**Determinants of foreign direct investment
and foreign direct investment in agriculture
in developing countries**

by

Fabian Farr

B.S., University of Hohenheim, 2009

A THESIS

Submitted in partial fulfillment of the

requirements for the degree

MASTER OF AGRIBUSINESS

Department of Agricultural Economics

College of Agriculture

KANSAS STATE UNIVERSITY

Manhattan, Kansas

2017

Approved by:

Major Professor
Dr. Allen Featherstone

ABSTRACT

Understanding determinants of Foreign Direct Investment (FDI) and Agricultural Foreign Direct Investment (AGFDI) is vital to policy makers in developing countries. FDI is a source of capital for the host country that does not affect its debt balance. Even so, technological spillover, better infrastructure as well as an increase in value added and market access have been the source of motivation to increase efforts to attract FDI. As for AGFDI, ongoing uncertainty with the financial markets created a shift in private investment towards tangible assets, which favors AGFDI to developing countries. Nevertheless, investment in agriculture suffers from low commodity prices and increasing productivity loss that discourage FDI and AGFDI. Therefore, it is crucial for policy makers to understand the determinants of AGFDI to create an attractive environment for potential investors.

We use country level panel data to estimate the impacts of country-level economic and social variables on FDI and AGFDI. The data consist of 22 developing countries. A subsample of 13 Latin American countries is also studied. Country and year fixed effects are used to isolate the impacts of the explanatory variables on FDI and AGFDI. The explanatory variables wer constructed to avoid contemporaneous endogeneity.

FDI determinants are consistent with previous studies and confirm traditional variables such as economy size, infrastructure and trade openness encourage FDI. A new variable that measures energy imports as a share of total energy use was negative for both main samples of FDI. The results of the Latin American panel for AGFDI, were mostly consistent with FDI determinants. Infrastructure, energy imports and economy size, as well as forestland share and agricultural value-add were statistically

significant for the amount of investment inflow and total flow respectively. Further

analysis with larger samples is necessary to confirm findings.   Also, social and

environmental impacts of AGFDI should be included in future studies.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ACKNOWLEDGMENTS

CHAPTER I: INTRODUCTION

Understanding determinants of Foreign Direct Investment (FDI) and

Agricultural Foreign Direct Investment (AGFDI) is vital to policy makers in developing

countries. FDI is believed to be a source of capital for the host country that does not

affect its debt balance. Technological spillover, better infrastructure as well as increases

in value added and market access motivate efforts to attract FDI.

1.1 FDI in Developing countries

FDI is crucial to developing countries with regards to their possibilities to

reduce unemployment, improve their human capital stock, increase productivity and

raise their economic output and welfare. As defined by the 1993 International Monetary

Fund (IMF) Balance of Payment Manual, FDI is "an investment made to acquire lasting

interest in an enterprise operating outside of the economy of the investor". According

to the same document the equity ownership should be more than 10% to be considered

a foreign investment (IMF 1993). [1]

Table 1.1 shows FDI inflows for the last two decades. Figure 1.1 and 1.2. show

the annual flows. During the first decade (2004 -2014), the world in general as well as

the developed nations experienced a record FDI in around year 2000. The peak is

mostly due to the rapid increase in FDI inflows to developed countries and Latin

America and developing countries did not experience such increases. For the second

decade developing countries narrowed the distance with the developed nations with

regards to FDI inflows.

In 2015 FDI flows reached the highest global levels since the financial crisis in

2009. During 2016, the United Nations reported a worldwide decrease in FDI flows of

---

[1] International Monetary Fund, "Balance of Payments Manual (BPM5),"
https://www.imf.org/external/np/sta/bop/bopman5.htm

13%. While developed countries accounted for 57% of world FDI flows, ten of the

biggest host countries for FDI were developing economies. Economic struggles, low

commodity prices and stagnated trade led to a 20% decrease in FDI in 2016 compared

to 2015. More specifically, FDI flows to Latin America (LATAM) fell by 19%

compared to the previous year. Especially alarming is the decline in investment in

manufacturing sector in developing countries, which is crucial to generate employment

and increase productivity through technology transfer. (UNCATD 2012)[2]

Table 1.1: FDI inflows World, Developing Countries and Latam 1994-2015

	1994-2004	2005-2015
World	7,106,628	15,866,609
Developing Countries	2,019,770	6,383,871
Latam	648,450	1,554,087

(Million Current US Dollars)
(Source: UNCTAD WIR annex table 01)

---

[2] UNCTAD, "Global Investments Trends Monitor: Global FDI Flows slip in 2016, Modest recovery expected in 2017," United Nations

Figure 1.1: FDI Inflows World, Developing Countries and Latam 1994-2015
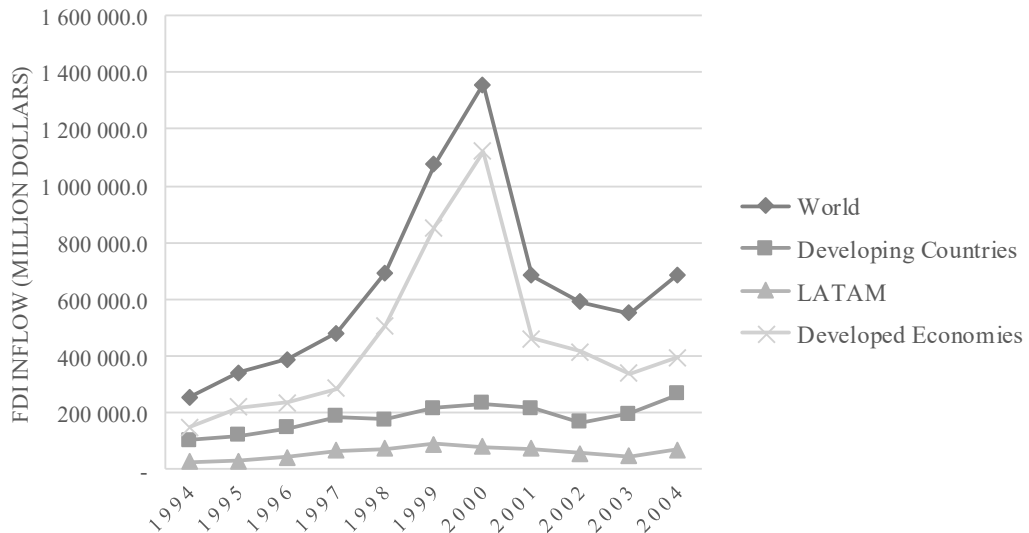
Figure 1.2: FDI Inflows World, Developing Countries and Latam 1994-2015
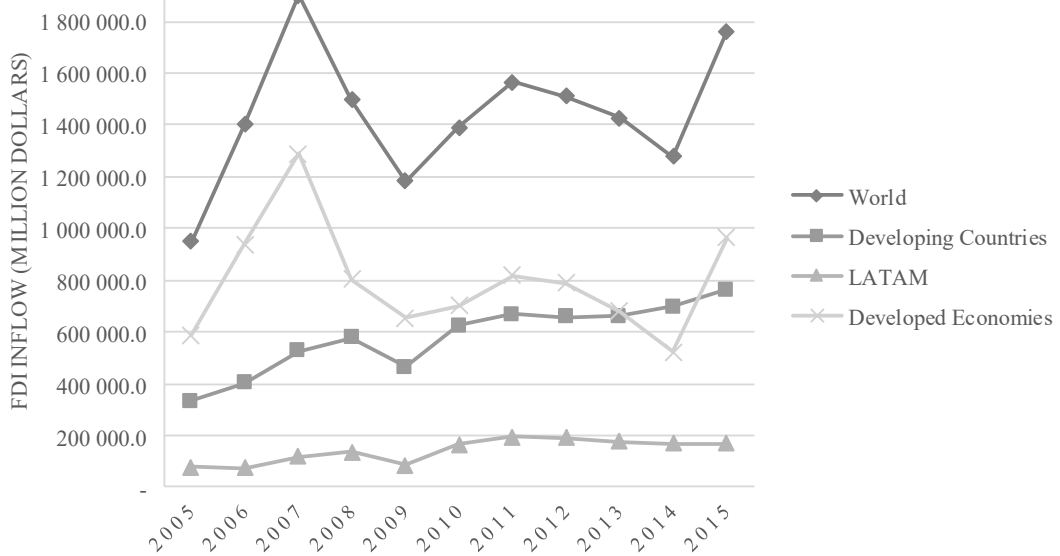
1.2 AG FDI

According to the Food and Agriculture Organization, world population could increase to 9.15 billion people by 2050. It has often been discussed that feeding the world has been, is and will be a challenge. FAO points out that in 2007 enough food

3

(2770 calories per person per day) was available for the population. However, in 2012 one-third (2.3 billion) of the world's population (6.9 billion) lived on less than 2500 calories per day and 7% (0.5 billion) less than 2000 calories per day. At the same time 28% (1.9 billion) were consuming more than 3000 calories per day (Alexandratos et al 2012).[3]

Feeding the world appears to be an issue of distribution rather than production. Current production systems that produce primary food products that compete with feed stock aggravate this situation. Alexandratos et. al. point out that towards 2050 the developing countries will have the highest growth in consumption per capita (Alexandratos et al 2012)[4]. This fast-growing demand needs to be solved by improving local production and efficient use of local resources. To transform arable land into productive land, improvements in infrastructure and human capital are major needs. These can and should be targets for sustainable foreign direct investment in the agriculture sector.

According to Alexandratos and Bruinsma, major diet shifts towards 2050 will lead to an increase in livestock products consumed. In 2015, 74 million tons of bovine meat were projected to be consumed, 55% of it in developing countries and over 60% in Latin American countries (Alexandratos et al 2050)[5]. Figures 1.3 to 1.6 demonstrate the situation. Figure 1.3. is the actual bovine meat production for 2014. LATAM as part of the Americas produces a large amount of livestock products. Figure 1.4. and 1.5. display how meat production changed over the last half decade. While South America had the highest growth in quantitative terms, it lags behind with regards to yield

---

[3] Nikos Alexandratos and Jelle Bruinsma, eds., "World Agriculture Towards 2030/2050: The 2012 Revision," special issue, *ESA WORKING PAPER* 12, no. 03 (2012)
[4] ibid.
[5] ibid.

improvements. This is a great opportunity for the countries of LATAM and its people.

Further, figure 1.6 presents the share of the Americas I global beef production.

Figure 1.3: World meat production 2014
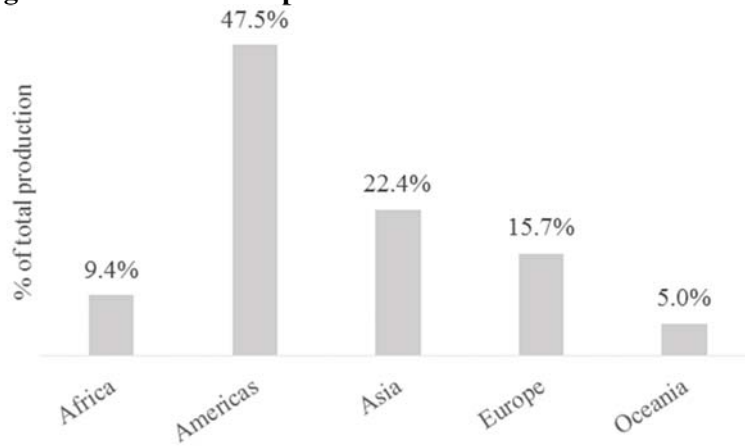
(Source: FAOSTAT)

Figure 1.4: Beef production growth 1961-2014
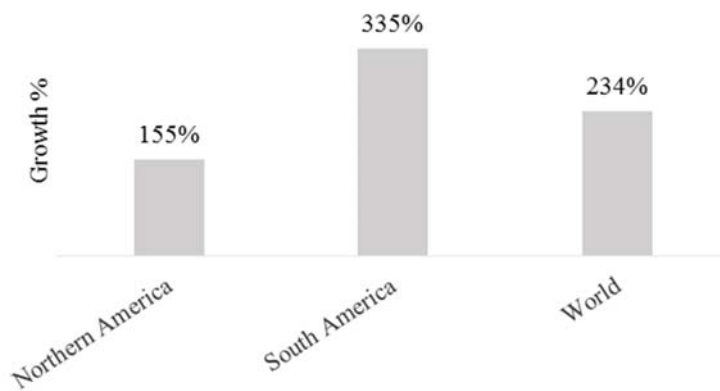
(Source: FAOSTAT)

Figure 1.5: Yield growth of carcass weight 1961-2014
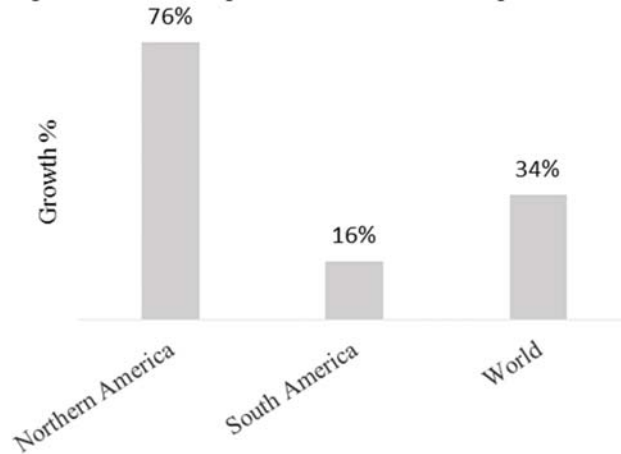
(Source: FAOSTAT)

Figure 1.6: World Beef production share of the Americas 2014
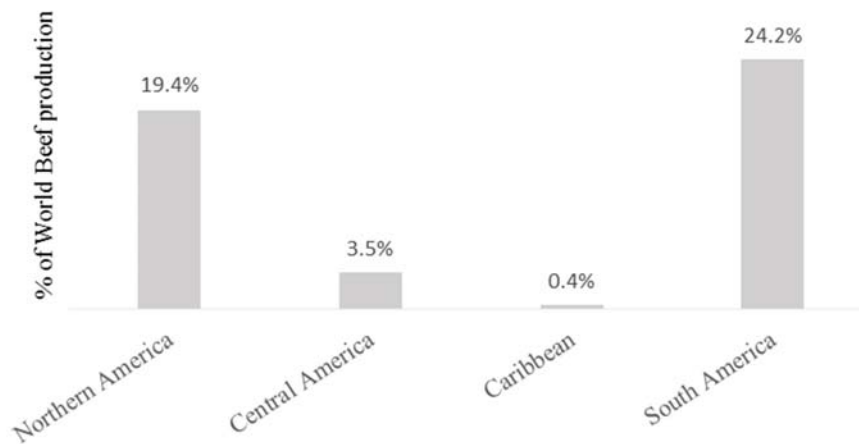
(Source: FAOSTAT)

The following tables and figures provide an overview on FDI share that is spent in primary sector comparing different country groups. Tables 1.2 and 1.3 show the AGFDI inward stock for 1990 and 2012 presented by the Ag FDI increased for all groups. Figures 1.7 and 1.8 further illustrate numbers in Tables 1.2 and 1.3. The percentage of "primary" is the amount of FDI that went into the primary production

sector. This figure is then split into mining, agriculture and others. The mining sector is the dominant recipient for AGFDI for all groups shown. In 1990 developing countries received less FDI in the primary sector compared to developed nations and the world. They recieved more in agriculture and less in mining. In 2012, they received more Primay FDI than developed nations and continued to be group that spent most in agriculture and less in mining (Figure 1.8).

With regards to export volumes, Latin America exported 16% of the global food and agricultural exports. (Duff and Padilla 2015)[6] According to the USDA, 31% of the 2017 world's oilseed production is expected to be harvested in Brazil and Argentina. (USDA 2017)[7]

To benefit from these opportunities in the long run LATAM will need to make major adjustments. Despite the fact, AGFDI has increased though many developing countries were not able to develop efficient long run strategies to stabilize economically. Heumesser and Schmid analyze how most of the value-added activities take place in developed countries in that large sums of AGFDI to developing nations is intvested into primary production such as cash and staple crops (Heumesser et al 2012).[8]

---

[6] Andy Duff and Andres Padilla, "Latin America: agricultural perspectives," accessed June 16, 2017, https://economics.rabobank.com/publications/2015/september/latin%2Damerica%2Dagricultural%2Dperspectives/
[7] USDA, "World Agriculture Production," June (2017), accessed June 16, 2017, https://apps.fas.usda.gov/psdonline/circulars/production.pdf
[8] Christine Heumesser and Erwin Schmid, "Trends in Foreign Direct Investment in the agricultural sector of developing and transition countries: A Review,"

Table 1.2: FDI inward stock 1990 Primary sector

Sector/industry	1990		
	Developed countries	Developing economies	World
Total	1,633,004	445,263	2,078,267
Primary	156,750	24,099	180,849
Agriculture, hunting, forestry and fishing	3,600	4,207	7,806
Mining, quarrying and petroleum	153,150	17,795	170,945
Unspecified primary	-	2,097	2,097

(Million Current US Dollars)
(Source: UNCTAD WIR Web table 24)

Figure 1.7: World inward stock FDI 1990 primary sector

■ Primary   ■ Agriculture, hunting, forestry and fishing
■ Mining, quarrying and petroleum   ■ Unspecified primary
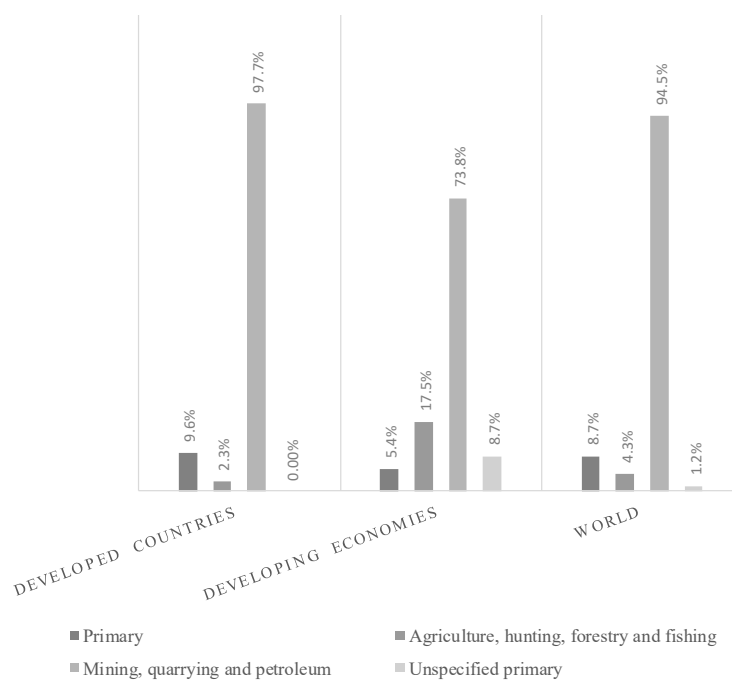
Table 1.3: FDI inward stock 2012 Primary sector

Sector/industry	2012			
	Developed countries	Developing economies	Transition economies	World
Total	15,905,431	7,030,622	368,376	23,304,429
Primary	1,082,493	593,272	63,251	1,739,016
Agriculture, hunting, forestry and fishing	19,915	58,803	2,976	81,694
Mining, quarrying and petroleum	1,052,836	534,460	60,275	1,647,571
Unspecified primary	9,742	10	-	9,752

(Million US Dollars)
(Source: UNCTAD WIR Web table 24)

Figure 1.8: World inward stock FDI 2012 Primary sector

- ■ Primary
- ■ Agriculture, hunting, forestry and fishing
- ■ Mining, quarrying and petroleum
- ■ Unspecified primary
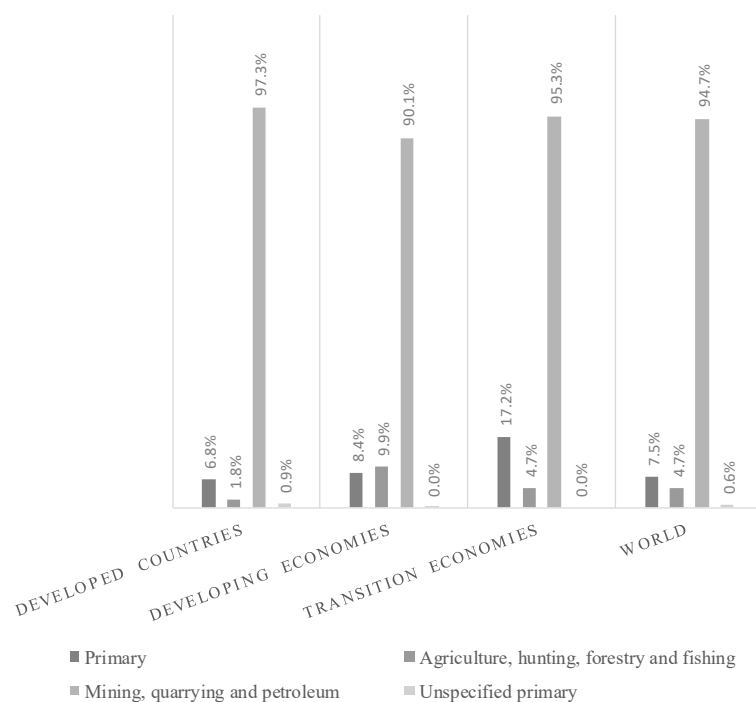
Ongoing uncertainty in the financial markets created a shift in private investment patterns towards tangible assets, that favors AGFDI in developing countries. Nevertheless, the latter suffer from volatile commodity prices and increasing productivity loss, both factors that discourage FDI and AGFDI. Equally important, agricultural activities directly impact the environment and therefore they need practices

9

to ensure long-term development strategies. As argued by Alvaro et al, mono cropping

systems such as soybeans in Argentina and Brazil create negative externalities for

society and the environment that need to be considered (Alvaro et al 2012)[9]. Duff and

Padilla wrote that in countries such as Bolivia and Guatemala between 30% and 40% of

the active workforce is employed in agriculture. Also, they estimate that 50% of the

region's food production comes from small scale farmers with limited access to

technology and infrastructure. (Duff and Padilla 2015)[10] Thus, it is crucial for policy

makers to understand the dynamics of AGFDI to create an attractive environment for

potential investors and encourage sustainable production systems. Approaches such as

the Green Commodity Programme (GCP) as part of the United Nations Development

Programme (UNDP) helped countries such as Paraguay and its beef production to take

first steps towards more sustainable production methods (Hiller 2016)[11].

1.3 Objectives

The objective of this thesis is to examine the determinants of AGFDI trends in

developing countries by using different data than those of previous studies. The focus

will be on developing countries, especially Latin America, for FDI determinant

analysis. Furthermore, the FDI flows for the agricultural sector of Latin American

countries is examined.

The results confirm the significance of the main macro economic variables such

as infrastructure, market size and trade openness as being important for FDI. Evidence

---

[9] Álvaro Calderón et al., *Foreign Direct Investment in Latin America and the Caribbean 2012,* Foreign Investment in Latin America and the Caribbean. Report (s.l.: ECLAC, 2013), accessed June 12, 2017, http://repositorio.cepal.org/bitstream/handle/11362/1152/S2013382_en.pdf;jsessionid=6816AD22E5C72 DDE9EEA072663452E16?sequence=1
[10] Duff and Padilla, "Latin America: agricultural perspectives"
[11] Lisa Hiller, "Costa Rica and Paraguay team up to achieve sustainable and low-carbon meat sectors," United Nations accessed June 16, 2017, http://www.undp.org/content/gcp/en/home/presscenter/articles/2016/06/23/costa-rica-and-paraguay-team-up-to-achieve-sustainable-low-carbon-meat-sectors.html

also shows that these vary between the two decades studied. Energy imports as share of total energy consumption is introduced as a new explanatory variable and it is statistically significant. As for AGFDI, determinants partially coincide with the FDI results in some Latin American countries.

This thesis is structured as follows. Chapter two summarizes the literature available on determinants of FDI and AG FDI in developing countries. In chapter three, the data is presented and how it is organized. Chapter four presents the econometrical model and equations applied. Remaining chapters five and six present the results and discussion, respectively.

CHAPTER II: LITERATURE REVIEW

2.1 Introduction

FDI determinants have been the studied by a number of authors. Different results have been found as to why foreign direct investment is important to developing countries and what directions host country policy makers should engage to attract more of it. Also, there have been arguments regarding how it can be a disadvantage.

Determinants of FDI flows can be influenced by internal and external aspects. Financial crisis in the home country can encourage what is known as "FDI fire sales" where investors shift their capital towards other countries they assume to be more reliable. Hasli et. al. studied a panel data of 23 developing countries on how a financial crisis and macroeconomic factors influence FDI flows. Evidence for the 20-year period suggests that the U.S. financial crisis exerted a positive effect in FDI inflows their sample. Their findings also confirmed traditional variables such as trade openness, exchange rates and money supply encourage FDI inflows. Further, they showed that country specific economic crisis reduced FDI inflows. Specifically, they tested for lending rates prior to a crisis that makes borrowing for business operations in the host country costly (Hasli et al 2017)[12]. Following classic economic theory, local comparative advantages in the host country such as lower wages, better tax conditions or large sources of natural resource attract FDI.

2.2 Traditional FDI determinants for developing countries

Many studies found evidence that host country factors such as economy size, infrastructure, human capital, political environment and trade openness are significant determinants for FDI in developing countries.

---

[12] Anita Hasli, Nurhani A. Ibrahim, and Catherine S. Ho, "The Effect of Financial Crisis and Macroeconomic Factors on FDI in Developing Countries," *International Journal of Economics and Financial Issues* 7, no. 1 (2017), http://www.econjournals.com/index.php/ijefi/article/download/3091/pdf

Biswas analyzed the determinants of FDI by multinational corporations using three regression models for 44 countries from 1983 to 1990. Biswas distinguished between traditional and nontraditional explanatory variables. The main findings indicate the interaction of both traditional and nontraditional factors for explaining FDI inflows. According to her findings, infrastructure, regime type and duration as well as property right protection are statistically significant regressors. (Biswas 2002)[13].

Sekkat et. al. studied the determinants of FDI for five different regions. They focused on variables such as infrastructure, openness and stability in economic and political conditions. The regression model included up to 72 countries for the decade of the 1990s. The findings were that openness attracts FDI. At the same time traditional variables such as infrastructure and human capital had statistically significant effects on FDI inflows. Interestingly, they found that the statistical significance of the human capital variable depends on whether regressors are introduced all at once or one at a time. With simultaneous introduction, human capital becomes insignificant. A further analysis of the results showed that the impact of openness is higher for the manufacturing share of FDI than for FDI in total. The study also showed that for two of the five regions (Africa and South Asia) the potential effect of openness on FDI is higher than the others (Sekkat et al 2007)[14].

Osuna studied the impact of human capital (HC) formation on inward foreign direct investment to Mexico. To measure human capital in the different states, the author used the amount of researchers, number of patents and tertiary and postgraduate enrollment (among others). Two regression models (multivariate analysis and random

[13] Romita Biswas, "Determinants of Foreign Direct Investment," *Review of Development Economics* 6, no. 3 (2002), doi:10.1111/1467-9361.00169
[14] Khalid Sekkat and Marie-Ange Veganzones-Varoudakis, "Openness, Investment Climate, and FDI in Developing Countries," *Review of Development Economics* 11, no. 4 (2007), doi:10.1111/j.1467-9361.2007.00426.x

effects) were applied for panel data for the period between 2007 and 2012. FDI expressed in million dollars was the dependent variable. The main results showed that the number of researchers as well as postgraduate enrollment as proxies for human capital are positive and statistically significant regressors explaining FDI to Mexican federal states. Furthermore, it is pointed out that being a U.S. border state or a big state in GDP terms increases FDI (Osuna 2016)[15].

Liu et. al. investigated whether FDI improves economic growth. For their study they created a panel data of 84 countries for the period of 1970 and 1999. Evidence suggested that large market size, human capital and technology absorptive abilities attract FDI. They concluded that improving these factors in the host country will attract more FDI (Liu et al 2005)[16].

Absorptive capacity or capabilities is a nontraditional variable used to explain FDI flows. Mehic and Siladzic conducted a study on the ability of a country to absorb technology and knowledge from its surroundings impacts on inward FDI and its effect on economic growth. According to Siladzic and Mehic, absorptive capability and its effect on economic growth has come to the attention to many researchers in studies about FDI. Their work includes a eleven year span for ten Eastern and Central European countries. Their results suggest that FDI explains why the ten countries have different economic growth. The study's results show that the more productive the host country's industry is, the larger is the effect of FDI on its economy growth is. This suggests that one of the major positive impacts of FDI to the host country is through

[15] Moisés A. Alarcón Osuna, "Human Capital Formation and Foreign Direct Investment: Is it a nonlinear relationship?," *Acta Universitaria* 26, no. 4 (2016), accessed November 10, 2016, doi:10.15174/au.2016.1032, http://content.ebscohost.com/ContentServer.asp?T=P&P=AN&K=118335670&S=R&D=fua&EbscoCont ent=dGJyMNLe80Sep644zOX0OLCmr06eqK5SsKi4SraWxWXS&ContentCustomer=dGJyMPLf7Hnk5 bmF39%2FsU%2BPa8QAA

[16] Xiaoying Li and Xiaming Liu, "Foreign Direct Investment and Economic Growth: An Increasingly Endogenous Relationship," *World Development* 33, no. 3 (2005), doi:10.1016/j.worlddev.2004.11.001

technology spillovers. The more technologically advanced the host country is in the beginning, the bigger the impact of FDI is (Siladzic and Mehic 2015)[17].

2.3 Geographic influence on FDI determinants

Another group of studies analyzed whether regions and countries are different regarding their FDI determinants. Kolstad and Villanger conducted a study for 135 countries to analyze whether Caribbean countries are more attractive for FDI than others. The main findings show that for the period between 1980 and 2002 Caribbean states obtained more FDI inflow than other comparable countries within the sample. The amount of FDI inflow shows a relative sensibility to the countries stability. There panel data included 13 of the 25 Caribbean states that were studied for three different hypotheses. The first was the amount of FDI received by Caribbean countries compared to others. The second hypothesis test is whether Caribbean states lose FDI inflow due to instability. The third hypothesis is whether the Caribbean receives more FDI because of less restrictions compared to other countries.

Kolstad and Villanger state that their study is different from previous LATAM FDI analysis as it focuses on one region, instead of comparing large economies such as Brazil with smaller ones such as Dominica (Kolstad and Villanger 2008)[18].

A recent study focused on the difference between Latin America and the Caribbean (LAC) and other countries. William's analyzed panel data for 68 developing countries for the period of 1975 to 2005. The results suggest that throughout all, trade, growth and infrastructure are statistically significant with the expected positive sign. Specifically, infrastructure favors LAC and attracts FDI to LAC countries. An increased

---

[17] Sabina Silajdzic and Eldin Mehic, "Absorptive Capabilities, FDI, and Economic Growth in Transition Economies," *Emerging Markets Finance and Trade* 52, no. 4 (2015), accessed November 10, 2016, doi:10.1080/1540496X.2015.1056000

[18] Ivar Kolstad and Espen Villanger, "Foreign Direct Investment in the Caribbean," *Development Policy Review* 26, no. 1 (2008), doi:10.1111/j.1467-7679.2008.00399.x

debt burden as well as constraints to the executive government power lowers FDI inflow to non LAC countries (Williams 2015)[19].

Lall et. al. investigated the relationship between short and long-term U.S. FDI in the Caribbean and its determinants. Two groups of variables were studied; economic and structural/locational. By understanding what attracts FDI, policy makers will be able to build more efficient strategies to attract FDI. The Caribbean competes with Latin America in attracting limited FDI from the US. Hence, it has to adapt its strategies of increasing FDI towards the changing preferences of the country of origin. The result showed that long run FDI is dependent on exchange rate, market size, and structural/locational related variables such as education and political rights. In this specific case, comparing the Caribbean to Latin America, nine out of 12 variables were statistically significant regarding its relationship with long run FDI. In fact, skilled labor and cultural similarity towards the US were found to have a positive relationship with FDI inflows in the Caribbean. The authors described them as preconditions, even more important than economic variables such as exchange rates, tax relief incentives and low local costs (Lall et al 2003)[20].

Mijiyawa investigated the determinants of Foreign Direct Investment on the African continent. The author studied 53 African countries during the period between 1970 and 2009. Country and time fixed effects were applied to correct estimations for endogeneity. Traditional variables such as market size, infrastructure, and openness were estimated in a fixed effects model and a General Methods of Moments (GMM) model. Results showed that most of the explanatory variables turn out to be statistically

---

[19] Kevin Williams, "Foreign direct investment in Latin America and the Caribbean: An empirical analysis," *Latin American Journal of Economics* 52, no. 2 (2015), doi:10.7764/LAJE.52.1.57

[20] Pooran Lall, David W. Norman, and Allen M. Featherstone, "Determinants of US direct foreign investment in the Caribbean," *Applied Economics* 35, no. 13 (2003), doi:10.1080/0003684032000100382

significant. Market size, infrastructure, and openness as well as the rate of return to investments were statistically significant for both models (Mijiyawa 2015)[21].

2.4 Structural Reforms

Less traditional variables have been tested for statistical significance Dutta and Roy studied how the institutional quality of a host country affects the inflow of FDI. They used panel data for 97 countries (1984-2002) to investigate how trade, labor market and credit regulations impact FDI inflows. The main findings are that FDI inflow is strongly related to regulation in the host country. More specifically, results show that FDI inflow is high when regulation is low. The labor market is statistically significant only when robust standard errors are estimated. FDI inflow increases when labor market regulations are less but only to a certain point, suggesting that chaos in the labor market is not attractive for FDI (Dutta et al 2009).[22]

Campos and Kinoshita analyzed determinants of FDI for 19 LATAM and 25 Eastern European countries for the period between 1989 and 2004. Their study was partitioned into three sectors: classical determinants, institutional factors, and structural reforms. The focus of this study lies on the structural reforms and their impact on FDI. More specifically, they studied the effect of trade liberalization, financial reforms, and privatization on FDI inflows. They found that financial sector reforms and privatization have a positive influence on FDI inflows. With regards to LATAM, privatization is a strong factor for FDI. Analyzing the results further, the authors found that for the

---

[21] Abdoul' Ganiou Mijiyawa, "What drives Foreign Direct Investment in Africa? An Empirical Investigation with Panel Data," *African Development Review* 27, no. 4 (2015)
[22] Nabamita Dutta and Sanjukta Roy, "WHAT ATTRACTS FOREIGN DIRECT INVESTMENT: A CLOSER LOOK," *Economic Affairs* 29, no. 3 (2009), doi:10.1111/j.1468-0270.2009.01925.x

financial sector, efforts made to attract more FDI even though outcomes are not visible yet (Campos and Kinoshita 2008)[23].

2.5 Foreign Direct Investment in Agriculture

Agriculture is believed to be vital for economic growth, especially for developing and transition countries. Nevertheless, the agriculture sector is rarely the target for large scale investments.

Awokuse and Xie analyzed a time series data for 15 developing and transition countries between 1971 and 2006. The main focus was the relationship between GDP growth and agriculture. Results showed that in 10 of 15 countries, agriculture value added tested statistically significant for economic growth. Further, it was found that agriculture was positive and significant for both short and long run economic growth (Awokuse and Xie 2015)[24].

A recent paper on AG FDI trends in developing countries by the FAO found that the share of AG FDI in developing countries doubled twice between 2003 and 2014. The study analyzed Foreign Direct Investment in food, beverages and tobacco (FBT-FDI). Five economies (China, Russian Federation, United States of America, Brazil and Mexico) received one-third of FBT-FDI. The authors found that the substantial increase did not benefit all the developing countries involved in the study. The article also mentioned important FBT-FDI flows between developing countries. China is responsible for substantial growth in AGFDI to Argentina and Brazil (Fiedler et al 2016)[25].

---

[23] Nauro F. Campos and Yuko Kinoshita, *Foreign Direct Investment and Structural Reforms: Evidence from Eastern Europe and Latin America* (International Monetary Fund, 2008); IMF Working Paper
[24] Titus O. Awokuse and Ruizhi Xie, "Does Agriculture Really Matter for Economic Growth in Developing Countries?," *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie* 63, no. 1 (2015), doi:10.1111/cjag.12038
[25] Yannik Fiedler and Massimo Iafrate, "Trends in foreign direct investment in food, beverages and tobacco," news release, 2016

A repeatedly mentioned concern in the literature is the nature and type of agricultural investment. More specifically, "land grabbing" for example, defined as the acquisition of vast land holdings by foreign and national investors is believed to increase the potential for conflict between the host country and foreign investors. The intent to secure future demand of potable water for the home country has been motivation of these acquisitions in some cases. Heumesser and Schmid highlighted the importance of context and type of FDI in developing countries and how the host countries adapt local policy and management to foreign inflows. They point out several opportunities as well as risk factors. Large scale land acquisitions are identified as the least favorable form of foreign investment in the long-run. They suggest a need to consider environmental and social impacts when possible. Finally, they emphasize the importance of local governments to guide private investments rationally to create a future for agricultural development (Heumesser et al 2012)[26].

---

[26] Heumesser and Schmid, "Trends in Foreign Direct Investment in the agricultural sector of developing and transition countries: A Review"

CHAPTER III: DATA

3.1 FDI Sample

The first set of data used are FDI inflows from 21 developing countries from three different regions with a focus on Latin America. The data cover the period from 1990 to 2015. Before 1990, data for many of the selected countries were incomplete. Table 3.1 shows the complete country list of the sample, Figures 3.1 and 3.2 display the interannual growth of FDI inflows for some of the countries selected. All values are current terms.

Five year moving averages are applied to the explanatory variables which is why the models are estimated for years 1994 onwards. This is different from previuos studies in which lagged variables are used. Two subsamples with same assumptions and variables were created for the periods of 1994-2004 (subsample one) and 2005-2015 (subsample two) to examine changes in the explanatory power of the variables.

Table 3.1: FDI inflows 1994-2015

	1994-2004	2005-2015
Argentina	64,603	61,930
Bolivia	5,176	4,352
China	409,608	768,851
Colombia	22,638	81,522
Costa Rica	4,578	14,418
Dominican Republic	6,217	14,851
Ecuador	5,578	4,058
El Salvador	2,312	3,315
Guatemala	2,134	6,587
India	31,491	215,303
Indonesia	8,667	92,075
Jamaica	3,585	4,810
Mexico	150,254	195,989
Panama	6,126	20,094
Paraguay	1,044	1,848
Peru	18,597	49,951
South Africa	15,679	38,575
Thailand	37,739	69,915
Togo	311	966
Uruguay	2,022	13,994
Venezuela, RB	25,515	16,265

(Million US Dollars)
(Source: UNCTAD)

Figure 3.1: FDI inflows 1995-2004 (Interannual growth)
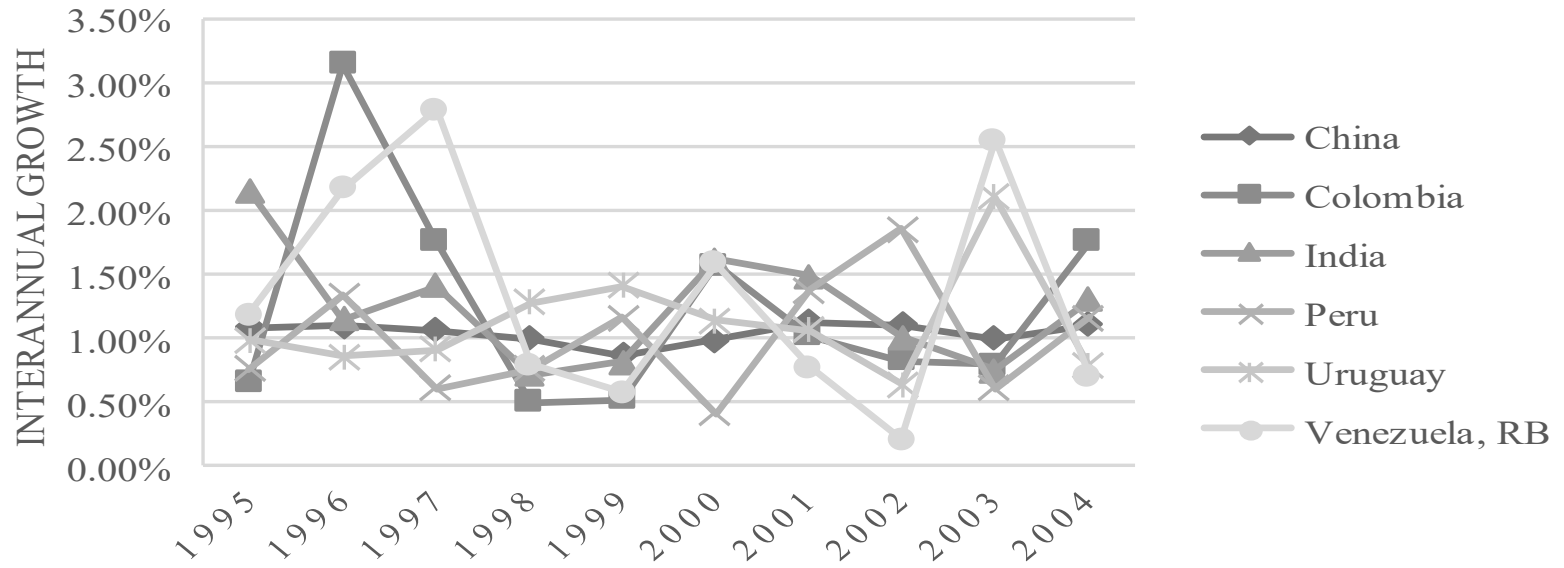
(Source: UNCTAD)

Figure 3.2: FDI inflows 2004-2015 (Interannual growth)
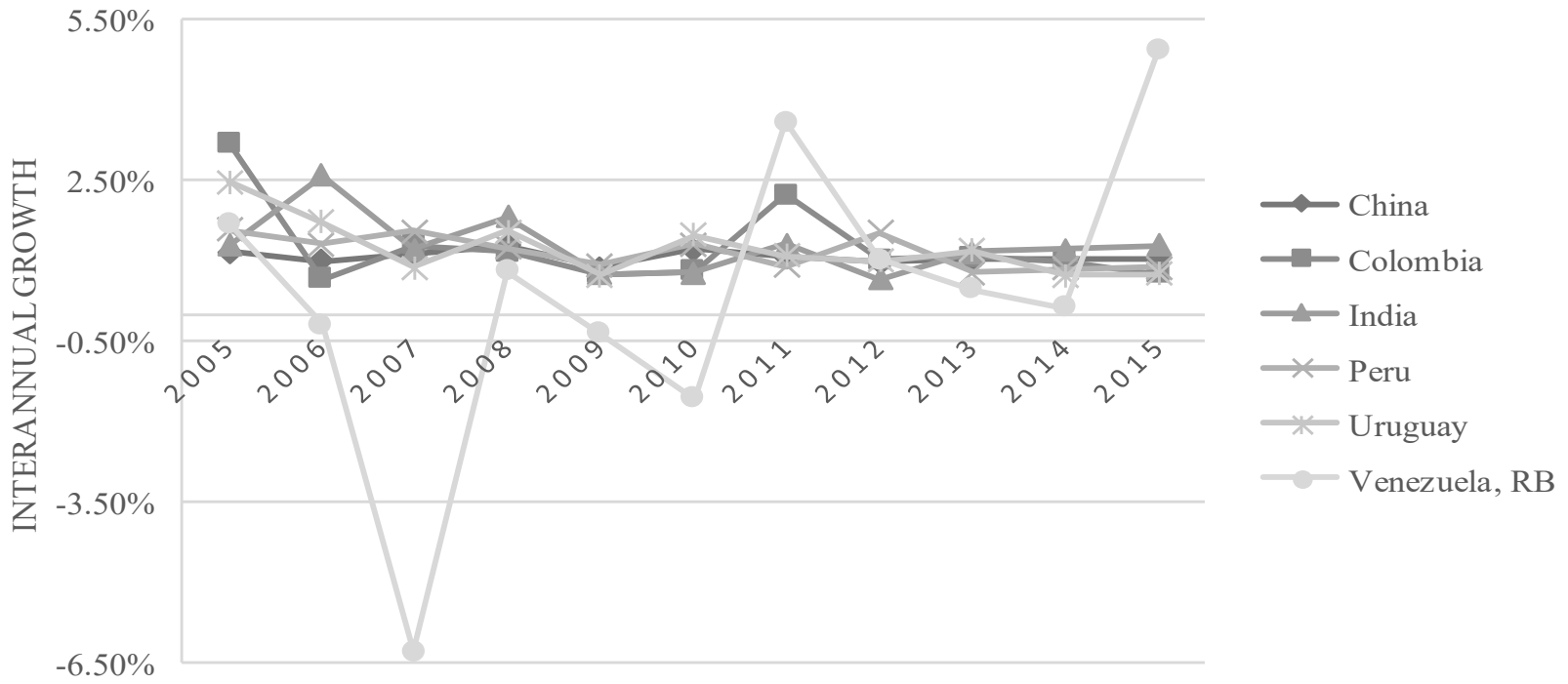
(Source: UNCTAD)

Table 3.1 shows FDI inflows for the period studied. For most countries, FDI net inflows were considerably higher during the second decade (2004-2015) including the commodity boom years as well as the financial crisis of 2009. Argentina, Bolivia and Venezuela are the only countries to report decreased values. Venezuela exhibits a considerable loss of 36% compared to the first decade (1994-2004).

The dependent variable to be explained is FDI inflows taken from the UNCTAD data base. Data from the World Development Indicators were used for explanatory variables. Following Williams (2015), Sekkat et. al. (2007), Biswas (2002) and others, eight widely recognized variables from the international FDI literature were used in the models.

Table 3.2 presents the explanatory variables for this study, including descriptions and their expected sign. Gross domestic product and population are variables that indicate the size of an economy. These are expected to have positive signs. Secondary school enrollment is a measure of the quality of human capital with an expected positive sign.. The number of cellular phones a proxy for infrastructure and is expected to be positive. Exports and trade indicate the openness of the economy, also with an expectedly positive sign or FDI. The amount of energy imports as share of total used is calculated as total consumption minus the economy's production. Increased dependency on external energy sources can be a limitation to development and hence is expected to have a negative sign.

The constraints of executive power are an indicator of government structures (Table 3.2). The polity project has been introduced by Gurr (1975) and has been

adopted for FDI determinants by several investigators.[27] On a scale between zero and

seven, it measures the amount to which constraints on the executive power hinder the

government form acting without control mechanisms. Zero indicates that the executive

power does not underlie any external control mechanisms regarding their actions taken.

Hence this variable is expected to have a positive sign as for every increase on the scale

(more control) FDI should increase as well.

Table 3.2: Description of FDI variables

Acronym	Depentand Variable	Explanation		
FDI US	FDI INWARD FLOW	US Dollars at current prices in millions		
Acronym	Explanatory Variables	Description	Expected Sign	Rationale (Assumption of Ceteris Paribus)
MA GDP 11	MA GDP, PPP (constant 2011 international $)	GDP in 2001 constant terms with a 5 year MA	+	larger economies attract more FDI
MA-POP	Population total	Population absolute numbers with 5 year MA	+	larger economies attract more FDI
MA-School Perc.	MA Gross enrolment ratio, secondary, both sexes (total)	Shows total secondary enrolment (Moving average)	+	Higher quality of human capital favours FDI inlfow
MA-CEL	MA Mobile cellular subscriptions (per 100 people)	Mobile cellular subscriptions (per 100 people) (Moving average) PROXY FOR INFRASTRUCTURE	+	Better infrastructure attracts more FDI
MA EXPO US	Exports of goods and services in 2010 consant US$ with 5 year MA	Exports of goods and services in 2010 consant US$ with 5 year MA	+	Trade openness favours FDI inflow
MA-TRA US	MA Trade expressed in constant 2011 US	Trade volume in constant GDP PPP (Moving Average)- takes TRA perc. And multiplies with GDP consant PPP	+	Trade openness favours FDI inflow
MA-ENERGY perc.	MA Energy Imports	Energy imports as a share of total energy use	-	Dependency on external energy source for production demotivates FDI inflow
MA ExConst	MA Constraints on Executive	in a scale of 1-7 categorizes how freely government executives can make choices and take actions (1= no control)	+	More control on executive power suggest solid governing and hence more FDI attraction

MA=Five Year Moving Average

Table 3.3 provides the mean, standard deviation, minimum and maximum for the

variables.

[27] Monty G. Marshall, "Polity 5 Project: Dataset User's Manual," http://www.systemicpeace.org/inscr/p4manualv2015.pdf

Table 3.3: Summary Statistics FDI dependent and independent variables

	Mean	Std. Dev.	Minimum	Maximum
FDIUS	5,419	12,498	-3,711	82,488
FDISHARE	0.0089	0.0080	-0.0040	0.0558
MAGDP11(millions)	817,030	1,916,600	4,793	16,056,000
MAPOP (millions)	143	344	2	1,358
MASCHOOLperc	69	19	21	112
MACEL	39	44	0	171
MAEXPOUS (millions)	145,210	479,660	839	3,944,100
MATRAUS (millions)	410,780	958,660	3,178	7,435,800
MAENIMPperc	-19	93	-333	90
MAEXCONST	6	1	1	7

3.2 AG FDI Sample

The second and smaller data are for AG FDI flow for 13 countries from

LATAM and the Caribbean. Table 3.4 shows AGFDI flows including agriculture,

livestock, forestry, fishing, hunting and mining. Not all countries are active in all six

subsectors so sources do not correspond precisely. In case of the Dominican Republic,

data include only mining. To gain more accuracy, a subsample (see Table 3.5.) was

created that measures AGFDI flows without mining. Countries such as El Salvador and

Dominican Republic are left out as there was no FDI in agriculture, fishing or forestry

registered.

The data cover the period from 2009 to 2015. On contrary to the FDI sample,

AGFDI data report total flow and not only inflows. In case of the negative values,

inflows do not offset outflows, hence disinvestment occurs. The source for the data are

the country's central banks in most cases except Mexico (Instituto de Informacion

Estadistica) and Guatemala (Banco de Guatemala). Whenever data were reported

quarterly, the four quarters were summed. All values are given in millions of United

States dollars.

There are alternative sources for AGFDI such as the official OECD data base or "fDi Markets" (private database – Financial Times Ltd.) recently used by Fiedler for a FAO publication in Trends in FDI. [28]

---

[28] Fiedler and Iafrate, "Trends in foreign direct investment in food, beverages and tobacco"

Table 3.4: AGFDI Flows to selected Countries in Latam and Caribbean (incl. Mining)

	Argentina	Bolivia	Brazil	Chile	Colombia	Costa Rica	Dominican Republic*	Ecuador	El Salvador*	Guatemala	Mexico	Paraguay	Uruguay
2009	869	94	4,597	7,772	3,034	78	758	58	0.8	139	1,502	9	253
2010	1,956	220	16,261	5,216	1,897	(3)	240	189	0.9	120	1,498	(6)	329
2011	1,767	238	10,297	18,222	2,636	(19)	1,060	380	(0.6)	325	988	15	383
2012	5,029	219	6,528	13,881	2,499	20	1,169	243	(2.6)	418	3,217	2	220
2013	2,366	151	9,990	4,304	3,273	2	93	274	6.4	335	5,776	59	378
2014	425	207	5,621	4,370	1,785	13	(39)	725	6.7	201	2,666	145	136
2015	(1,136)	180	8,310	10,681	745	331	6	628	1.4	156	1,232	22	124

(Millions of United States Dollars)
(Source: Central Banks of the individual countries)
(*Figures only include mining investments; no agriculture, fishing or forestry investments listed)

Table 3.5: AGFDI Flows to selected Countries in Latam and Caribbean (no Mining)

	Argentina	Brazil	Chile	Colombia	Costa Rica	Ecuador	Mexico	Paraguay	Uruguay
2009	267	420	75	20	81	52	22	6	253
2010	325	702	179	58	(8)	11	115	19	314
2011	275	900	(11)	156	(24)	0	127	7	383
2012	175	466	(115)	26	22	18	145	56	200
2013	90	773	168	296	2	21	208	43	388
2014	129	511	25	203	24	39	169	146	128
2015	204	728	(2)	211	331	68	163	39	101

(Millions of United States Dollars)
(Source: Central Banks of the individual countries)

Figure 3.3 illustrates AGFDI for various countries from 2010 to 2015.

Figure 3.3 AGFDI Total flow 2009-2015
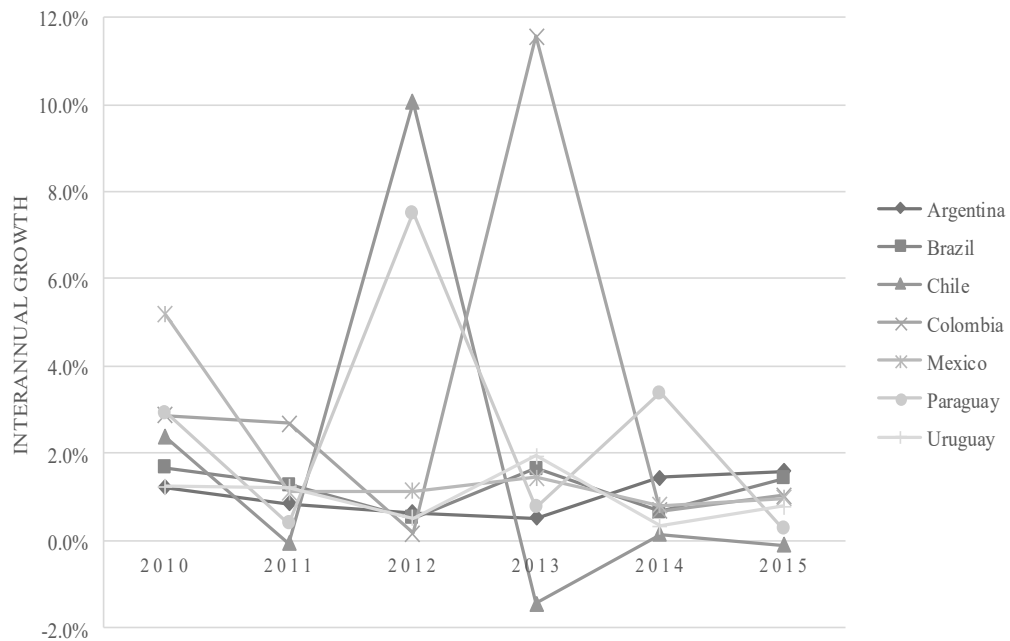
The explanatory variables used to explain the FDI were used again and three agriculture related variables were added (Table 3.6). Agricultural Land, Forest Land and Agriculture Value-Add are from World Development Indicators. The percentage of agricultural and forest land are introduced as proxies for potential quantitative development/growth of agriculture in the country. Agricultural land is expected to have a positive sign, as the more land available more quantitive growth can be expected. FAO's forecast for 2050 indicates that more than 50% of potential agricultural production growth in LATAM will come from arable land transformation. (Alexandratos et. al. 2012).[29] The forestland share is expected to be negative, as forestry products often produced on marginal soils that also serve for cattle.. For this study, the latter is expected to be attractive for AGFDI because of the profitable nature

---

[29] Alexandratos and Bruinsma, "WORLD AGRICULTURE TOWARDS 2030/2050"

considering expected worldwide shifting diet patterns towards consumption of livestock products. A third additional variable is the agricultural value-add within the country's economy. This indicates the ability of the sector to add value on the primary production. It is expected to be positive.

Table 3.6: Description of additional AGFDI variables

Acronym	Dependent Variable	Explanation
AG FDI US	AG FDI FLOW	Expresses the FDI total flow for agriculture and mining in a host country . Values already deflated by WDI deflator

Acronym	Explanatory Variables	Description	Expected Sign	Rationale (Assumption of Ceteris Paribus)
MA-AGLANDperc	Agricultural land (% of land area)	Agricultural Land as a % of total land area with a five year Moving Average	+	More agricultural land avaible attracts AGFDI
MA-FORLANDperc	Forest area (% of land area)	Forest Land as a % of total land area with a five year Moving Average	-	Forest land competes with cattle breeding area and hence is likely to demotivate AGFDI
MA-AGVA US	MA Agriculture, value added (constant 2010 US$)	WDI AG value add in constant terms with a five year MA	+	Higher ability to add value on primary production encourages FDI to the sector

Table 3.7 displays the mean, standard deviation, the minimum, and the maximum for the

variables.

Table 3.7: Summary Statistics AGFDI dependent and independent variables
AGFDI Summaery Statistics

	Mean	Std. Dev.	Minimum	Maximum
AGFDIUS	171	204	-113	882
AGFDISHARE	0.0007	0.0015	-0.0004	0.0062
MAAGLANDperc	46	17	21	84
MAFORLANDperc	36	17	9	60
MAAGVAUS (millions)	16,129	24,211	1,965	95,560,000

CHAPTER IV:ESTIMATION MODELS

4.1 Introduction

A country and year fixed effects model is estimated from the panel data and using four main equations. These equations differ in the way units are displayed as well as their functional form. The GRETL software was used to estimate these regression equations.

4.2 Model specifications

The fixed effects model controls for the possible bias that might originate from omitted explanatory variables (unobserved heterogeneity) by "fixing" aspects of the countries that do not change over time, such as culture. Studenmund wrote, "..the fixed effects model works by allowing each cross sectional unit to have a different intercept" (Studenmund 2011).[30] In fact, fixed effects as well as random effects models are widely accepted for panel data analiysis. Biswas in her study on traditional and nontraditional FDI determinants focused on the fixed effects, to allow for omitted variable bias and sample selection bias (Biswas 2002)[31].

To capture effects that are inherit to a certain period, time dummies are added for each year, excluding the last year. The financial crisis of 2009 or the major defaults in Brazil and Argentina in 2001 could be an example of an event that might influence the outcomes. Time dummies for each year were chosen over a linear simple time trend variable, due to the complexity of the panel and flexibility of allowing time effects to differ by year. As the functional form and measures change, the variables from tables 3.2 and 3.7 were modified accordingly. For equations one and three, logarithmic transformations were applied. Equations one (semi log) and two (linear) estimate the models for determinants of FDI in real terms and as a share of GDP. Foreign direct

---

[30] A. H. Studenmund, *Using Econometrics: A Practical Guide*, 6th ed. (Addison-Wesley, 2011)
[31] Biswas, "Determinants of Foreign Direct Investment"

investment, gross domestic product, exports and trade are expressed in real (or constant) terms and logged. Equation number one is in estimated semi log form. Two subsamples are also estimated for periods 1994-2004 and 2005-2015.

EQU.1: FDI (logs)

ln_FDIUS = const. + β ln_MAGDP11 + β ln_MAPOP + β MASchoolperc + β MACEL + βln_MAEXPOUS + β ln_MATRAUS + β MAExConst – β MAENIMperc + ε

EQU. 2: FDI/GDP

For equation two, all variables in real dollar terms are converted to shares of GDP. Furthermore, real GDP (MAGDP11) is replaced by GDP growth (MAGDPgr). Equation two has a linear functional form. The original 22 year sample is also estimated for two periods.

FDI Share = const. β MASchoolp + β MACELp + + β MAPOPp + β MAEXPOp + β MATRAp - β MAENIMp + β MAExConst + β MAGDPgrp + ε

EQU. 3: AGFDI (logs)

Equations three (semi log) and four (linear) estimate the models for determinants of AGFDI in real dollar terms and as share of GDP. Agricultural value added, population, exports, trade and Gross Domestic Product are expressed in real terms and are logged.

l_AGFDIUS= const. + β ln_MAAGVAUS + β ln_MAPOP + β ln_MAEXPOUS + β ln_ MATRAUS + βln_MAGDP11 + β MAAGLANDperc + β MAFORLANDperc + β MACEL + β MASchoolperc + β MAExConst - β MAENIMperc + ε

EQU. 4: AGFDI/GDP

For equation four, MAGDP11 has been replaced by GDP growth values (GDPgr).

$$\text{AGFDI Share} = \text{const.} + \beta \, \text{MAAGVAperc} + \beta \, \text{MAPOP} + \beta \, \text{MAEXPOp} + \beta \, \text{MATRAp} + \beta \, \text{MAGDPgr} +$$

$$\beta \, \text{MAAGLANDp} + \beta \, \text{MAFORLANDp} + \beta \, \text{MACEL} + \beta \, \text{MASchoolp} + \beta \, \text{MAExConst} - \beta \, \text{MAENIMp} + \varepsilon$$

4.3 Endogeneity, Inflation, Causality

Additionally, moving averages and GDP deflators are used to correct for causality/simultaneity and inflation respectively. Despite the fact of losing five years of data due to the moving averages, this drawback is minor compared to potential endogeneity issues. Williams discusses endogeneity concerns between FDI and explanatory variables. To test for this phenomenon, they used simultaneous equation models that were beyond the scope of this study. Williams data were estimated with all three alternatives for panel data, pooled OLS, Fixed and Random Effects. To deal with endogeneity, the regressors were lagged and a general method of moments estimator was used (Williams 2015).[32]

Williams pointed out that there are several technical issues with assessing the relationship between simultaneity, FDI and economic growth. Endogeneity is one of them and arises from the interdependency of variables. Some investigations using cross country data suffer from technology differences between the countries.

The author addresses these issues by using bigger samples and longer periods, as well as different regression techniques such as single equation and simultaneous equations. They also adopt other approaches such as instrumental variables and country group dummies. For their sample of 84 countries, evidence confirmed the existence of

---

[32] Williams, "Foreign direct investment in Latin America and the Caribbean"

an endogenous relationship between FDI and economic growth for the period of 1985

to 1999, but not for the whole sample (Li and Liu 2005). [33]

---

[33] Li and Liu, "Foreign Direct Investment and Economic Growth"

CHAPTER V: RESULTS

5.1 Introduction

The results for FDI equations one and two find statistical significance for traditional explanatory variables such as economy size, infrastructure, government structures, and trade openness. However, statistical significance varies throughout the subsamples. The variable for energy import was statistically significant with the expected negative sign for the original 22-year sample, for both, share and log version. In the AGFDI equations three and four, variables such as infrastructure and economy size are consistent with the findings of the FDI equations. As for the agricultural variables, forestland share and agricultural value add were statistically significant as well.

5.2 FDI equations one and two

Table 5.1 displays regression results for equation one and the subsamples. The original sample indicates statistical significance for GDP (1% level), constraints on the executive (5% level) and energy imports (10% level) all with the expected signs. Regression results indicated no statistically significant common intercept for the groups, which is why the fixed effects model is adequate. When observing the subsamples, for 1994-2004 GDP was significant at the 5% level with its expected sign. For the second subsample from 2005 to 2015 total population and GDP are statistically significant at the 1% and 5% level respectively. For this subsample the constant was highly significant at the 1% level.

Table 5.1: FDI Inflows (logs)

	1994-2004			2005-2015			1994-2015		
	Coef.	S.E.	p-Value	Coef.	S.E.	p-Value	Coef.	S.E.	p-Value
MASchoolPerc	-0.009	0.015	0.533	-0.010	0.008	0.236	-0.008	0.006	0.155
MACEL	-0.006	0.016	0.725	0.001	0.003	0.767	0.003	0.003	0.260
	-0.460	0.687	0.504	0.225		0.647	0.253	0.294	
l_MAEXPOUS					0.491				0.391
	0.124	0.739	0.867	-0.149		0.759	-0.419	0.295	
l_MATRAUS					0.487				0.157
MAENIMPperc	0.002	0.004	0.572	-0.004	0.003	0.110	-0.003	0.001	0.057*
MAExConst	-0.055	0.093	0.558	-0.153	0.133	0.254	0.103	0.044	0.019**
l_MAGDP11	1.947	0.883	0.028**	1.608	0.747	0.032**	1.353	0.354	0.0001***
l_MAPOP	-3.045	2.804	0.279	4.874	1.831	0.008***	0.719	0.893	0.421
TT94	-0.781	0.804	0.333				-0.021	0.596	0.972
TT95	-0.662	0.738	0.371				0.031	0.577	0.957
TT96	-0.501	0.673	0.458				0.111	0.561	0.843
TT97	-0.172	0.609	0.778				0.366	0.543	0.500
TT98	0.087	0.539	0.872				0.581	0.527	0.271
TT99	-0.029	0.466	0.950				0.385	0.505	0.446
TT00	-0.106	0.400	0.791				0.202	0.489	0.679
TT01	0.069	0.335	0.838				0.329	0.471	0.486
TT02	-0.407	0.275	0.140				-0.236	0.452	0.602
TT03	-0.195	0.225	0.387				-0.105	0.432	0.808
TT04							-0.012	0.409	0.976
TT05				0.975	0.428	0.023**	0.424	0.388	0.275
TT06				0.751	0.392	0.056*	0.273	0.359	0.448
TT07				0.952	0.353	0.007***	0.538	0.327	0.101
TT08				0.990	0.313	0.001***	0.652	0.296	0.028**
TT09				0.433	0.275	0.118	0.163	0.270	0.547
TT10				0.481	0.239	0.045**	0.260	0.244	0.288
TT11				0.636	0.208	0.002***	0.455	0.223	0.042**
TT12				0.630	0.187	0.0009***	0.492	0.211	0.019**
TT13				0.432	0.171	0.012**	0.338	0.203	0.096*
TT14				0.034	0.162	0.835	-0.003	0.199	0.990
Nr.Observations		218			226			445	
Nr. Countries		21			21			21	
F stat		2.34			3.76			9.63	
Within R-squared		0.19			0.26			0.41	
Test statistic		7.88			12.84			13.38	
p-Value		5.7432E-16			1.36E-25			2.02E-33	
Observation				Constant at 1% level significant					

Table 5.2 presents the results for equation two and its subsamples. The main sample for the 1994-2015 found statistical significance for exports and trade both at the 1% level. While trade has the expected positive sign, exports show a negative coefficient. Infrastructure and the newly introduced energy import variable had their expected signs and were statistically significant at a 5% level. GDP growth was statistically significant at a 1% level with the expected positive sign. Equal to the main sample of equation one, energy import is a significant FDI determinant as well. Time dummies for 2008, 2011, 2012 and 2013 were statistically significant from 2015.

The 1994 to 2004 subsample is consistent with the main sample regarding trade and exports, both being statistically significant at the 1% level. The sign for trade is positive as expected, while exports was negative against expectations.

The second period subsample coincides with the main sample showing significance for GDP growth (5% level). Furthermore, population (5% level), time trend variable (5% level) the intercept (5% level) and contraints to the executive (10% level) are statistically significant. The signs are as expected (positive) for population and GDP growth. For constraints on the executive, th it sign was unexpectedly negative. Also similar to the main sample all time dummies but two (2009, 2014) displayed statistical significance for the second sample.

Table 5.2: FDI Inflows (GDP Share)

FDI Share Equation

	1994-2004			2005-2015			1994-2015		
	Coef.	S.E.	p-Value	Coef.	S.E.	p-Value	Coef.	S.E.	p-Value
MASchoolp	0.01	0.01	0.29	-0.01	0.01	0.52	0.01	0.01	0.24
MACELp	0.01	0.01	0.28	0.00	0.00	0.30	0.00	0.00	0.027**
MAEXPOp	-0.10	0.03	0.0002***	0.03	0.04	0.51	-0.07	0.02	0.0002***
MATRAp	0.06	0.02	0.0003***	-0.03	0.02	0.23	0.03	0.01	0.0015***
MAENIMPp	0.00	0.00	0.49	0.00	0.00	0.55	0.00	0.00	0.047**
MAExConst	0.00	0.00	0.54	0.00	0.00	0.067*	0.00	0.00	0.11
MAGDPgrp	0.00	0.02	0.90	0.07	0.04	0.049**	0.05	0.02	0.008***
l_MAPOP	-0.02	0.02	0.32	0.05	0.02	0.013**	0.00	0.01	0.63
TT94	0.00	0.00	0.97				0.00	0.00	0.50
TT95	0.00	0.00	1.00				0.00	0.00	0.54
TT96	0.00	0.00	0.88				0.00	0.00	0.45
TT97	0.00	0.00	0.38				0.01	0.00	0.17
TT98	0.00	0.00	0.15				0.01	0.00	0.061*
TT99	0.00	0.00	0.19				0.01	0.00	0.071*
TT00	0.00	0.00	0.66				0.00	0.00	0.25
TT01	0.00	0.00	0.41				0.01	0.00	0.14
TT02	0.00	0.00	1.00				0.00	0.00	0.25
TT03	0.00	0.00	0.91				0.00	0.00	0.28
TT04							0.00	0.00	0.25
TT05				0.01	0.00	0.081*	0.00	0.00	0.13
TT06				0.01	0.00	0.068*	0.01	0.00	0.081*
TT07				0.01	0.00	0.052*	0.01	0.00	0.050*
TT08				0.01	0.00	0.013**	0.01	0.00	0.012**
TT09				0.00	0.00	0.28	0.00	0.00	0.55
TT10				0.00	0.00	0.20	0.00	0.00	0.35
TT11				0.01	0.00	0.004***	0.00	0.00	0.009***
TT12				0.00	0.00	0.010**	0.00	0.00	0.043**
TT13				0.00	0.00	0.019**	0.00	0.00	0.052*
TT14				0.00	0.00	0.87	0.00	0.00	0.99
Nr.Observations		226			231			457	
Nr. Countries		21			21			21	
F stat		2.690			2.33			3.63	
Within R-squared		0.21			0.18			0.21	
Test statistic		3.96			7.04			6.83	
p-Value		2.5933E-07			1.75E-14			2.45E-16	
Observation					constant significant at 5% level				

41

5.3 AGFDI Equations

5.3.2. AGFDI

      Results for agricultural FDI show similarities to FDI outcomes in equations one

and two . The population variable as a proxy for economic size was statistically

significant with the expected positive sign (Table 5.3). The share version also displayed

the expected sign for the energy import variable as well as for the infrastructure proxy

(Table 5.4). The forest land variable was statistically significant and with the expected

negative sign for both the share and log model (Tables 5.3 and 5.4). The agriculture

value-add variable was negative as opposed to expectations. With regards to the

possible influence of any specific years on the regression outcome, in the share model

all years were statistically significant from 2015 while in the log model only 2010 was

statistically significant. The R-squared of these AGFDI equations are higher than those

of equations one and two, likely due to the shorter time frame.

Table 5.3 AGFDI Flow (logs; no mining)

	2009-2015		
	Coef.	S.E.	p-Value
MAAGLANDperc	-0.719	0.429	0.103
MAFORLANDperc	-1.034	0.549	0.068*
MASchoolPerc	-0.010	0.089	0.915
MACEL	0.053	0.041	0.207
MAENIMPperc	-0.021	0.018	0.263
MAExConst	4.384	2.710	0.116
l_MAAGVAUS	-6.946	9.753	0.482
l_MAEXPOUS	3.651	9.779	0.711
l_MATRAUS	-4.095	11.565	0.726
l_MAGDP11	7.837	14.668	0.597
l_MAPOP	86.516	38.592	0.032**
TT09	8.098	4.892	0.108
TT10	6.882	3.950	0.091**
TT11	4.954	3.045	0.114
TT12	3.594	2.204	0.113
TT13	2.269	1.468	0.132
TT14	0.938	0.770	0.232
Nr.Observations		58	
Nr. Countries		9	
F stat		1.450	
Within R-squared		0.435	
Test statistic		2.142	
p-Value		0.060	
Observation		Constant at 10% level significant	

Table 5.4 Subsample 2 AGFDI flows (share; no mining)
AGFDI Share

	2009-2015		
	Coef.	S.E.	p-Value
MAAGLANDp	0.011	0.024	0.649
MAFORLANDp	-0.052	0.023	0.031**
MASchoolp	-0.005	0.007	0.423
MACELp	0.011	0.002	0.0000008***
MAENIMPp	-0.002	0.001	0.061*
MAExConst	0.001	0.002	0.508
MAAGVAp	-0.317	0.127	0.017**
MAEXPOp	-0.006	0.021	0.785
MaTRAp	0.008	0.013	0.529
MAGDPgrp	0.020	0.016	0.218
l_MAPOP	0.129	0.032	0.0002***
TT09	0.015	0.003	0.0000007***
TT10	0.012	0.002	0.00001***
TT11	0.009	0.002	0.00001***
TT12	0.006	0.001	0.00003***
TT13	0.004	0.001	0.00005***
TT14	0.001	0.001	0.045**

Nr.Observations	63
Nr. Countries	9
F stat	3.86
Within R-squared	0.6394
Test statistic	5.3525
p-Value	0.0002
Observation	Constant at 1% level significant

CHAPTER VI: SUMMARY AND DISCUSSION

Foreign direct investment inflows to developing countries are important for their development. To increase them, policymakers need to understand what are the determinants of foreign direct investment. Further, it is important to manage foreign capital inflow according to each country's development strategy. This study examined FDI determinants for a sample of 21 developing countries, with focus on Latin America. In addition to the main sample, a 13-country dataset to investigate the determinants of FDI in agriculture.

The use of country fixed effects was found to be appropriate for the panel data obtained. Also the use of time dummies for each year instead of an individual linear time trend variable was appropriate to capture several global macroeconomic events.

Results for FDI determinants are consistent with previous studies and confirm traditional variables such as economy size, infrastructure and trade openness as increasing FDI. A new variable introduced measuring energy imports as a share of total energy usage, was statistically significant and negative. When subsamples were analyzed, statistical significance varied between the two decades. Findings show that in the 1990s export and trade were the main determinants for Latin America based upon fiscal policy adaptations on the way to market liberalization. Constraints on the executive and economic growth were the main determinants for the second decade that could be consistent with the agricultural commodity boom and changing governments after defaults in Brazil and Argentina.

For further analysis, it is important to test the energy import variable in a nonlinear form. Many countries import energy, especially oil and do not automatically experience constraints to their development. It would be interesting to test for the minimum threshold of energy imports in relation to FDI by changing the functional

form of this variable. Productivity losses and rising production costs are major issues in LATAM and should be included in future studies on FDI.

As for the AGFDI samples, once mining related FDI was excluded from AGFDI inflow, economy size (share and log model), energy import(share model), infrastructure (share model) and forest land percent (share and log model) and agriculture value-added (share model) are statistically significant with their expected sign except for the value-added variable. A possible interpretation for this could be that the less exploited this part of the value chain within the host country is, the higher potential for margin and growth and hence the more attractive for foreign investment.

Further analysis is required including more countries and widening the time-period, to create more robust analysis for AGFDI. Crucial will be to gather data for separate total flows; inward and outward flows. Additionally, a comparison between the data gathered for AGFDI determinants from central banks and other databases such as fDi Markets could be very useful. Proxies for productivity loss and production cost should be included in future studies. Finally, it is crucial to better understand the impact of AGFDI on the society and the environment.

BIBLIOGRAPHY

Alarcón Osuna, Moisés A. "Human Capital Formation and Foreign Direct Investment: Is it a nonlinear relationship?" *Acta Universitaria* 26, no. 4 (2016): 66–78. Accessed November 10, 2016. doi:10.15174/au.2016.1032. http://content.ebscohost.com/ContentServer.asp?T=P&P=AN&K=118335670&S=R &D=fua&EbscoContent=dGJyMNLe80Sep644zOX0OLCmr06eqK5SsKi4SraWxW XS&ContentCustomer=dGJyMPLf7Hnk5bmF39%2FsU%2BPa8QAA.

Alexandratos, Nikos and Jelle Bruinsma, eds. "WORLD AGRICULTURE TOWARDS 2030/2050: THE 2012 REVISION." Special issue, *ESA WORKING PAPER* 12, no. 03 (2012).

Awokuse, Titus O., and Ruizhi Xie. "Does Agriculture Really Matter for Economic Growth in Developing Countries?" *Canadian Journal of Agricultural Economics/Revue canadienne d'agroeconomie* 63, no. 1 (2015): 77–99. doi:10.1111/cjag.12038.

Biswas, Romita. "Determinants of Foreign Direct Investment." *Review of Development Economics* 6, no. 3 (2002): 492–504. doi:10.1111/1467-9361.00169.

Calderón, Álvaro, Martha Cordero, Olaf d. Groot, Jorge, Mario Martínez, Javier Meneses, Miguel P. Ludeña et al. *Foreign Direct Investment in Latin America and the Caribbean 2012.* Foreign Investment in Latin America and the Caribbean. Report. s.l.: ECLAC, 2013. Accessed June 12, 2017. http://repositorio.cepal.org/bitstream/handle/11362/1152/S2013382_en.pdf;jsessioni d=6816AD22E5C72DDE9EEA072663452E16?sequence=1.

Campos, Nauro F., and Yuko Kinoshita. *Foreign Direct Investment and Structural Reforms: Evidence from Eastern Europe and Latin America*. International Monetary Fund, 2008; IMF Working Paper.

Duff, Andy, and Andres Padilla. "Latin America: agricultural perspectives." Accessed June 16, 2017. https://economics.rabobank.com/publications/2015/september/latin%2Damerica%2 Dagricultural%2Dperspectives/.

Dutta, Nabamita, and Sanjukta Roy. "WHAT ATTRACTS FOREIGN DIRECT INVESTMENT: A CLOSER LOOK." *Economic Affairs* 29, no. 3 (2009): 81–86. doi:10.1111/j.1468-0270.2009.01925.x.

Fiedler, Yannik, and Massimo Iafrate. "Trends in foreign direct investment in food, beverages and tobacco." News release. 2016.

Ganiou Mijiyawa, Abdoul'. "What drives Foreign Direct Investment in Africa? An Empirical Investigation with Panel Data." *African Development Review* 27, no. 4 (2015): 392–402.

Hasli, Anita, Nurhani A. Ibrahim, and Catherine S. Ho. "The Effect of Financial Crisis and Macroeconomic Factors on FDI in Developing Countries." *International*

Journal of Economics and Financial Issues 7, no. 1 (2017): 31–36.
http://www.econjournals.com/index.php/ijefi/article/download/3091/pdf.

Heumesser, Christine, and Erwin Schmid. "Trends in Foreign Direct Investment in the
agricultural sector of developing and transition countries: A Review."

International Monetary Fund. "Balance of Payments Manual (BPM5)."
https://www.imf.org/external/np/sta/bop/bopman5.htm.

Kolstad, Ivar, and Espen Villanger. "Foreign Direct Investment in the Caribbean."
Development Policy Review 26, no. 1 (2008): 79–89. doi:10.1111/j.1467-
7679.2008.00399.x.

Lall, Pooran, David W. Norman, and Allen M. Featherstone. "Determinants of US
direct foreign investment in the Caribbean." *Applied Economics* 35, no. 13 (2003):
1485–96. doi:10.1080/0003684032000100382.

Li, Xiaoying, and Xiaming Liu. "Foreign Direct Investment and Economic Growth: An
Increasingly Endogenous Relationship." *World Development* 33, no. 3 (2005): 393–
407. doi:10.1016/j.worlddev.2004.11.001.

Hiller, Lisa. "Costa Rica and Paraguay team up to achieve sustainable and low-carbon
meat sectors." Accessed June 16, 2017.
http://www.undp.org/content/gcp/en/home/presscenter/articles/2016/06/23/costa-
rica-and-paraguay-team-up-to-achieve-sustainable-low-carbon-meat-sectors.html.

Marshall, Monty G. "Polity 5 Project: Dataset User's Manual."
http://www.systemicpeace.org/inscr/p4manualv2015.pdf.

Sekkat, Khalid, and Marie-Ange Veganzones-Varoudakis. "Openness, Investment
Climate, and FDI in Developing Countries." *Review of Development Economics* 11,
no. 4 (2007): 607–20. doi:10.1111/j.1467-9361.2007.00426.x.

Silajdzic, Sabina, and Eldin Mehic. "Absorptive Capabilities, FDI, and Economic
Growth in Transition Economies." *Emerging Markets Finance and Trade* 52, no. 4
(2015): 904–22. Accessed November 10, 2016.
doi:10.1080/1540496X.2015.1056000.

Studenmund, A. H. *Using Econometrics: A Practical Guide*. 6th ed. Addison-Wesley,
2011.

UNCTAD. "Global Investments Trends Monitor: Global FDI Flows slip in 2016,
Modest recovery expected in 2017."

USDA. "World Agriculture Production." June (2017). Accessed June 16, 2017.
https://apps.fas.usda.gov/psdonline/circulars/production.pdf.

Williams, Kevin. "Foreign direct investment in Latin America and the Caribbean: An
empirical analysis." *Latin American Journal of Economics* 52, no. 2 (2015): 307–41.
doi:10.7764/LAJE.52.1.57.