favorable effect on FDI despite the results of a negative relationship in Mexico, Brazil and Argentina. Cuadros et al. (2001) determines

that national income has a positive effect on FDI and that FDI has served to integrate national markets into the global economy more effectively than could be achieved through trade flows.

While export orientation is a main focus of analyzing the determinants of FDI, Nunes et al. (2006) contests a country's market size, infrastructure, and inflation are equally important variables in determining the ability to draw foreign capital. Nunes et al. (2006) finds that the larger the country's market size, the higher the level of foreign capital that their country receives. Nunes et al. (2006) states that foreign capital is attracted to countries where the infrastructure consists of well – maintained roads and accessible ports for trade. Nunes et al. (2006) agrees with the conclusion that the degree of openness has a positive effect on FDI flows while finding that the relative cost of labor negatively impacts FDI flows.

Pacheco – Lopez (2005) concludes in his analysis of Mexico that exports have a limited effect on FDI flows and that significant economic policy such as the NAFTA agreement may actually result in increased economic turmoil despite stimulating FDI flows in the short run. Pacheco – Lopez (2005) states that FDI flows associated with acquisitions and mergers will have a limited impact on exports and subsequently on FDI flows.

In contrast, Acosta et al. (2006) finds that there is a distinct association between FDI flows and workers' remittances in Latin America. Acosta et al. (2006) stresses the raising importance of remittances to developing countries especially in Latin America which currently receive more remittances than any other region in the world.

Developing countries face an uncertain future as FDI flows fluctuate in response to changes in the global economy. As a result, it is increasingly important to determine the driver of FDI flows into the region in order to promote sustainable growth and economic prosperity.

4.0 DATA AND EMPIRICAL METHODOLOGY

4.1 Definition of Variables

Independent variables consist of eight variables obtained from various sources. Appendix A and B provide data source, acronyms, descriptions, expected signs, and justifications for using the variables. First, DEGOP is calculated as the ratio of (Exports+Imports)/GDP as a proxy to the degree of openness of the economy.

Second, WORKRM is the measure of worker's remittances and compensation of employees paid measured in US dollars. This variable is calculated as a percentage of GDP. Third, XRATE describes the official exchange rate as a period average within the region in comparison to the US dollar. Fourth, UNEMP represents the unemployment total as a percentage of the total labor force. Fifth, REALINT is the effective interest rate of the given country in comparison to the US dollar.

The sixth, SIZE is calculated as (1-Poverty)*GDP where poverty is the poverty headcount ratio at $1.25 a day as a percentage of the population (World Bank, World Development Indicators). This is different from the more common use of GDP, or GDP per capita to capture market size effect. By taking into account a degree of poverty in order to measure the size of the market, the results and model specification improved significantly.

Seventh, CURACC is the level of the current account balance to capture the portion of domestic investment financed by foreigner's savings. Finally, INFL is the inflation rate of a given country within the region as an annual percentage. As a result, the specification with each variable described is shown below.

$$FDI = \beta 0 + \beta 1DEGOP + \beta 2WORKRM + \beta 3XRATE + \beta 4UNEMP + \beta 5REALINT + \beta 6SIZE + \beta 7CURACC + \beta 8INFL + \varepsilon$$

4.2 Data:

This study consists of 10 Latin American and Caribbean Countries: Argentina, The Bahamas, Barbados, Bolivia, Chile, Colombia, Dominican Republic, Panama, Peru, and Venezuela in panel data form. All the information comes from the World Bank's World Development Indicators and the ECLAC's Statistical Annual report 2009. The main dependant variable used in the analysis is FDI: FDI net inflows of investment. It is measured in constant 1992-2008 US$ from the World Bank's World Development Indicators.

FDI is the annual flow from foreign countries to the Latin American and Caribbean region. It represents the funds that foreign companies provide to their affiliates within the region. There are three main forms of FDI in the region: acquisitions of private assets, privatizations and investments in new assets. The definition of FDI in this paper is consistent with the IMF's definition of FDI flows that distinguishes FDI as an international investment with the objective of obtaining a lasting interest in an enterprise resident in another economy (IMF Balance of Payment Manual 2008, p.95, item 359). The concept of FDI described in the manual is the basis for the description provided in the second edition of the OECD Detailed Benchmark Definition of FDI.

This study uses annual data from 1992 to 2008. Data were obtained from the World Bank's World Development Indicators (WDI) website in addition to the Economic Commission for Latin America and the Caribbean (ECLAC) 2009 Statistical Yearbook. Data for the independent variables of DEGOP and CURACC were collected from the Economic Commission for Latin America and the Caribbean ECLAC 2009 Statistical Yearbook. The dependant variable FDI and the independent variables SIZE, XRATE, UNEMP, INFL, REALINT and WORKRM were obtained from the World Bank's World Development Indicators website. It is worthy to note that publically available ECLAC data is comprised of statistical information through the CEPALSTAT portal and slight differences do appear between the printed and electronic versions of the yearbook in terms of the detail of information covered. Summary statistics for the data are provided in Table 1.

Table 1: Summary Statistics

Variable	Obs	Mean	St. Dev	Min	Max
XRATE	130	280.52	627.9066732	0.07	2877.65
INFL	130	10.46	15.8411131	-1.84	115.52
UNEMP	130	11.67	4.357629591	4.30	25.57
CURACC	130	-597.26	4167.131637	-14482.00	15519.00
REALINT	130	11.75198311	11.22878914	-8.6485737	61.84075677
DEGOP	130	1.049409657	2.018639566	0.14730981	17.65527209
WORKRM	130	1.21503477	3.922054067	0.00254214	29.23682175
SIZE	130	53256008203	68501953594	1428696871	2.86739E+11

4.3 Research Methodology

In a time series analysis, a comparison of many countries is performed over a specified period of time. However, for the intent and purpose of this paper, a panel data

regression analysis will be used because there was a significant amount of data available for a specified period of 1992 – 2008 for the 10 countries chosen.

A regression will be run where the regression coefficient indicates that change in the dependant variables associated with a one-unit increase in the independent variable in question, holding all other independent variables constant. In doing so, the ordinary least squares aim to minimize the summed squared residuals and provide statistically significant results furthered by meaningful policy recommendations.

5.0 EMPIRICAL RESULTS

The primary purpose of this study was to determine whether specific variables had a significant effect on FDI flows over a variety of different countries within the Latin American and Caribbean region. In order to accurately regress the determinants of FDI flows for 10 countries from 1992 – 2008; an ordinary least squares regression was run identifying the effects of macroeconomic variables on flows of FDI. The regression was more specifically defined from its original form to prevent multicollinearity between the variables of market size and gross domestic product growth and the degree of openness calculation and measure of exports. By further defining the model, the regression avoided any possible bias or skewed results in order to accurately capture the effects of each variable on FDI. Certain variables were removed from the specification that yielded insignificant results during preliminary regressions. The results of the regression are displayed in Table 2 below.

Table 2: Regression Results for Factors Influencing FDI

Variable	Coefficient	Probability
DEGOP	2.50E+08***	0.0093
WORKRM	1.78E+08***	0.0005
XRATE	717121**	0.0176
UNEMP	-78311135*	0.0893
REALINT	38563308**	0.0231
SIZE	0.02177***	0.0000
CURACC	-72363.99	0.2012
INFL	-6135551	0.6262
C	6.18E+08	0.3639
R-squared	0.452415	

Note: ***, **, and * denotes significance at the 1%, 5%, and 10% respectively.

The results of the regression show that six out of the eight variables were statistically significant, three of which were significant at 1%. These variables include the degree of openness, worker's remittances, and the market size. In addition, the real interest rate and the exchange rate are significant at the 5% level and the unemployment rate is significant at the 10% level.

The variable for the degree of openness was statistically significant and had an expected positive sign that corresponds to the results of the study. This indicates that the degree of openness (as measured by a ratio of Exports plus Imports divided by GDP) will have positive effects on the amount of FDI flows within the region. This corresponds with many studies and information provided that as the economy becomes increasingly more integrated into the global market by means of a strong export orientation, FDI flows will increase. As previous studies have concluded, exports are treated as the principal means by which the liberalisation process indirectly affects economic growth as supported by the export – led growth hypothesis (ELG). However, due to the increasing

importance of FDI within the region, focusing solely on openness as its cause would be misleading.

The second variable that was statistically significant was workers' remittances and compensation of employees paid. The expected sign for this variable was positive and the results indicate that more openness and better governance that attract workers' remittances also increase the FDI flows which are consistent with previous studies. The findings of this study reinforce the findings of past empirical results suggesting that a higher remittances to GDP ratio tend to be associated with a higher growth rate in both the Latin American and Caribbean region and at the global level. Despite this correlation, findings have suggested that remittances lead to higher income equality and tend to have a profound impact on poverty levels, variables of which were not directly analyzed in this study.

The third statistically significant variable is the exchange rate. Consistent with the study's results, this variable was predicated to have a positive expected sign, which indicates that as the exchange rate remains at a favorable level to foreigners, this will result in an increased flow of FDI. This can be explained by the fact that foreign investors are attracted to markets where their currency is highly valued. Despite the variability of exchange rates, this study supports the claim that favorable exchange rates have resulted in economic growth for the region.

The forth statistically significant variable is the market size which includes a measure of poverty. The expected sign of this variable was positive and supports the claim that the larger a country's market, the higher the level of foreign capital the country receives. This can be explained by the fact that a larger market experiences more

product diversity and greater competition enabling the country to more effectively absorb foreign capital.

The fifth statistically significant variable is the real interest rate. This coincides with the expected positive sign of the variable. Naturally, as interest rates become lower the money supply is loosened and the economy is stimulated. However, lower interest rates can ultimately lead to inflation and although it's not statistically significant, inflation is consistent with its expected negative sign indicating its negative impact on FDI.

The sixth and final statistically significant variable is the unemployment rate. The results are in agreement with the expected negative sign of the variable. As the unemployment rate rises, the available labor force declines ultimately resulting in lower economic output. Rising unemployment urges investors to move elsewhere with available foreign capital reducing FDI flows to the region.

6.0 CONCLUSION

With a rapid increase in FDI across many countries within the region, there is a need to determine what is affecting this dramatic increase and if this trend can be expected to continue in the future. The primary purpose of this study was to identify factors that contribute to this increased inflow of foreign capital among developing nations in the Latin American and Caribbean region.

The results of this study indicate that there are several factors that consistently affect the inflow of foreign capital. As expected, the developing economies have shifted towards a more open, export led growth which has resulted in a significant increase in the attractiveness to foreign investors. The second variable that affects FDI is the worker's

remittances and compensation of employees paid, which indicates that higher remittances levels tend to be associated with a higher growth rate in region. The third variable affecting FDI flows is the exchange rate. Foreign capital is highly valued resulting in substantial buying power in foreign markets. The forth variable positively affecting FDI is the market size. Naturally, as markets become more globally accessible foreign investors are attracted to untapped demographics and extremely liquid markets where interest rates, the remaining variable positively affecting foreign capital flows, are extremely low. The inflation and the current account balance variable negatively impact flows of FDI as expected indicating poor governance and the presence of unstable markets. The remaining unemployment variable describes the negative correlation of an increasing unemployment rate reducing the availability of labor and halting economic growth.

This study indicates that there is a direct correlation between all six variables and the flows of FDI, indicating that these factors may be consistent variables across all other countries. This coincides with Chang's (2007) claim in his analysis of Taiwan's factors affecting FDI. Despite these findings, there may be other factors that were not analyzed in this study that could affect a country's ability to attract FDI. However, from the results of this study, there is no evidence to support such a claim.

Appendix A: Variable Description and Data Source

Acronym	Description	Data Source
FDI	Total FDI for a given country, taken in terms of current US$	World Development Indicators Online
XRATE	Official Exchange Rate for a given country, a period average taken in terms of US$	World Development Indicators Online
INFL	Inflation Rate as expressed by the GDP Deflator as an annual %	World Development Indicators Online
UNEMP	Unemployment Rate for a given country taken as a % of the total labor force	World Development Indicators Online
CURACC	Current Account Balance for a given country	ECLAC Statistical Yearbook 2009
REALINT	Real Interest Rate of a given country taken as an annual %	World Development Indicators Online
DEGOP	The ratio of (EXPORTS+IMPORTS / GDP)	ECLAC Statistical Yearbook 2009
WORKRM	Workers' remittances and compensation of employees paid, taken in current US$ as a % of GDP	World Development Indicators Online
SIZE	The ratio of (1-poverty)*GDP where poverty is the headcount ratio at $1.25 a day as a % of the population	World Development Indicators Online

Appendix B: Variables and Expected Signs

Acronym	Description	Expected Sign
FDI	Total Amount of Foreign Capital Investment Flows	Dependent Variable
XRATE	The value of domestic currency in relation to foreign currency	+
INFL	The impact of low interest rates on value of money supply	-
UNEMP	The total percentage of the labor force currently unemployed	-
CURACC	The amount of domestic investment finance by foreign investors	-
REALINT	The cost of borrowing within the host country	+
DEGOP	The amount of exports and imports in relation to economic growth	+
WORKRM	The percentage of foreign workers contributing to domestic production	+
SIZE	The size of the domestic market adjusted for levels of poverty	+

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C	6.18E+08	0.3639
R-squared	0.452415	

Note: ***, **, and * denotes significance at the 1%, 5%, and 10% respectively.

Appendix 3: List of Countries Analyzed

Country
Argentina
The Bahamas
Barbados
Bolivia
Chile
Colombia
The Dominican Republic
Panama
Peru
Venezuela

Bibliography

Acosta, P. C. (2006). Remittances and Development in Latin America. *The World Economy* .

Chang, S. C. (2007). The Interactions Among Foreign Direct Investment, Economic Growth, Degree of Openness and Unemployment in Taiwan. *Applied Economics* , 39, 1647-1661.

Cuadros, A. A. (2001, March). Openness and Growth: Re-Examining Foreign Direct Investment, Trade and Output Linkages in Latin America. *CREDIT Research Paper* , No.1 Vol.4.

ECLAC. (2009). *ECLAC Statistics and Economics Division.* Retrieved March 20, 2010, from ECLAC Statistical Yearbook: http://websie.eclac.cl/anuario_estadistico/anuario_2009/eng/default.asp

(2008). IMF Balance of Payments Manual.

Nunes, L. C. (2006, October). Determinants of FDI in Latin America. *Working Paper* , 252, 1-16.

Pacheco - Lopez, P. (2005). Foreign Direct Investment, Exports, and Imports in Mexico. *World Economy* , 1157, 1-17.

Singh, H. J. (1995, November). Some New Evidence on Determinants of Foreign Direct Investment in Developing Countries. *Policy Research Working Paper* , 1531, 1-48.