



Journal of Globalization, Competitiveness  
& Governability / Revista de  
Globalización, Competitividad y  
Gobernabilidad / Revista de  
Globalização, Competitividade e  
Governabilidade

E-ISSN: 1988-7116

Gonzalez-Perez, María Alejandra; Riegler, Stephanie; Riegler, Franz Xaver  
Foreign Direct Investment (FDI) and Social Responsibility Networks (SRN) in Colombia  
Journal of Globalization, Competitiveness & Governability / Revista de Globalización,  
Competitividad y Gobernabilidad / Revista de Globalização, Competitividade e  
Governabilidade, vol. 5, núm. 1, enero-abril, 2011, pp. 42-59  
Portal Universia S.A.  
Boadilla del Monte, España

Available in: <http://www.redalyc.org/articulo.oa?id=511851326005>

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## Foreign Direct Investment (FDI) and Social Responsibility Networks (SRN) in Colombia

AREA: 2  
TYPE: Specific case

*Inversión extranjera directa y redes de responsabilidad social en Colombia*

*Investimento directo estrangeiro (IDE) e redes de responsabilidade social (RRS) na Colômbia*

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*This paper empirically examines the relationship between FDI and CO<sub>2</sub> emissions via a Vector Autoregressive Analysis (VAR) model for the 1970–2005 period in Colombia. This paper first presents the concept of Corporate Social Responsibility and defines Latin America's socio-political since the 1980s, explaining the FDI's rise in South America and how this led to the consolidation of networks Social Responsibility Networks (SRN). This paper demonstrated that there is a causal relationship in the Granger sense of the impact of FDI on the CO<sub>2</sub> emissions in Colombia. This paper provides insights for the region which could be explored in future comparative research amongst South American countries.*

*Este artículo examina la relación entre inversión extranjera directa y emisiones de CO<sub>2</sub> usando un modelo de análisis de vector autoregresivo para el periodo 1970–2005 en Colombia. En este artículo se contextualiza en la presentación del concepto de responsabilidad social empresarial, y presenta la situación socio política en Suramérica desde 1980, explicando la consolidación de las redes de responsabilidad social en la region. Este artículo demuestra una relación causal en terminos Grangerianos del impacto de la inversión extranjera en las emisiones de CO<sub>2</sub> en Colombia*

*O presente artigo analisa, de forma empírica, a relação entre o IDE e as emissões de CO<sub>2</sub> através de um modelo de Análise de vector autorregressivo para o período de 1970–2005 na Colômbia. É apresentado, em primeiro lugar, o conceito de Responsabilidade Social Empresarial e descreve a situação sócio-política da América Latina na década de 1980, explicando o aumento do IDE nesta região e como esse aumento levou à consolidação das Redes de Responsabilidade Social (RRS). O presente artigo demonstra a existência de uma relação causal no sentido de Granger do impacto do IDE nas emissões de CO<sub>2</sub> na Colômbia. São disponibilizadas sugestões para a região, as quais podem ser exploradas em futuras pesquisas comparativas entre os países da América do Sul.*

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DOI  
10.3232/  
GCG.2011.V5.N1.03

RECEIVED  
10.12.2010

ACCEPTED  
11.02.2011

## 1. Introduction

The relationship between foreign direct investment (FDI) and corporate social responsibility (CSR) has recently been made explicit by some authors (Frost & Ho, 2005; Goyal, 2006; Kolk & van Tulder, 2010; Lévy, 2007; Marchick & Slaughter, 2005), who claim that there is an evident connection between the rise of CSR and the rise of FDI since the 1990s. For instance, Goyal (2006) suggests that maybe CSR could be result of the previous surge of FDI, as a business strategy to adapt to opportunities and challenges in their external environment.

According the a survey by the Political and Economic Link Consulting (PELC) and the Ethical Corporation magazine for the World Bank Group in 2003, it was found that CSR plays a significant role factor in determining the location of multinationals activities (FDI-magazin, 2003). According to the interpretation of the agencies which carried out the survey, this study found that FDI improves environmental and labour standards and other national conditions as a consequence of CSR. This paper aims to examine a link between applying a vector autoregressive (VAR) analysis.

The social spill over of FDI in the form of the effects of multinational corporations on wages and working conditions in developing countries has been empirically tested by authors such Brown *et al*, 2004. There is abundant academic and social activism literature concerning the exploitation and mistreatment of workers by multinational firms in developing countries (Blackett, 2001; Christopherson & Lillie, 2005; Locke *et al*, 2007). Still, there is not necessarily a consensus of causality amongst the literaturebetween FDI and negative spill over (Lim, 2001; Luo, 2005; Muchlinski, 2001). Nonetheless, some authors suggest that corporate social responsibility is one of the responses to the social disparities resulting from globalisation (Blowfield, 2005; Gonzalez-Perez & McDonough, 2007; Jenkins, 2005; Matten, 2005; Swift & Zadek, 2002).

The political economy context plays a relevant role in order to understand a country's behavior internally and internationally, and with those two aspects goes along a social structure that determines the needs and capacity of such policies. Due to certain expectations in the global arena and the internal demands on better social conditions arising from these context and structures, the development of Social Responsibility Networks (SRN) (Gonzalez-Perez & McDonough, 2007) finds its space to blossom. Gonzalez-Perez & McDonough (2007: 139) define SRN as the network of civil society actors (including primary and secondary stakeholders of private companies) and state agencies that together provide a platform for the design, implementation and monitoring of initiatives to readdress the negative effects of globalisation.

The decade of the 1980s came as a lost decade in terms of economic growth for Latin America due to the external debt of the countries of the region and its lack of capacity to increase growth. However, Santamaría-Vergara (2007) even highlights the fact that the countries came to the 1990s poorer than they were in the beginning of the 1980s, all of this not only because of the debt but mainly as a result of insufficient policies and limited solutions. The privatisations along with the welcoming policies to FDI allowed MNEs to acquire enterprises in Latin America that traditionally used to be governmental monop-

### KEY WORDS

**Colombia, Foreign direct investment, Social responsibility networks, Corporate social responsibility, CO<sub>2</sub> emissions**

### PALABRAS CLAVE

**Colombia, Inversión extranjera directa, Redes de responsabilidad social, Responsabilidad social empresarial, Emisiones de CO<sub>2</sub>**

### PALAVRAS-CHAVE

**Colômbia, investimento directo estrangeiro, redes de responsabilidade social, responsabilidade social empresarial, emissões de CO<sub>2</sub>**

### JEL CODES

**M140; M160; Q530**

lies as the public services sector. Since the mid 1990s, Latin American governments looked forward to increase the FDI especially in telecommunications, health and public services sectors in order to improve the infrastructure and receive new technologies that allow better social conditions for their societies (Tresiman, 2003).

Globalisation, new concerns on environmental sustainability and interests for the improvement of social structures had made MNEs, International Organisations and Governments move towards CSR, as an alternative to Stated-driven growth. Social Responsibility Networks (SRN) emerged in the region stronger under these contexts, where the companies, the government and the societies are evidently interconnected. Besides, pasts experiences in the region had shown that a market closure and a turned back to globalisation can have more unfavorable results than the current policies, still if the downsides of globalisation, economic policies and social inequities are known. SRNs emerged within the current international settings creating a new order where the governments are not the only ones responsible for the welfare of the population, but the business firms and civil society agencies must also mitigate the harm they cause and contribute to an improvement of the societies where they are.

Increasingly, CSR has become a buzzword, possibly because it means different things to different people, and because the concept of CSR is vague, ambiguous, multidimensional and changing (Bredgaard, 2003, 2004; Garriga & Melé, 2004). As described by Bredgaard (2003) CSR is a natural feature of political decision-making that secures political support from different corners, allows for compromises and makes it possible for different actors to read their interests into political programs. Social responsibility can be used in public relations to achieve better image and reputation; and economic and management research has identified an empirical correlation between CSR and economic performance (Ahmad, 2003; Carter, 2005; Gray & Smeltzer, 1989, Griffin & Mahon, 1997, McWilliams & Siegel 2000, 2001). However, the line of causation is unclear. Bredgaard (2004) wondered if companies behaved in a socially responsible manner because of their economic success or if they became economically successful because they behaved in a socially responsible manner.

MNEs, which by definition operate and are managed across national jurisdictions, are increasingly powerful and not always accountable entities. This power and lack of accountability is reflected both at international and national levels. In order to attract and maintain FDI nations have to create favorable conditions for foreign corporations. This conflict between FDI and national sovereignty may weaken national governments and limit their regulatory actions at both the national and transnational level, explaining the shift from nation-state regulation towards alternative forms of regulation. These alternative forms rely heavily on voluntary initiatives by the MNEs which are implemented and monitored within the civil society. However, it is important to highlight that, historically, voluntary initiatives have tended to evolve into mandatory form, enforced by the law.

As it was briefly mentioned before, some authors suggest that CSR is one of the responses to the social disparities resulting from globalisation (Blowfield, 2005; Gonzalez-Perez & McDonough, 2007; Jenkins, 2005; Matten, 2005; Swift & Zadek, 2002). Hopkins (1999) suggests that in order to reverse the negative consequences of globalisation, there is a need for a 'planetary bargain' between the public and the private sectors. Continuing with the argument, Michael Edwards (2004) suggests that there is a mutual relationship between eco-

conomic actors and civil society. Edwards (2004) states that no modern society can develop and maintain sustainable social goals without access to the surplus that market economies create, and he clarifies this further by saying that “a civil society cannot survive where there are no markets, and markets need a civil society to prosper” (Edwards, 2004: 50).

Political theories (Garriga & Melé, 2004) view CSR initiatives either as emanating from the bottom up, in which enterprises are initiators; or from the top down, in which governments are initiators; and according to their focus, either on societal responsibility or on labour market responsibilities.

Another angle explaining the relationship between corporations and society is the observation that the shareholders of multinational corporations include millions of working people around the world, who through retirement plans and mutual funds have their pensions and life savings invested in the shares of corporations. It has been suggested (Davis *et al*, 2006; Stiglitz, 2006) that if the level of awareness of this ownership is increased and a systematic accountable approach to collective ownership of corporations is taken it will have positive implications on the process of state and civic involvement.

The number of critical consumers, citizens and investors is increasing. Their use of information technologies has facilitated the exposure and dissemination of information on unethical civic, political, environmental and social behaviours of corporations (Becker-Olsen *et al*, 2006; Bredgaard, 2003, 2004; Smith & Higgins, 2000). This has increased the power of the media, both to expose and to defend business practices.

Since the 1990s, the global market has required suppliers to comply with increasing regulatory and voluntary standards, imposed on supermarkets' global value chains (Barrientos & Kritzing, 2004; Codron *et al.*, 2005; Tallontire & Greenhalgh, 2005). The process of deregulation, the shrinking role of the state, the national effort to attract Foreign Direct Investment (FDI), flexible policy arrangements towards Transnational Corporations (TNCs) and challenges to conventional trade-union strategies and practices since the 1980s in many ways provide the preamble for the emergence of Corporate Social Responsibility (CSR) in the 1990s. This emergence is manifested in the proliferating of codes of conduct and other voluntary standards reflecting environmental and social commitments. Many of these standards have resulted from a civil-society backlash reflecting concerns about social, economic and environmental conditions of production (Dombois, 2003; Jenkins *et al*, 2002; Jenkins, 2005; Maitra, 1997).

Three factors have facilitated the development of the current era of CSR at the international level:

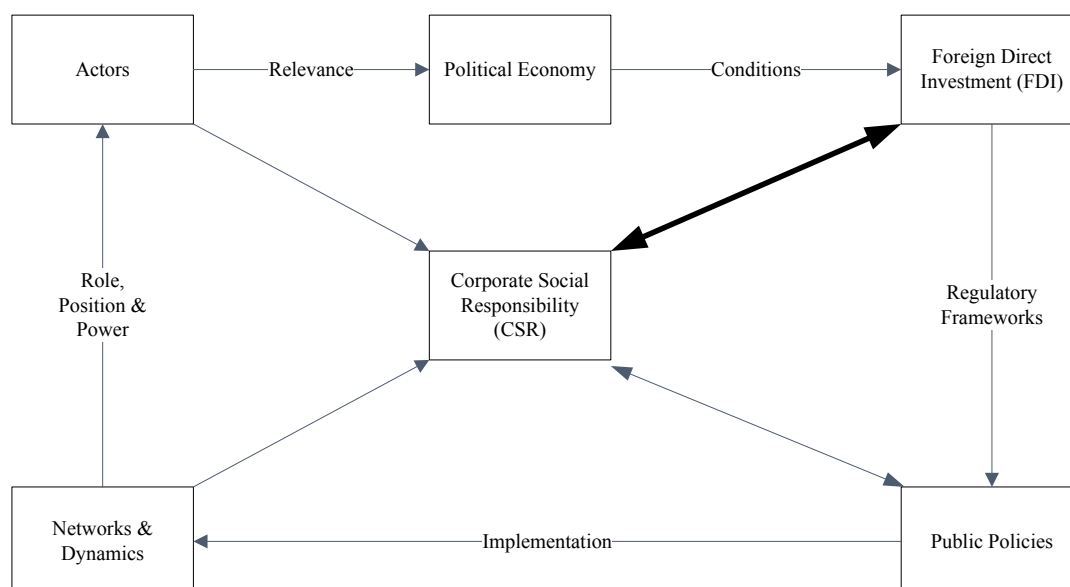
1. The formulation of the field of 'Business Ethics' by academics, policy makers and business firms since the 1960s.
2. The perceived decline in state influence in the public sphere and the consequent transposition of governing power to civil society (which has traditionally acted in the private sphere).
3. Rapid economic globalisation with its effects on societies, the environment, and business strategy.

Since the 1990s the discourse about CSR has become more prominent in managerial, governmental, policy analysis and civil society publications (Michael, 2003). During the 1990s, some firms began to recognise their role in the social welfare of their stakeholders and assume greater responsibility towards development.

The relationship between Foreign Direct Investment (FDI) and CSR is shown in Figure 1 within the framework of analysis of the present research. Goyal (2006) suggests that the relationship between FDI and CSR has been long neglected, although it can have important consequences, as for instance CSR can serve as a signaling device, changing the under-efficient outcome of a Prisoners' dilemma to cooperation as the final equilibrium outcome for companies entering the country.

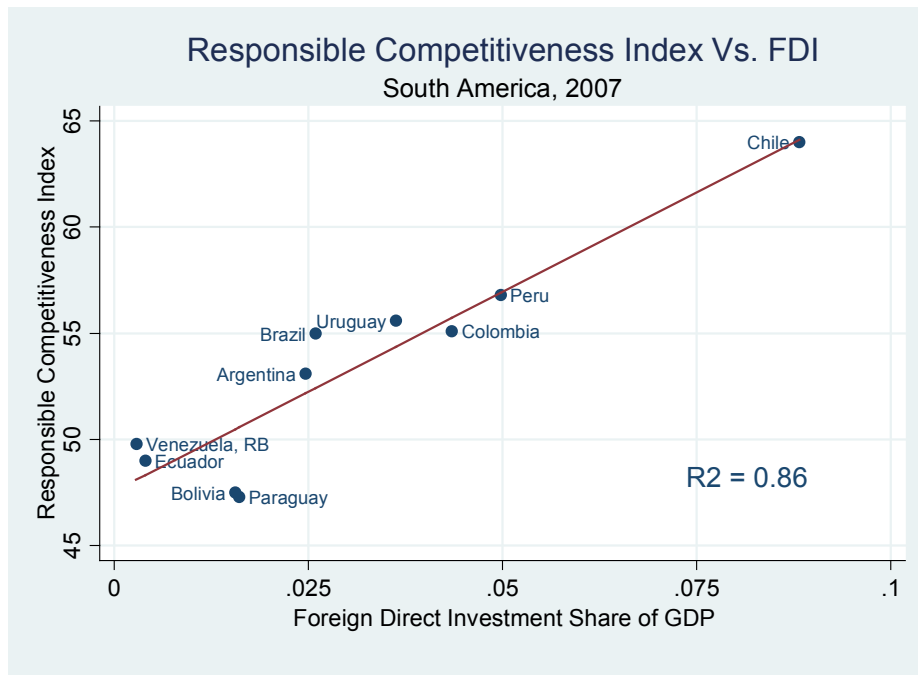
It is clear that both CSR and FDI are expected to be endogenous, because a higher level of FDI can have an increase of responsible business practices, but a higher level of social responsibility within a country can increase its attractiveness for FDI inflows.

Figure 1: CSR Analysis Framework



In order to analyze the relationship between responsible competitiveness and foreign direct investment, a simple regression analysis is applied. 2007 Foreign Direct investment flow data and GDP data are obtained from the World Bank World Development Indicators Database, both expressed in current USD. The Foreign Direct Investment data is divided by the GDP of each country.

Figure 2: Correlation between the Responsible Competitiveness Index and the share of Foreign Direct Investment in South America



Source: World bank, Accountability, Own calculations

As it is possible to observe in Figure 2, there seems to be a positive relationship between a country's responsible competitiveness and its level of foreign direct investment flow divided by the country's GDP. The regression  $R^2$  coefficient is 86%, suggesting a strong relationship. Main outliers are Bolivia and Paraguay, who have a higher level of foreign direct investment than the regression model's prediction, and Brazil, who has a lower foreign direct investment level than predicted.

At this point, it is important to highlight that the relationship between responsible business practices and FDI can be in both directions: On the one hand, responsible business practices increase the competitiveness of the country in order to attract FDI, but on the other hand, FDI can cause implementation of responsible practices. This bidirectional relationship is studied in the following section using an appropriate methodology and focusing on the  $CO_2$  level in Colombia.



## 2. CO<sub>2</sub> Emissions and FDI in Colombia: A VAR Approach

The relationship between CO<sub>2</sub> emissions and FDI is expected to be dynamic, and the effect of responsible business practices should have a delayed impact on environment contamination. Both variables are possibly endogenous; therefore a Vector Autoregression (VAR) approach seems to be appropriate.

The VAR approach has been extensively (Globerman & Shapiro, 2002; Noorbakhsh & Paloni, 2001; Singh, 1995) used in order to analyze the effects and causality of FDI, as attracting FDI constitutes a widely recommended policy measure. For example, Mutascu and Fleischer (2009) analyze the effect of FDI on wage level in Romania using a VAR model, and conclude that a reduction in wage levels does not Granger-cause FDI, but FDI does Granger-cause an increase in the wage levels.

Regarding this Pollution Haven Hypothesis, Hoffmann *et al.* (2005) study the Granger causality of FDI and CO<sub>2</sub> across countries and find that for low-income countries, CO<sub>2</sub> emissions Granger-causes FDI, while for middle-income countries, FDI Granger-causes CO<sub>2</sub> emissions. Thus the authors conclude that pollution havens are more likely in less developed countries.

For the case of India, Acharya (2009) applies a co-integration analysis for CO<sub>2</sub> emissions, FDI and GDP growth, and concludes that the effect of FDI on CO<sub>2</sub> emissions is quite large and causality exists in the Granger sense, thereby suggesting the existence of a pollution haven hypothesis.

In the present case, the research objective is restricted (1) to study the negative externalities of FDI on the CO<sub>2</sub> emission level in Colombia, and (2) to provide evidence on the responsibility assumed by FDI.

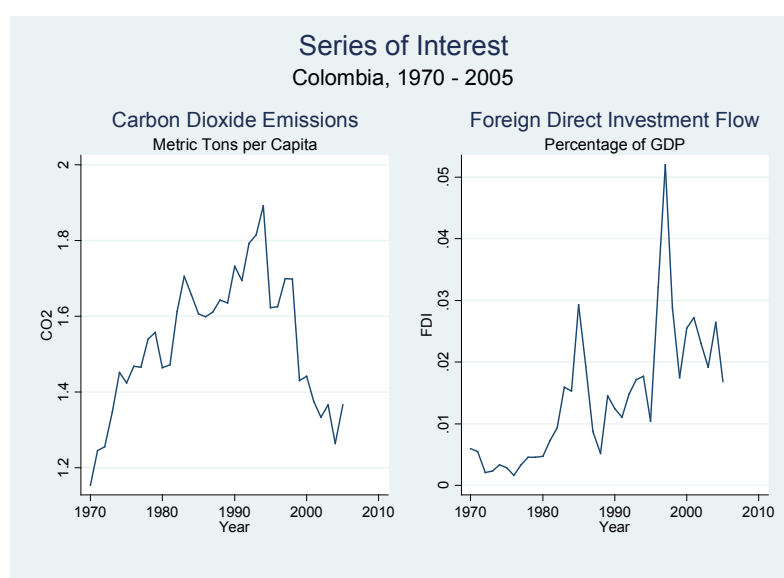
The vector to be studied is defined as [CO<sub>2</sub>, FDI]', where: CO<sub>2</sub> is the level of CO<sub>2</sub> emissions expressed in metric tons per capita, thereby correcting for changes in the population which could have originated changes in the emission level, and FDI is the proportion of new FDI which is entering the country, divided by the GDP of the same year (Both FDI and GDP are expressed in current USD).

The data is derived from the World Bank World Development Indicator database, and comprises the period of 1970 to 2005. As the number of observations is rather small, the t and f statistics of the estimation are corrected for small sample size.

As a first step, the graphics of both series are analyzed. It is possible to observe in [Figure 3](#) that the Foreign Direct Investment series has been corrected for an outlier in 2005, the acquisition of Bavaria S.A. by the South African company SAB Miller. This outlier is corrected for the purpose of this research, as it distorts the FDI series. The outlier observed in 1999 is due to the contraction of GDP because of a recession, but has not been corrected as it is not as large as the Bavaria outlier. Both series seem to be not stationary. The CO<sub>2</sub> emissions per capital have a decreasing trend since 1990, while the FDI proportion has been increasing during the same period, thus providing weak evidence of a possible cointegration relation between both series.



Figure 3: Carbon Dioxide Emissions and Foreign Direct Investment flow in Colombia



Data Source: World bank.

In Figure 4, the results of a Johansen cointegration test are presented. As the test shows, the series are cointegrated with full rank ( $r = k$ ). According to Lütkepohl (2005), in this case the correct estimation consists of a VAR model with level variables.

Figure 4: Johansen Cointegration Test Results

Johansen Tests for Cointegration					
Trend: constant			Number of obs = 34		
Sample: 1972 - 2005			Lags = 2		
Maximum Rank	parms	LL	Eigenvalue	Trace Statistic	5% Critical Value
0	6	152.57038	.	23.5057	15.41
1	9	162.0853	0.42862	4.4758	3.76
2	10	164.32321	0.12334		

After determining the correct model, it is necessary to choose the right lag number. Figure 5 presents several lag order criteria, as provided by the STATA software package. The lag order criteria recommend two lags, which is also in accordance with the yearly data used.

Figure 5: Several Lag Order Criteria

Selection - Order Criteria								
Sample: 1974 - 2005					Number of obs = 32			
Lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	114.889	3.00E-06	-7.05554	-7.02517	-6.96393			
1	143.256	56.734	4	0	6.50E-07	-8.57847	-8.48738	-8.30365
2	152.985	<b>19.46*</b>	4	0.001	<b>4.5e-07*</b>	<b>-8.93659*</b>	<b>-8.78476*</b>	<b>-8.47854*</b>
3	156.742	7.5137	4	0.111	4.60E-07	-8.92139	-8.70883	-8.28013
4	159.369	5.2545	4	0.262	5.10E-07	-8.83559	-8.5623	-8.01112

After selecting the right Lag order, the VAR estimation is realized. The specific results are presented in [Figure 6](#). Both equations are globally significant, and several coefficients are individually significant. But in order to assess the topic of interest, the impulse-response functions of both variables, there are several postestimation tests to be performed.

Figure 6: VAR Estimation Results

Sample: 1972 - 2005		No. of obs = 34	
Log Likelihood	164.3232	AIC =	-9.077836
FPE	3.93E-07	HQIC =	-8.924738
Det(Sigma_ml)	2.17E-07	SBIC =	-8.628906

Equation	Parms	RMSE	R-sq	F	P > F
CO2	5	0.075593	0.8064	30.18945	0.00000
FDI	5	0.007232	0.6284	12.25856	0.00000

CO2 Equation						
	Coef.	Stand. Err.	t	P > t	[95% Conf. Interval]	
CO2						
L1.	0.6428217	0.1595366	4.03	0	0.3165327	0.9691107
L2.	0.2329375	0.1586039	1.47	0.153	-0.0914438	0.5573188
FDI						
L1.	2.717286	1.712762	1.59	0.123	-0.7857045	6.220277
L2.	-6.329451	1.798222	-3.52	0.001	-10.00723	-2.651675
Cons.	0.2450896	0.1264579	1.94	0.062	-0.013546	0.5037251

FDI Equation						
	Coef.	Stand. Err.	t	P > t	[95% Conf. Interval]	
CO2						
L1.	-0.0351179	0.0152619	-2.3	0.029	-0.0663319	-0.0039038
L2.	0.0464229	0.0151726	3.06	0.005	0.0153914	0.0774545
FDI						
L1.	0.8173503	0.1638492	4.99	0	0.482241	1.15246
L2.	-0.2877528	0.1720246	-1.67	0.105	-0.6395827	0.064077
Cons.	-0.0103073	0.0120974	-0.85	0.401	-0.0350493	0.0144348

The estimated VAR is, as depicted in Figure 7, stable, as all the eigenvalues of the estimated coefficients matrix fall inside the unit circle.

Figure 7: Stability Condition of the estimated VAR

Eigenvalue Stability Condition	
Eigenvalue	Modulus
$0.8417172 + .1999822i$	0.865148
$0.8417172 - .1999822i$	0.865148
$-0.1116312 + .5390329i$	0.550471
$-0.111631 - .5390329i$	0.550471
All the eigenvalues lie inside the unit circle. VAR satisfies stability condition.	

The Jarque-Bera test presented in Figure 8 validates the normality assumption of the estimated VAR, as the non-normality hypothesis cannot be rejected, nor the kurtosis and skewness tests for both equations.

Figure 8: Jarque Bera Test Results

Jarque-Bera Test			
Equation	chi2	df	Prob > chi2
CO2	1.405	2	0.49532
FDI	3.703	2	0.15696
ALL	5.109	4	0.27633

Skewness Test				
Equation	Skewness	chi2	df	Prob > chi2
CO2	-0.38246	0.829	1	0.36259
FDI	0.8067	3.688	1	0.05482
ALL		4.517	2	0.10453

Kurtosis Test				
Equation	Kurtosis	chi2	df	Prob > chi2
CO2	2.3623	0.576	1	0.44781
FDI	3.1057	0.016	1	0.89992
ALL		0.592	2	0.74378

Another important test is the Lagrange-Multiplier test with the null of no autocorrelation at a specific lag order. As presented in Figure 9, this hypothesis cannot be rejected for both lag order.

Figure 9: LM Test for Autocorrelation

Lagrange-Multiplier Test			
lag	chi2	df	Prob > chi2
1	6.099	4	0.19188
2	4.8911	4	0.29865

Figure 10 presents a last test before the impulse-response functions are calculated: A Wald-type test for lag-exclusion. As the result show, all lags are significant for all equations considered.

Figure 10: Wald Test for Lag-Exclusion

Equation: CO2				
lag	F	df	df_r	Prob > F
1	10.8251	2	29	0.0003
2	6.24828	2	29	0.0055

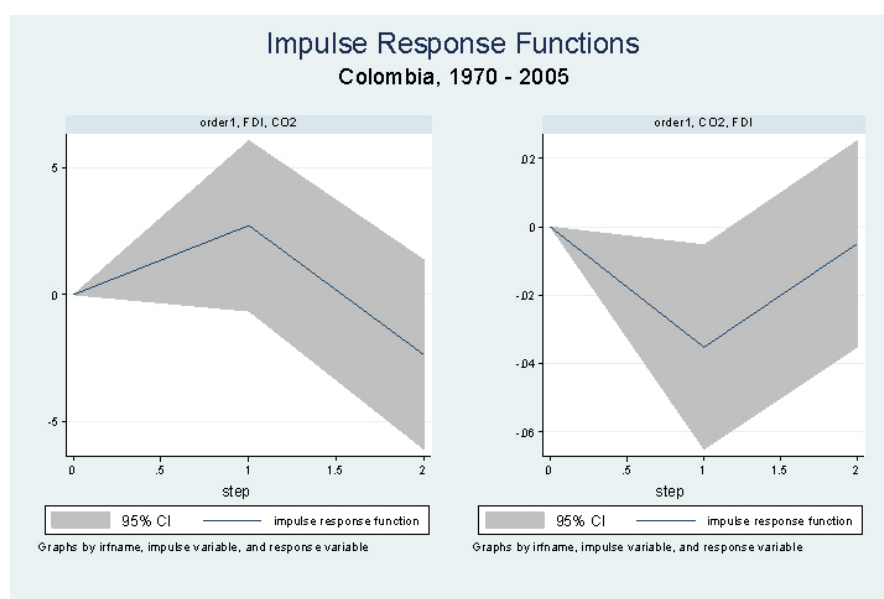
Equation: FDI				
lag	F	df	df_r	Prob > F
1	13.4949	2	29	0.0001
2	4.92868	2	29	0.0144

Equation: All				
lag	F	df	df_r	Prob > F
1	12.1776	4	29	0.0000
2	5.64966	4	29	0.0017

In order to evaluate the VAR estimation results, the impulse response functions of both variables are presented in Figure 11. The impact of an increase of one standard deviation in the proportion of foreign direct investment as a percentage of the GDP increases first the CO<sub>2</sub> emissions, which is according to the expected. But then the FDI decreases Colombia's CO<sub>2</sub> emissions in an almost equal amount, which could be explained as the FDI taking responsibility for its negative externalities – thereby being environmentally responsible according to the definition of Restrepo and Molina (2009).

The impact of an increase of one standard deviation in the CO<sub>2</sub> emissions has only negative consequences on the proportion of FDI as a percentage of the GDP, which is in accordance with the relationship between country competitiveness and responsibility as proposed by AccountAbility (2007).

Figure 11: Relevant Impulse-Response Function of the estimated VAR



Source: World bank, Own Calculations.

Finally, the variables are tested for Granger-Causality. As Figure 12 shows, FDI Granger-causes the CO<sub>2</sub> level at a 5% significance level, but CO<sub>2</sub> does not Granger-cause FDI. Thereby, it is interesting that this specific relationship between the variables is only unidirectional, as it seems that foreign enterprises do not significantly take into account the CO<sub>2</sub> emission level of a country for investment decisions, but their decisions do have an Granger-caused impact on the CO<sub>2</sub> emissions, while being, in general terms, environmentally responsible in order to reduce this CO<sub>2</sub> emissions.

Figure 12: Results of the Granger Causality Tests

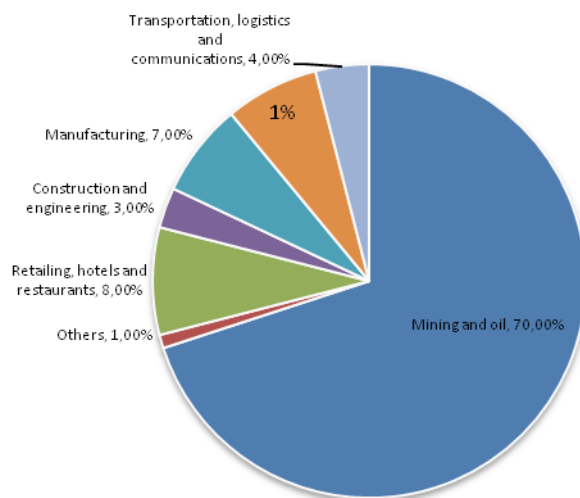
Granger Causality Wald Tests					
Equation	Excluded	F	df	df_r	Prob > F
CO2	FDI	6.9391	2	29	0.0034
CO2	ALL	6.9391	2	29	0.0034
FDI	CO2	4.8906	2	29	0.0148
FDI	ALL	4.8906	2	29	0.0148

Thereby this research provides more information regarding the specific relationship between one component of the previous used Responsible Competitiveness index and Foreign Direct Investment, for the Colombian case. It seems appropriate to question the relationship between FDI and the specific components, as not in all cases FDI is endogenous, and vice versa.

There is another question related to this specific study: The relevance of the use of aggregated FDI for the CO<sub>2</sub> emission level. FDI can be directed to several different sectors of the economy, including for instance service industry, which does not have a high impact on CO<sub>2</sub> emissions of the country.

Figure 13 depicts the destination of foreign direct investment, for the year 2009. It is possible to see that 67% of Foreign Direct Investments in Colombia are directed to sectors which are expected to pollute and to have a direct impact on CO<sub>2</sub> emission level, as for instance the mine exploitation, manufacturing activities and transport services. Nonetheless it is important to highlight the need of further analyzing the micro perspective of this relation, as individual enterprises have different level of CO<sub>2</sub> emissions.

Figure 13: Destination of Foreign Direct Investment in Colombia in 2009





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#### 4. Conclusions on the Relationship FDI and CSR

The present investigation presented two different approaches for the empirical examination of the relationship between FDI and CSR. Both approaches suggest a strong relationship between the variables of interest: The first approach concludes on the correlation between a CSR index and FDI, while the second approach suggests that FDI in Colombia is environmentally responsible because it reduces its negative externalities on CO<sub>2</sub> emissions.

The first approach, while having the advantage of being more general, has the disadvantage of ignoring any specific effects of the relationship. The second approach provides deeper insight into the specific relationship between the variables, but is limited in the sense that it only takes into account the actual results.

Nonetheless, both approaches seem to be complementary, as they highlight different aspects of this relationship. It is recommended that further research develops a model which takes into account the general relationship as well as specific effects.

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