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Spring 5-1-2012

## The Effects of Foreign Direct Investment on Sovereign Debt Sustainability in Latin America

Oriana I. Fuentes

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# **The Effects of Foreign Direct Investment on Sovereign Debt Sustainability in Latin America**

A Capstone Project Submitted in Partial Fulfillment of the  
Requirements of the Renée Crown University Honors Program at  
Syracuse University  
and the  
Program of Distinction in Economics at Syracuse University

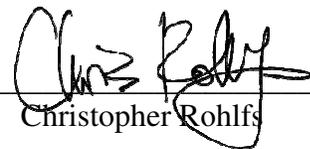
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May 2012

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## Abstract

Sovereign debt has been a central political issue in Latin American nations for many years, especially considering the region's long history of defaults and restructurings. Finding ways to grow sustainably at manageable levels of indebtedness has certainly been a challenge, especially with the large number of factors that play into how a nation finances itself and its growth. One of these factors, foreign direct investment (FDI), has attracted significant attention after countries became more politically stable and protective of investor interests in the early 1990s. As a result, inflows of FDI have grown at record levels reaching over \$112 billion in 2010, up from around \$30 billion in 1995 (World Bank, 2011).

This project sets out to explore a possible relationship between sustainable growth in Latin America and the high levels of foreign direct investment entering the region, especially within the past twenty years. In order to do so, it examines the causality between the ratio of total debt to gross domestic product (GDP), and three different measures for FDI. The first measure is based on the nominal inflows of FDI into a country, the second and third are indexes based on extraordinary quarters of FDI inflow, either significant quarter on quarter (QoQ) growth or large aggregated individual FDI transactions per quarter.

Regressions suggest that there is an inverse relationship between nominal FDI and the natural logarithm of the debt to GDP ratio. To reduce the debt to GDP ratio from 29% (current average for the South American and Caribbean regions) to 21% about an \$2.34 billion increase in FDI inflows is required. This relationship could be explained through increases in tax revenue from transactions. Another plausible mechanism is the improvement of market sentiment on the economic wellbeing of a nation from seeing significant monetary commitments from foreign firms to a country. This may reduce interest rates at which a country rolls over its debt making it less burdensome to sustain. These findings, however, are not supported by a relationship between debt to GDP and the two indexes of extraordinary FDI transactions. This could be attributed to a lagged effect, as only announcement dates of transactions are being considered in an effort to gauge whether market sentiment surrounding meaningful FDI events is largely affecting the economy.

Further research could examine large transactions more closely and their effect on generic 10-year bond rates for a country to see whether investment aids perception on a country's creditworthiness. Another method could include a similar study in regions such as south-east Asia, which has also seen significant inflows of foreign capital over the past decade.

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## Acknowledgements

To all of those who have walked with me down this path,  
Who listened,  
Who shared,  
Who advised.

Thank you for all of your patience, honesty and friendship.

## Advice to Students

***On research.*** By all means, you will find what you're interested when you just so happen to be looking for what you *think* you're interested in. Shift through books, journals, and articles until you stumble over something that makes you stop, look up and wonder. Some have more of these moments than others, but it is these moments that define what you'll be truly thrilled to read more about for the months going forward.

***On school.*** Those you will learn from are not exclusively standing in front of a classroom, lecturing. They will be sitting next to you in class, at a coffee shop, on the quad, in an office or where you volunteer. Listen carefully, for everybody has something valuable to say. Soak up the moments where you are exploring the world around you. As a student of life, you should also be a teacher – knowledge and experience that isn't shared becomes self-defeating.

***On life.*** Stop and look around at what's happening around you, take in today like a work of art you discover for the first time, with surprise, illusion and a renewed passion for the world yet to be known. It is too often that we miss out on life, slow down and enjoy the simple things.

## I. Introduction

The following study explores the effect of foreign direct investment (FDI) on the sustainability of sovereign external debt in Latin American nations. The over \$1 trillion of total debt in the continent has become a significant part of the region's political agenda, especially considering a long history of significant defaults and restructurings, such as Argentina in 2002, Ecuador in 2000 and Uruguay in 2003. There are several definitions of what sustainable debt entails. However, at heart, a sustainable amount of debt is that which will be serviced and repaid according to the terms of the contract. Although there is literature available on the meaning of sustainable debt and optimal debt positions, few explore how either of these evolves with macroeconomic changes in the economy. In light of the extraordinary levels of FDI flowing into the region, this study seeks to examine whether FDI has any influence in moving a country's total debt position toward a more or a less sustainable one. In order to do so, FDI over years 1990-2012 is modeled in three different ways.

External sovereign debt is undertaken as a means to remedy the difference in between levels of national savings and those of investment (McDonald, 1982). In general, sovereign debt is serviced and repaid over a number of years and then rolled-over at an interest rate which reflects the current credit risk outlook for the country in question.

FDI and sovereign debt are covered by literature extensively, independently from each other. FDI is a flow of capital into a country which

provides direct capital financing and a series of productivity benefits such as introducing foreign technology, training, and new processes. FDI promotes economic growth through development, job creation and modernizing an industry (Alfaro et al. 2006). FDI is a means of acquiring a long term interest in the performance of an entity in a foreign country. This is done by exerting some degree of control over the enterprise through ownership (Rivera-Batiz, 2000). Latin American countries have become increasingly dependent on FDI in the past couple of decades. In the late 1980s and 1990s many of these nations went through a process of liberalization, including changes in regulation governing trade and investment. As a consequence, FDI levels rose to becoming the most significant form of foreign capital into Latin American countries (Rivera-Batiz, 2000).

With a significant surge in FDI, governments gain other forms of income such as tax revenue. This could help growth while sustaining lower levels of debt, yet achieving the same results. Significant involvement of foreign firms in a country may also serve as a market indicator of the stability of the economy and may contribute to lowering interest rates, making it easier to rollover debt.

Historical levels of GDP, FDI, external debt and average interest rates were drawn by country from Bloomberg, Capital IQ, the World Bank's and Central Banks' databases. These were drawn for a selection of countries which excluded those with economic and political ambiguities, such as Cuba. Aside from macroeconomic indices, individual transactions in the region that represent FDI inflows were drawn from Capital IQ. Two indexes were created with

information on transactions and quarter-on-quarter (QoQ) growth in FDI. These two measures track both occurrence and recency since quarters where significant FDI events took place.

The natural logarithm of the debt to GDP ratio is modeled by a linear regression with nominal FDI while controlling for country specific time trends. The controls are modeled by a constant C, which accounts for characteristics that are inherent to a country. The controls also account for changes over time that may affect the entire region.

It appears that nominal FDI inflows have an effect on the GDP ratio. To reduce the debt to GDP ratio by 5% within moderate levels of debt (25-10% of GDP) an increase in \$1.5 to 2 billion dollars of FDI is required.

The relationship above is not supported by regressions with the two indexes which track quarters with significant changes in amount of FDI or significant amount of accumulated individual transactions. This may be due to a lag in the effect of transactions, as the index is based on announcement dates. This means market sentiment shortly after a transaction is announced might not have a significant effect, instead, these transactions could be modeled using closing dates where capital has actually entered the economy. There may also be a lag in the time until foreign capital flows actually have an effect in the economy in a way that may actually impact liquidity.

The following segments of the study include an outline of key institutional factors surrounding the work, contained in Section II, then a

description of the dataset, and preliminary results in Section III. This is followed by Section VI which describes the model used to assess the effect of FDI on sovereign debt. Section V discusses results and finally, Section VI draws conclusions and potential further studies on the topic.

## **II. Key Institutional Factors**

A sustainable debt position would ideally be modeled by calculating the present value of all expected future debt service payments, and then, ensuring current resources are sufficient and growing at a pace fast enough to cover these obligations. However, due to the high uncertainty of these future cash flows at a country level these calculations may prove futile. Instead, authors explore different proxies for current debt position in terms of relative levels to total debt or debt service to total output. A sustainable ratio of debt to GDP is one that does not grow constantly (Roubini, 2001). Another approach is evaluating changes in debt servicing. Higher levels of debt servicing are an indicator of both high levels of debt as well as of high interest rates. As these two trend upward, sovereign debt becomes burdensome and its marginal benefit decreases compared to that of other forms of capital.

Entities that decide to engage in FDI transactions abroad are looking for a medium to long term commitment to a region and an industry, this is usually due to availability of resources or low cost of labor. In order to do so the investor must exert significant control or ownership over the venture. After governments in

Latin America became more protective of the interests of foreign firms in their countries at the end of the 1980s and early 1990s there was a surge in FDI into the region. Prior to this Latin America's economic instability and volatile interest rates deterred firms from investing in the region, financial reforms stabilized the economy making the investment climate far more appealing. "By the end of the decade, FDI was the major source of foreign capital in Latin America, greatly exceeding the value of financing obtained through emerging stock markets, bank borrowing, and other forms of external finance" (Rivera-Batiz, 2000).

FDI is evaluated in three ways in the following study: first, on a nominal basis, as quarterly inflows into a country; second, as an index that tracks significant QoQ changes in a particular country (changes outside one standard deviation from the mean of FDI growth); finally, as an index that tracks quarters with extraordinary inflow of specific FDI transactions into a country. Due to the fact that each country has its own policies with respect to FDI, controls for country fixed effects and country-specific time trends will be included.

### III. Data

#### Data Description

##### *Data Source 1: Capital IQ*

In order to provide more granular insight to the behavior of an economy surrounding significant inflows of FDI, individual corporate transactions were obtained to create an FDI activity index.

Capital IQ is database owned by Standard & Poors's. Their "platform combines deep global company information and market research with powerful tools for fundamental analysis, idea generation, and workflow management" (Capital IQ, 2012). They provide financial information on public and private entities, ranging from corporations to sovereign nations. Their service is used by investment banks and money managers to research investment opportunities, understanding the market and other data required for financial services.

Part of the database's functionality includes access to information on historical transactions. These transactions can be screened according to their total value, type, announcement date, geographic location, and so forth. For the purposes of this study, historical transactions between the years 1990 and 2012 where the target corporation was located in Latin American countries were obtained, including information on total transaction value, relevant days and information on the buyers, sellers and target.

Individual transactions and their values will be used as an indirect measure of FDI. Individual transactions, especially the most significant ones, often receive attention from the media and can generate a hype in the market in regards to the investment climate in a particular nation or industry. High profile transactions draw attention to the nation's economy, attracting more FDI activity as well as being a good indicator for the country's economy, potentially lowering its credit risk profile. Therefore, using large transactions as a measure of FDI will account for actual inflow of capital into a nation but also will have the added benefit of capturing effects from market sentiment.

After downloading all of the transactions and company events in the two regions, those which were private placements, and merger and acquisition activity were retained, since IPOs and shelf registrations do not comprise FDI activity. After this, all transactions in which the target corporation and the buyers were in the same country were dropped, because these do not represent flows of foreign capital. The total value of these transactions was aggregated per quarter in which they were announced. The biggest ten quarters by total transaction inflow per country were chosen and used to create an FDI activity index. Aside from accounting for the actual flows of foreign capital into an economy, these large quarters will be used to create an index which accounts for occurrence of transactions and recency (Fig. 2). Announcement dates in the transactions are used as a time frame in order to measure for market sentiment surrounding the initiation on an investment process.

Information on transactions in a region is limited to the content provided by Capital IQ, which may not be exhaustive, however, due to the fact that the index is considering largest transactions there is a higher possibility that most of them are available in the database.

*Data Source 2: Bloomberg Professional Economic Indices*

Bloomberg Professional is financial services database, a segment of Bloomberg L.P which is a mass media and data provider. Bloomberg offers access to a large amount of both real-time and historical data on companies, governments and financial securities. Their terminals give users access to financial information, news, analytics, communications, charts, liquidity, as well as execution services. They gather data from a wide variety of sources including stock exchanges, the Securities and Exchange Commission (SEC), central banks and other international organizations such as the World Bank and news from a variety of sources including their in-house news line of business (Bloomberg, 2012). This database is a research tool used in the finance industry as well as trading platform which some small to medium money managers use for portfolios.

Bloomberg has a wide variety of economic indices and indicators specific to different countries and regions. Historical values for 1990-2012 of quarterly GDP, debt, FDI, risk ratings, USD exchange spot rates and interest rates were drawn for each country. This was done in order to gain more insight than that provided by the World Bank, which was mostly yearly information.

The data from Bloomberg is going to be used for measures of nominal GDP and debt, these will be used to generate a ratio of both. Also, nominal FDI will be used as the first measure of FDI before diving into assessing the two other indexes. Exchange rates are used to have all variables available in USD.

All of the measures were put in terms of billions of USD. Then, the historical ratio of debt to GDP was calculated. From the flows of nominal FDI, historical quarter on quarter (QoQ) growth was calculated, and then, the quarters which experienced growth rates one standard deviation outside the mean growth were deemed to be extraordinary. These extraordinary quarters were used to create an index which tracks occurrence and recency of significant FDI events in a country (Fig. 2).

Some of the data for the period being examined has gaps, possibly due to changes in central bank data reporting. In some cases, there may be variation from country to country in the method used to calculate total debt or GDP, and so forth. This could create a bias, however, most of the historical information should still be internally consistent and can be controlled for through country fixed effects.

### *Data Source 3: The World Bank*

The World Bank Group is an international organization with the missions of reducing poverty and supporting development. This is done through two institutions, the International Bank for Reconstruction and Development (IBRD) and then International Development Association (IDA). They provide low-interest

loans, interest-free credits and grants to developing countries. They also provide support through policy advice, research and analysis, and technical assistance (World Bank, 2012).

Their Open Data Website offers countrywide economic and development indicators as a means of supporting public knowledge and information transparency. From here, panel data for a selection of countries were obtained. This included real and nominal GDP, FDI inflow, total external debt, total debt service, total interest payments, principal repayments and average interest rate on new debt commitments.

Due to the fact that data from the World Bank is more homogenous in terms of units, currency type, and accounting and reporting methods it was used as a method of corroborating data obtained from other sources, such as Bloomberg.

Since data from the World Bank is only yearly, it cannot be used directly in the study because it won't give deep insight into smaller variations over time. However, yearly totals for FDI, total debt and GDP were compared to individual historical indices obtained from Bloomberg to check for accuracy.

World Bank data is fairly complete and consistent, it is, however, only available on a yearly basis which is probably a frequency too large to see effects over time with variations in FDI.

#### *Data Source 4: Central Banks*

Central Banks are government organizations that are in charge of regulating a nation's monetary policy by managing the currency, money supply and interest rates. They collect relevant macroeconomic data which is shared internally and with other global organizations such as the International Monetary Fund (IMF) or the World Bank.

Information obtained from different Central Banks was used as a means of examining a country's accounting policies for the information they disclose. Central Bank websites were also used to inspect for additional information that may be relevant to the study.

#### Descriptive Results

An initial method of assessing the data obtained for the study, sample means were taken to gauge the size of investments and of current debt to GDP ratios in the region. Specific cases of FDI transaction were also reviewed to gain better insight into which areas were investing in the region and in which industries. Finally, prior to modeling debt to GDP ratio with regressions, the ratio was graphed against the FDI indexes to see if there was any visible relationship between the two.

Total debt per country for the sample varies between 10% and 46% of GDP, averaging 29%. This is a significant improvement from the early 2000s where countries such as Argentina and Bolivia had debt balances over 100% of

GDP. The transactions included in the study vary from \$30.7 billion to \$722 000, averaging almost \$3 billion. These FDI transactions also vary across industries and country of origin. For example transactions include the acquisition of Argentine oil exploration and production firm Occidental Argentina, by Chinese conglomerate SINOPEC in 2010, or acquisition of Brazilian steel-maker Companhia Siderurgica Nacional by American The AES Corporation.

After examining plots of the debt to GDP ratio (Fig.3 and Fig. 4) and the index of quarters with significant FDI transactions, it seems that periods where high volumes of FDI inflows are present there is a drop in the debt to GDP ratio, this is particularly clear in the case of Argentina and in some periods in Brazil.

#### **IV. Model**

The regression for debt to GDP ratio is going to be modeled in the following way:

$$\ln(\text{debt:GDP}_{it}) = \beta_0 + \beta_1 * FDI_{it} + C * x_{it} + u_{it}$$

The equation above describes the relationship between inflows of FDI into a country in billions of USD and the natural logarithm of the ratio of total debt for a country to GDP, both also in billions of USD. Both FDI and the ratio of debt to GDP are evaluated on a quarterly basis starting the first quarter of 1990.  $C * x_{it}$  represents controls for country fixed effects and country-specific time trends.

These controls are a means of accounting for specific characteristics of a country, and time-trend controls are a means of accounting for characteristics of each time period that may have affected the region as a whole.

The coefficients obtained from linear regression imply that there is an inverse relationship between positive inflows of FDI into a nation and the ratio of debt to GDP similarly to what we could see in some of the initial graphs (Fig. 3 and Fig. 4). This is also consistent with the expectation that increased investment in a nation will improve its state of indebtedness relative to growth.

## V. Results

It appears that nominal inflows of FDI have an impact in reducing the debt to GDP ratio by 5% with an increased in \$1.5 to \$2 billion invested at moderate levels of debt (25%-10%). This may suggest that inflows of FDI enable a country to grow without taking on more debt, and may also provide liquidity through mechanisms such as tax revenue to pay down part of the obligations.

These results are statistically significant but are not supported by the results obtained from regressions on the transaction indexes, as these show a positive relationship with the debt to GDP ratio. This may be because of the way the indexes are modeled. The index tracks both occurrence and recency of significant transactions, perhaps there is a lagged effect after each transaction that has an effect on the economy. Another possibility is that announcement dates do not have a significant effect, but rather, closing dates on transactions are more impactful on

the economy. This might be due to a lag in the effect of significant FDI flows into the economy.

Out of other regressions performed, regression of significant FDI transactions on the debt to GDP ratio is also statistically significant the interaction between transaction monetary values and the transaction index does show results which are both expected and statistically significant. This regressor may better account for the size of the transactions (while still accounting for occurrence and recency). This is statistically significant when controlling for country fixed effects, it is likely that specific time-trends is not an adequate control for this measure due to the lagged nature of the index.

Other potential regressions may include evaluating how risk ratings evolve over time with significant changes in FDI inflows. Or assessing how interest rates might be affected around very large transactions to gain better insight into how market sentiment changes with foreign investments.

## **VI. Conclusion**

This study consists of an exploration of potential benefits of FDI aside from spillovers effects in productivity and technology. Large volumes of FDI, especially like in the case of Latin American countries, may present some liquidity benefits. The results are particularly interesting due to the surge in investment in emerging markets in recent years. Policies favoring FDI, such as tax benefits, and regional trade agreements (RTAs) may bring additional influx of

capital. Finding other benefits will shed light on how far these policies can go aside from creating opportunities and development at the micro-level.

Due to the fact that this study was an initial exploration of a potential relationship between FDI and sovereign debt, controls were limited to the essential accounting for country-specific effects and time trends. However, other factors could be modeled, especially if countries are examined on an individual basis. For example, an indicator for financial crisis which accounts for severity and type of crisis should be included to incorporate the economic irregularity that a crisis represents. Other factors that could be controlled for are belonging to regional trade agreements or accounting for significant changes in FDI policy.

Further research could involve comparing Latin America to investment growth in Asian regions which have recently experienced significant growth in commitments of foreign capital. Other variables that can be examined are generic interest rates on 10-year bonds and refinancing rates to roll-over debt to gauge the way in which market sentiment surrounding large investments in a country may impact the overall economic environment of a country.

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### Appendix

Fig. 1 Regression Table for the natural logarithm of debt to GDP

		(1)	(2)	(3)	(4)	(5)	(6)	7	8
FDI_nominal	Coefficient	-0.03167**	-0.13820**					-0.03577**	-0.01894**
	Robust S.E.	0.00941	0.00565					0.00931	0.00593
FDI_QoQ				0.33227**	0.01714**			0.02980**	0.01341**
				0.00655	0.00654			0.00762	0.00633
FDI_Transactions						0.01250	0.01641**	0.00821	0.01093**
						.00786	0.00561	0.00762	0.00518
<b>Controls</b>									
Country and Quarter Fixed Effects		Yes		Yes		Yes		Yes	
Country-specific Trends			0		Yes		Yes		Yes

\*\* Indicates significance at the .05 level

FDI\_nominal in billions of dollars. FDI\_transactions represents activity index for 10 quarters with the highest FDI transaction volume.

FDI\_QoQ represents activity index for QoQ percentage changes one st.dev outside mean change.

Fig. 2 Building an FDI index

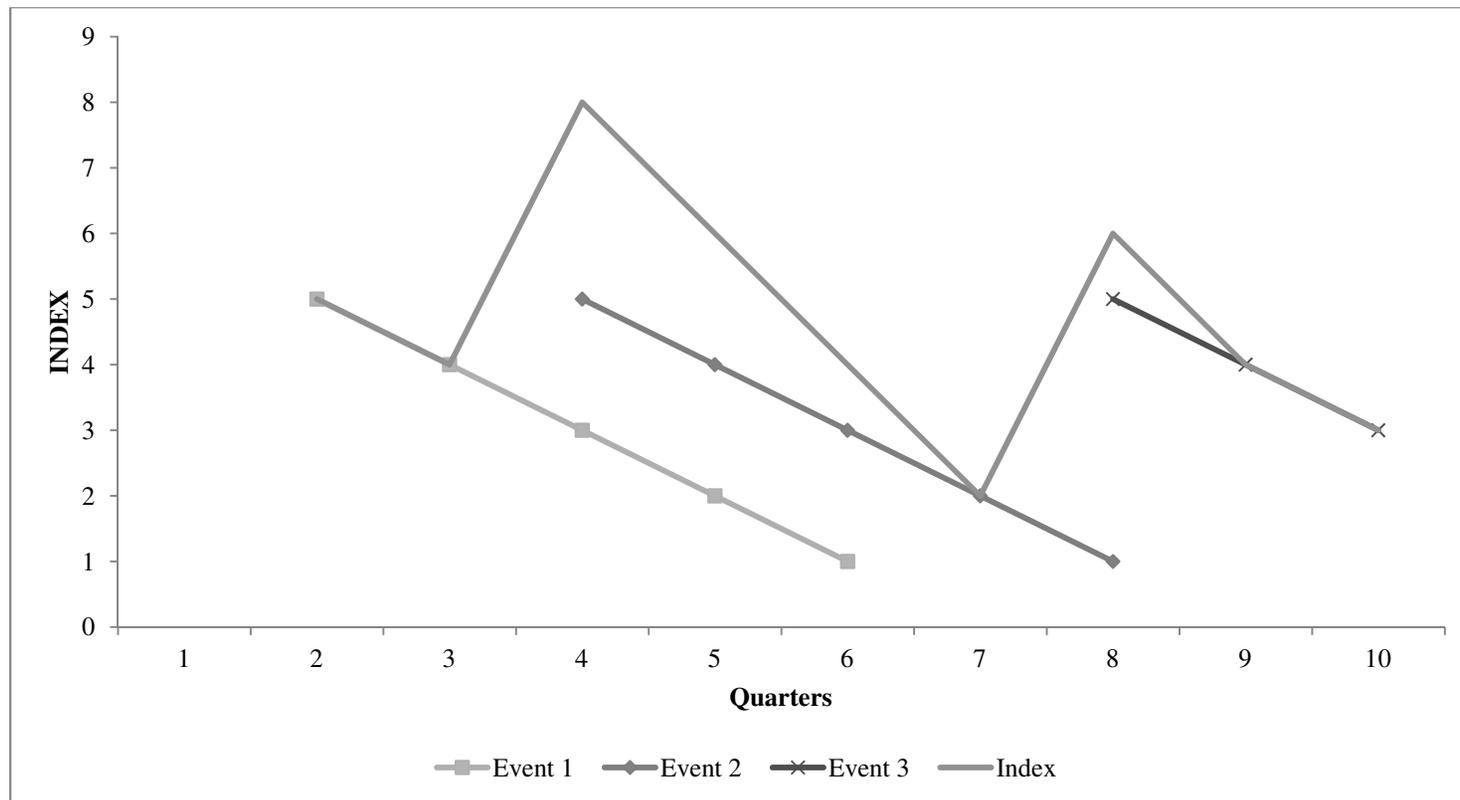


Fig. 3 FDI and debt to GDP in Argentina

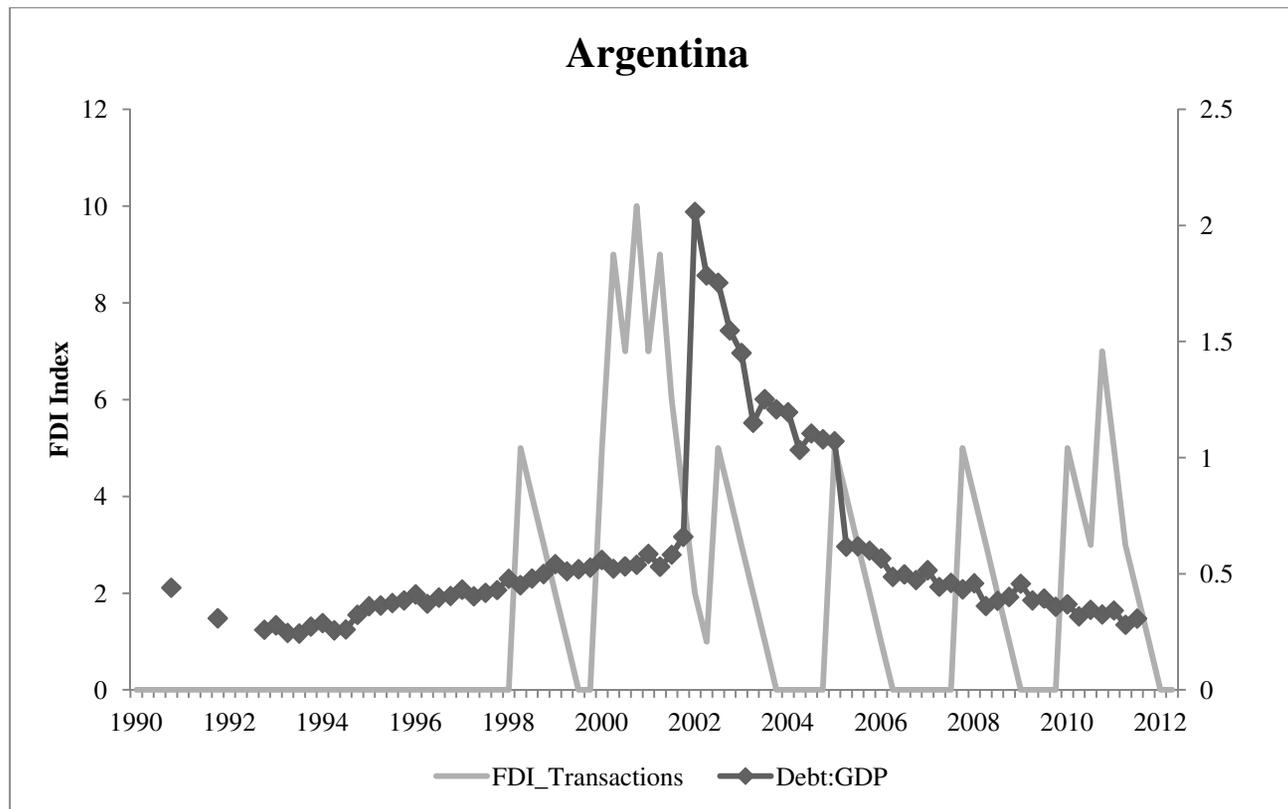
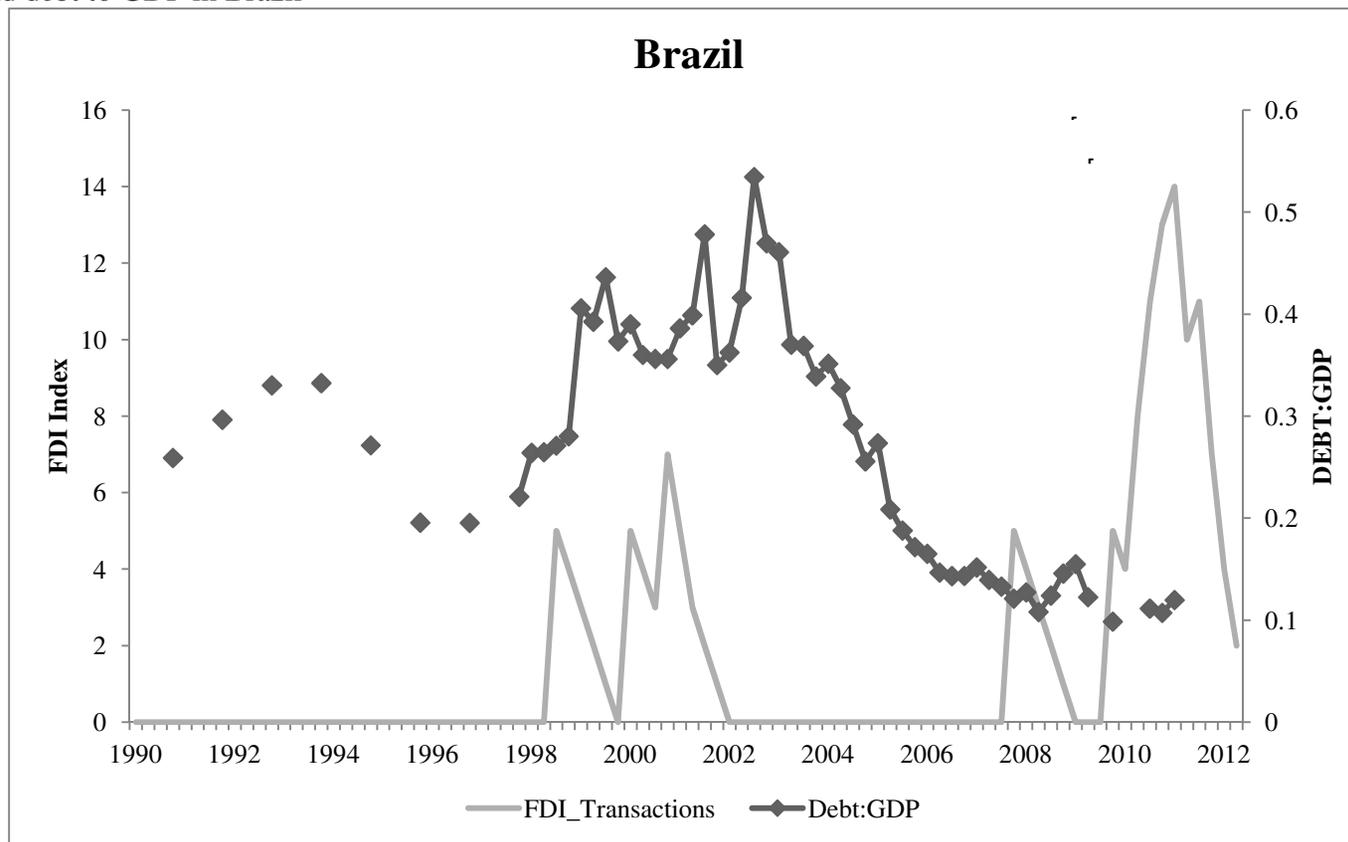


Fig. 4 FDI and debt to GDP in Brazil



## **Summary**

Oriana I. Fuentes

Honors Capstone / Distinction Thesis in Economics

Summary

Advisor: Chris Rohlf

Reader: Fernando Diz

May 2012

### The Effects of Foreign Direct Investment on Sovereign Debt Sustainability in Latin America

This study is an exploration in econometric analysis, which aims to find a relationship of causality between two variables of interest. The analysis is based on regressing data sets and evaluating the statistical likelihood that the relationship between two variables of interest isn't due to mere chance.

More specifically, this study explores the relationship between foreign direct investment (FDI) and sovereign debt in countries in Latin America. FDI is a source of capital that originates from foreign enterprises interested in having a controlling interest in local business or resources. They achieve control by owning part of a company or exerting some form of controlling influence. There has been a significant increase in FDI since in the region since the early 1990s due to better political stability and protection of investor interests. The vast amount of resources and opportunities in these countries has also opened doors for foreign firms to participate in these economies. FDI has a series of benefits, which include bringing foreign technology and knowledge to a region, creating jobs and

contributing to the national economy. This research attempts to explore the possibility of other benefits at a macro level, specifically focusing on the sustainability of sovereign debt.

Countries take on sovereign debt to finance their activities by using funds that they were unable to obtain from the national economy. Historically, Latin American nations have had large amounts of debt which became unmanageable and resulted in defaults or in restructurings. Defaults usually occur when a country misses an interest payment on a debt obligation. Restructuring debt involves changing the terms of the contract by setting new payment schedules, amounts due or interest rates.

For the purposes of this project, data was taken from finance and international organization databases, including Bloomberg, Capital IQ, the World Bank and several Central Banks. The main measures used were quarterly inflows of FDI, quarters where FDI from individual transactions (obtained from Capital IQ) were largely significant, and quarters which experienced significant quarter on quarter growth in FDI. The last two measures were used to create activity indexes which track high levels of FDI activity in a country in an effort to see whether very significant events show more visible effects on debt sustainability. These were evaluated in terms of how they impacted the ratio of total debt to gross domestic product (GDP) for each country over years 1990-2012. Total debt to GDP is a measure of debt sustainability because it is a way of portraying how much a country can grow without undertaking more debt and interest obligations.

After regressing the ratio of debt to GDP and the three different measures of FDI, a model obtained suggests that there is an inverse relationship between the debt to GDP ratio and nominal FDI inflows, where increasing inflows of FDI by about \$2 billion reduces the ratio by about 5% at moderate levels of indebtedness (10-25% of GDP). Regressions on the two other measures of FDI, which were based off of quarters with significant swings in capital flows, do not support these initial results. It may be the case that there is a lagged effect between the announcement of individual corporate transactions in a region and an actual effect on the economy.

Findings suggest that there is a relationship between FDI and debt sustainability, however, further research should probably closely examine transactions and other factors which may be good indicators of debt sustainability, for example the interest rates at which countries can rollover or renew their debt contracts when the obligations come due. Another method would be examining this phenomenon in Asia where there has also been a significant surge in FDI over the past two decades.