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## Capital flows, institutional quality and terms of trade

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## Capital Flows, Institutional Quality and Terms of Trade

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### Abstract

This paper studies the relationship between *FDI* and the *TOT* in the less developed countries in response to the institutional quality that each presents. Our hypothesis is that the least developed countries with low institutional quality are reluctant to invest Rodrik [2007], suffer from credit constraints Agénor and Aizenman [2004], and face an endogenous risk premium given the asymmetries of information, depend on their collateral Gertler and Rogoff [1990], closely linked to the behavior of their *TOT*. We found that the coefficient that measures the response of *FDI* to *TOT* is decreasing with institutional quality. Countries with low quality experience a penalty for having low institutional quality.

**JEL Classification:** F32, F34, F41

**Keywords:** Capital Flows, Terms of Trade, Lucas Paradox, Institutional Quality.

### Resumen

Este trabajo estudia la relación entre los términos de intercambio atendiendo a la calidad institucional que presentan los países menos desarrollados. Nuestra hipótesis es que los países menos desarrollados con baja calidad institucional son expulsores de la inversión Rodrik [2007], enfrentan restricciones crediticias Agénor and Aizenman [2004], y la prima de riesgo endógena, dada la asimetría de información, depende de su colateral Gertler and Rogoff [1990] que está directamente vinculado al comportamiento de los *TOT*. En este trabajo encontramos que el coeficiente que mide la respuesta de la inversión externa directa a los términos de intercambio es decreciente con la calidad institucional. Los países con baja calidad institucional sufren por ello una penalización.

**Clasificación JEL:** F32, F34, F41

**Palabras Claves:** Flujo de Capitales, Términos de Intercambio, Paradoja de Lucas, Calidad Institucional.

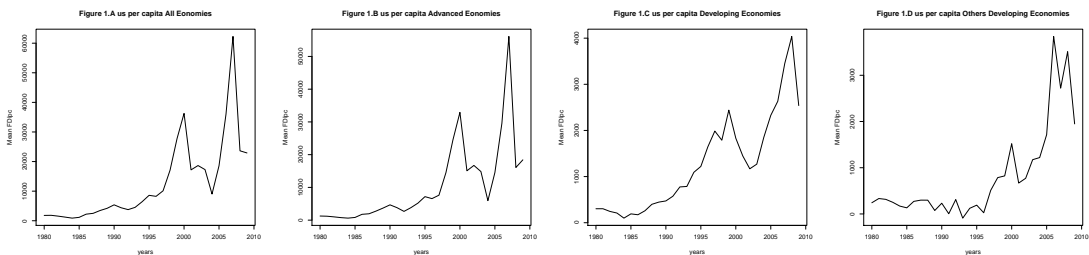
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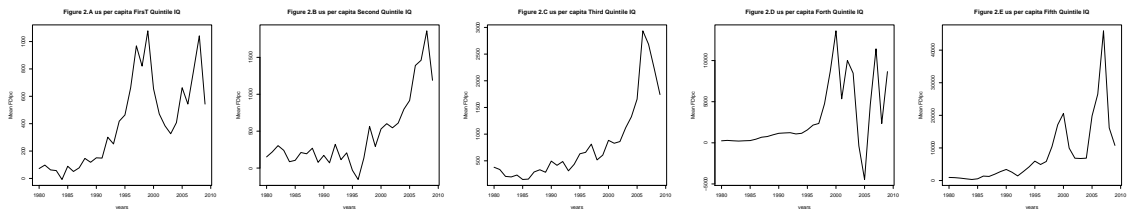
# 1 Introduction

escribo una pelotudes From the 1990s global flows of foreign direct investment ( $FDI$ ) increased substantially. This higher levels of transnational investment is explained mainly by development countries: in fact, the average observed for the least of  $FDI$  to developing countries has been four times the corresponding average observed by the least developed countries from 1990 to 2008. During the financial crisis of 2007,  $FDI$  flows fell globally, although there is evidence that these flows are recovering faster in developing countries. Although it still is not clear, why capital flows to the (capital-intensive) developed countries rather than flowing to countries with higher relative endowment labor.

Figure 1 shows the evolution of foreign direct investment during 1980-2009 both globally and for the most advanced and developed economies according to the IMF classification. Stressing that advanced countries dominate the global trend of foreign direct investment and the least developed countries receive significant flows of investment recently from the mid-nineties.



A rather different behavior is seen for the same group of countries as institutional quality variable is used to classify the evolution of foreign direct investment. The general problem addressed in this paper is the deficiency that have less developed economies (among which is Argentina) to receive capital in a context of increased global trend of  $FDI$ . The focus of this paper is to depict differences in the response of  $FDI$  to terms of trade ( $TOT$ ) in developing countries according the institutional quality they show.



This paper studies the relationship between  $FDI$  and the  $TOT$  in the less developed countries in response to the institutional quality. Our hypothesis is that the least developed countries with low institutional quality are reluctant to invest Rodrik [2007], suffer from credit constraints Agénor and Aizenman [2004], and face an endogenous risk premium given the asymmetries of information, depend on their collateral Gertler and Rogoff [1990], closely linked to the behavior of their  $TOT$ . In others word, a shocks (permanent) positive in the  $TOT$  increase the current income and lowers they risk premium (increased collateral), however the investment grows less in countries with lower institutional quality due to prevailing credit constraints that make individuals to save to protect against adverse (transitory) shock in the future. Consequently, when less developed countries face a positive cycle in their  $TOT$ , the opportunity is wasted as a result of low institutional quality, and investment does not respond to new opportunities.

To assess the relationship between  $FDI$  and the  $TOT$  in accordance with the institutional quality we group 40 economies for the period between 1980 to 2009. This methodology of grouping countries by its  $IQ$  status enables us to assess how close a developing countries is from a developed one. Actually, given that all developed countries have high level of institutional quality, this variable seems to be a pretty good discriminant to control for different countries behaviour

within the group of less developed nations. The rest of this paper is organized as follows. Section II reviews the literature which supports our working hypothesis. In section III the estimation strategy and its results are discussed. Section IV conclusion and policy recommendations are presented. The statistical appendix describes the variables used and their sources.

## 2 Theoretical issues and stated hypothesis

Our theoretical approach follows the seminal work of Lucas [1990] who according to neoclassical theory states that the differences in production per worker between rich and poor economies are due to differences in the level of capital per worker. However, if trade in capital good is free and competitive, the capital will be allocated only in the poorer economy (where capital per worker is lower) until the capital-labor ratio, and hence capital return are equalized. Lucas finds that relative income per worker ratios (between U.S. and a given developing country) are large to expect to flow as expected by neoclassical theory. Then, he explores three possibilities to explain why capital does not flow to poorest countries. Firstly, Lucas corrects labor input estimation for differences in human capital. Secondly, he indicates that differences in the level of capital per worker are additionally caused by human capital stocks local spillovers. he point out that a "political risk" would appear as borrowing contracts arising from the flow of capital goods to poor economies can not be enforced. Policy recommendation should be focused on the investment in human capital to reduce income per worker differentials between poor and rich countries as well as on the reduction of "political risk" in order to promote the capital to flow toward poor countries.

Alfaro et al. [2008] based on Lucas classification summarizes the theoretical explanations of "Lucas paradox" in two groups. First, those that consider differences in fundamentals across countries (missing factor of production, government policies, institutional structure and total factor productivity) on the one hand; and those who emphasize the existence of imperfections in capital markets. Obst state that these imperfections arise because of either asymmetric information problems or due to sovereign risk. Additionally, asymmetric information problems can be *ex-ante* (adverse selection), *interim* (moral hazard) or *ex-post* (costly state verification). Alfaro et al. [2008] indicate that the quality of the country's institutions affects the capital flows toward poor countries by assuming that institutions encourage investment decisions by ensuring property rights of entrepreneurs and preventing elites from blocking the adoption of new technologies. Under this view, the Solow's residual not only captures the differences in overall efficiency across countries but also the incentive that institutions offer to promote the foreign investment.

Gertler and Rogoff [1990] presents a model when an endogenous risk premium appears in less developed countries as a consequence of moral hazard in capital markets. They state that borrowing countries have to bear higher interest rate ( the risk-free rate plus a risk premium) because of the existence of information asymmetries in credit markets; creditors are not sure that borrowed funds will be applied to finance capital formation in the poor economy (actually, borrowers could secretly lend abroad rather than invest in the projects). Given that investors are not able to verify what the borrower does with the funds they require higher interest rate to lend them. However, the higher the interest rate the lower the investment needs in the poor countries. Thus, it is concluded that the optimal capital stock is below the level associated with the first-best allocation (as a result, the ex-post per capita output may lie below its first-best value). Moreover, they show that risk premium depend upon the size of the collateral (i.e. natural resources), which is supposed to be independent from the projects to which the borrowed funds would be applied.

Barone and Descalzi [2012a] test the hypothesis that indicates that *TOT* shocks raise the value of the collateral that the domestic economy possesses to back liabilities: as *TOT* increase the (endogenous) borrowing rate decreases and it encourages capital accumulation in developing economies. This assumption was tested by distinguishing four groups of countries according to the country income level (lower, medium, upper medium and higher income). Results indicate that the risk premium is negatively associated with the terms of trade in all country groups, although the estimated coefficients seem to be greater for the group of countries with higher income level. However, the growth variable (which also could be approximated to the collateral) is not significantly different from zero and has the expected negative sign. Barone and Descalzi [2013] analyzed the relationship between the *FDI* and the *TOT*, distinguishing between group of more developed countries (taken according to the IMF classification) of those developing (or less developed). They found that the response of *FDI* inflows to the terms of trade is higher in the first group (more developed) than in the second.

In summary: i) the least developed countries with low institutional quality are reluctant to invest [Rodrik, 2007]; ii) the least developed countries face restrictions in the credit market [Agénor and Aizenman, 2004]; iii) in the least developed countries an endogenous risk premium is formed, due to asymmetric information, which depends on the collateral [Gertler and Rogoff, 1990]; iv) in less developed countries the collateral depends on the terms of trade. Based on the assumptions above it is concluded that in less developed countries, with a positive (permanent) shock to the terms of trade: a) increase current income; b) the risk premium decrease (increase collateral); however, the investment will grow less in countries with lower level of institutional quality; c) consumption (function of permanent income) grow less than the most advanced countries since due to the prevailing credit squeeze individuals increase their saving to protect against adverse shocks in the future. Consequently, when the least developed countries face a positive terms of trade cycle, the opportunity is "wasted" because due to low institutional quality investment does not respond to new opportunities.

### 3 Estimation strategy

Firstly, we focusing into the relationship, if any, between the *FDI* inflows and terms of trade. Secondly, we analyze the relationship between foreign direct investment and terms of trade distinguishing between developments levels. Third we analyze this relationship distinguishing between the level of institutional quality.

#### 3.1 *FDI* and *TOT*

We consider the following regression equation:

$$fdi_{it} = \alpha + \beta_1 \times tot_{it} + \beta_2 \times infl_{it} + \beta_3 \times ac_{it} + \beta_4 \times rd_{it} + \beta_5 \times m2gdp_{it} + \epsilon_{it} \quad (1)$$

Where *fdi* represent the foreign direct investment inflow in *per-capita* terms, *tot* are the terms-of-trade, *infl*, is the annual inflation rate, *ac* is a measure of trade openness, *rd* is the dependency rate, while *m2gdp* is the *M2-to-GDP* ratio.

Our stated assumption implies that  $\beta_1$  is expected to be positive. The sign of the remaining control variables is expected to be as follows. The estimated coefficient of inflation should be negative (as an increasing inflation rate is thought to rise risk premium and thus to discourage investment and capital inflows). The response of the *FDI* inflows to  $AC(\beta_3)$  is expected to be positive (trade and financial openness should be correlated). It is expected that the coefficient of the rate of dependency will be positive, given that *RD* is linked to the domestic savings: in

particular, the higher the  $RD$  the lowest the domestic savings are prone to be (given a borrowing rate, the domestic saving is considered a substitute of capital flows).

Following Wooldridge [2002] We apply fixed effects feasible generalized least squares (FEFGLS). The results are showed in Table 1. It can be seen that the coefficient of  $TOT$  is positive and significantly different from zero at 1% level of significance; it would reinforce our hypothesis that a terms-of-trade shock increases the collateral and also tends to lower the risk premium, encouraging investment and capital inflows. The sign of coefficient of  $INFL$  is positive and significantly different from zero at 10% level of significance. Meanwhile, the  $AC$  and  $M2GDP$  coefficients have the expected sign and are statistically different from zero at 1% level of significance, highlighting the importance of economic liberalization and the deepening of the credit sector to foreign direct investment inflows.

Table 1: **Determinants of Foreign Direct Investment (FDI)**

<i>Independent variable</i>	<i>Dependent variable is the FDI per capita</i> Equation 1
$TOT$	0.6594 (0.0000)
$INFL$	0.0042 (0.0367)
$AC$	3.8598 (0.0000)
$RD$	-1.1581 (0.2821)
$M2GDP$	4.0400 (0.0000)
<i>Observation</i>	1350
<i>AdjustedR – squared</i>	0.176

Note: p-value between parentheses. The dependent variable is the Foreign Direct Investment per capita. The list of explanatory variables includes the terms of trade ( $TOT$ ), the rate of inflation ( $INFL$ ), the trade openness ( $AC$ ), the dependency ratio ( $RD$ ) and the quasi money to gross domestic product ratio ( $M2GDP$ ).

### 3.2 $FDI$ and $TOT$ from different level of Income

To assess the relationship between  $FDI$  and the  $TOT$  in accordance with the level of income we consider the following regression equation:

$$fdi_{it} = \alpha + \beta_1 \times tot_{it} + \gamma \times DLi_{it} \times tot_{it} + \beta_2 \times infl_{it} + \beta_3 \times ac_{it} + \beta_4 \times rd_{it} + \beta_5 \times m2gdp_{it} + \epsilon_{it} \quad (2)$$

Where  $DLi_{it}$  is dummy variable interacting with  $tot$  that takes the value 1 if the economy is into the group of advanced economies, developing economies or others developing economies. Our stated assumption implies that  $\beta_1$  is expected to be lower in countries with lower income than the value estimated for more high income level. Our main interest relies on the value of

$\gamma$  and  $\beta_1$ .  $\gamma$  reflects the differentiated impact of terms of trade on foreign direct investment in those economies that display low levels of income. Thus, if  $Dli_{it}$  equals 1 (meaning that the  $Li$  is low), then  $\beta_1 + \gamma$  represent the response of  $FDI$  to terms of trade in those countries where the  $Li$  index is low.

Table 2 shows the results. The two last columns reports the results obtained after splitting the group of “other economies” into two subgroups: the set of “developing” countries ( $DE$ ) - the countries that are suppose to have more chances of reaching the developed ones; and the set of “other developing economies” ( $ODE$ ) who are suppose to be more distant from the first group. For the subgroup of  $DE$  and  $ODE$  the coefficient of  $TOT$  is positive and significantly different from zero at 1% level of significance, and is lower from the group  $ODE$  than  $DE$ . The  $\gamma$  coefficients is negative and statistically significant at 1% level of significance.

Table 2: **Foreign Direct Investment and Terms of Trade. Different Level of Income**

<i>Independent variable</i>	<i>Dependent variable is the FDI per capita</i>		
	FEFGLS AE	FEFGLS DE	FEFGLS ODE
<i>TOT</i>	0.0962 (0.4520)	1.1535 (0.0000)	0.8081 (0.0000)
<i>DLi * TOT</i>	8.7876 (0.0000)	-0.7876 (0.0021)	-0.7897 (0.0033)
<i>INFL</i>	0.0041 (0.0542)	0.0020 (0.2832)	0.0055 (0.0185)
<i>AC</i>	3.7416 (0.0000)	3.5844 (0.0000)	3.7416 (0.0000)
<i>RD</i>	-0.3674 (0.7719)	-1.0074 (0.4047)	-1.1366 (0.3337)
<i>M2GDP</i>	3.4907 (0.0000)	3.7317 (0.0000)	3.9930 (0.0000)
<i>AdjustedR – squared</i>	0.179	0.175	0.176

Note: p-value between parentheses. The dependent variable is the Foreign Direct Investment per capita. The list of explanatory variables includes the terms of trade ( $TOT$ ), the rate of inflation ( $INFL$ ), the trade openness ( $AC$ ), the dependency ratio ( $RD$ ) and the quasi money to gross domestic product ratio ( $M2GDP$ ).

### 3.3 $FDI$ and $TOT$ from diferent level of Institutional Quality

To assess the relationship between  $FDI$  and the  $TOT$  in accordance with the institutional quality we consider the following regression equation:

$$fdi_{it} = \alpha + \beta_1 \times tot_{it} + \gamma \times Diq_{it} \times tot_{it} + \beta_2 \times infl_{it} + \beta_3 \times ac_{it} + \beta_4 \times rd_{it} + \beta_5 \times m2gdp_{it} + \epsilon_{it} \quad (3)$$

In this case,  $DIq_{it}$  is dummy variable interacting with  $tot$  that takes the value 1 if the economy is into the group of higher institutional quality. Our stated assumption implies that  $\beta_1$  is expected to be lower in countries whtih low institutional quality than the value estimated for more institutional. In this case, our main interest relies on the value of  $\gamma$  and  $\beta_1$ .  $\gamma$  reflects the differentiated impact of terms of trade on foreign direct investment in those economies that



display low levels of institutional quality. Thus, if  $Diq_{it}$  equals 1 (meaning that the  $iq$  is low), then  $\beta_1 + \gamma$  represent the response of  $FDI$  to terms of trade in those countries where the  $IQ$  index is low. On the other hand, if  $Diq_{it}$  equals zero,  $\beta_1$  is the response of  $FDI$  for the group of countries with higher institutional quality index. Thus,  $\gamma$  represent the differential response of  $FDI$  inflows to terms of trade in countries with low institutional quality. The hypothesis is that  $\gamma$  is negative and significantly different from zero: the countries belonging to the group with the lowest values for the  $IQ$  index tend to receive less capital than those within the group with higher  $IQ$  index when a (positive)  $TOT$  shock happens.

The positive effect of terms of trade on  $FDI$  inflows that experience more-confident countries tend to be offset in the group of less reliable economies as capital is prone to flight at the time the economy goes through the shock. Thus,  $\gamma$  is a measure of the punishment that less-reliable countries (those that exhibit bad fundamentals) suffer for belonging to the low- $IQ$  group.

Table 3 shows the results of estimating equation proposed using feasible generalized least squares with fixed effects. This results suggest that  $\gamma_1$  is negative and statistically significant at the usual level of significance, and  $\beta_1$  is positive and statistically significant. Additionally,  $\gamma_1$  is positive and statistically significant for the group of countries in the top of index of institutional quality. The results observed to  $\beta_1$  and  $\gamma_1$  coefficients suggest that as institutional quality improvement penalty by low institutional quality is decreasing. In other words, improving terms of trade promoted a positive response in the foreign direct investment flows that are used by countries depending on their institutional quality. While business opportunities improve due to the improvement in the terms of trade does not potentiate the environment their implementation.

**Table 3: Foreign Direct Investment and Terms of Trade. Different Level of Institutional Quality**

<i>Independent variable</i>	<i>Dependent variable is the FDI per capita</i>				
	FEFGLS IQQ1	FEFGLS IQQ2	FEFGLS IQQ3	FEFGLS IQQ4	FEFGLS IQQ5
<i>TOT</i>	0.8978 (0.0000)	0.8528 (0.0000)	0.6709 (0.0000)	0.6849 (0.0000)	0.2596 (0.1056)
<i>DQi * TOT</i>	-0.6709 (0.0044)	-0.6760 (0.0030)	-0.1928 (0.6593)	-0.4988 (0.3059)	17.0713 (0.0000)
<i>INFL</i>	0.0042 (0.0412)	0.0038 (0.0596)	0.0042 (0.0389)	0.0042 (0.3708)	0.0035 (0.0932)
<i>AC</i>	3.7099 (0.0000)	3.7199 (0.0000)	3.8547 (0.0000)	3.8458 (0.0000)	3.8636 (0.0000)
<i>RD</i>	-1.1838 (0.3049)	-1.0178 (0.3532)	-1.2004 (0.2652)	-1.2685 (0.2394)	-0.0660 (0.9512)
<i>M2GDP</i>	3.7805 (0.0000)	3.9671 (0.0000)	4.0304 (0.0000)	4.0289 (0.0000)	3.4251 (0.0000)
<i>AdjustedR – squared</i>	0.176	0.176	0.176	0.176	0.184

Note: p-value between parentheses. The dependent variable is the Foreign Direct Investment per capita. The list of explanatory variables includes the terms of trade ( $TOT$ ), the rate of inflation ( $INFL$ ), the trade openness ( $AC$ ), the dependency ratio ( $RD$ ) and the quasi money to gross domestic product ratio ( $M2GDP$ ).

### 3.4 $FDI$ and $TOT$ , GMM estimation

Another possibility is to estimate the relationship between  $FDI$  and the institutional quality index applying the Generalized Method of Moments (GMM). In this case, the dependent variable ( $fdi$ ) depends on its own lagged value and the remaining variables expressed in levels. The obtained estimators are consistent and unbiased under the assumption of time-invariant

unobserved heterogeneity. This is a dynamic model, that also includes first differences to avoid this problem. It is possible to use lagged values of both dependent and independent variables as instruments.

The basic model is specified as follows:

$$\begin{aligned} y_{i,t} &= \alpha * y_{i,t-1} + \beta * X_{i,t} + \varepsilon_{i,t} \\ \varepsilon_{i,t} &= \mu_i + \nu_{i,t} \\ E(\mu_i) &= E(\nu_{i,t}) = E(\mu_i \nu_{i,t}) = 0 \end{aligned} \quad (4)$$

Where  $\mu_i$  represents the fixed effect, while  $\nu_{i,t}$  are idiosyncratic shocks.

Taking first differences to eliminate the non-observed individual effect and the constant: Si tomamos diferencia para remover el efecto individual y la constante y asimilar la heterogeneidad no observada, se tiene:

$$\Delta y_{i,t} = \alpha \Delta y_{i,t-1} + \beta * \Delta X_{i,t} + \Delta \nu_{i,t} \quad (5)$$

However, there still exists the possibility that the error would be correlated with the lagged dependent variable. This problem can be solved by introducing instrumental variables. We can use as instrumental variables the lags of the dependent variables expressed in differences or in levels. It is also possible to include external variables as instruments.

Estimating the equation in first differences may not be the best strategy. It is suggested that the variables in levels could be weak instruments for the equations containing variables in first differences. To deal with this problem a GMM system is estimated comprised of equations in both in levels and in first differences, utilizing the variables in first differences as instruments for the equations containing variables in levels. The GMM estimator is efficient when controlling for simultaneity problems. However, this methodology may be subject to a number of problems. First, there is a potential weakness of the instruments, that is increasing with number of lags of the instrumental variables. Moreover, it is assumed that the errors are uncorrelated, which is not always true for all the variables.

The model that stress the relationship between *fdi* and *diq* is the following:

$$fdi_{i,t} = \alpha + \beta_1 fdi_{i,t-1} + \beta_2 * tot_{i,t} + \gamma_0 * Diq_{i,t} + \beta_3 * infl_{i,t} + \beta_4 * ac_{i,t} + \beta_5 * rd_{i,t} + \beta_6 * m2gdp_{i,t} + \epsilon_{i,t} \quad (6)$$

The results are presented in Table 4. The foreign direct investment (*fdi*) flows depends on the level achieved in the immediately preceding period, since  $\beta_1$  is significantly different from zero. Also, the effect of the terms of trade (*tot*) over *fdi* are similar to those obtained in previous estimates, where the coefficient  $\beta_2$  is positive and statistically different from zero in all estimates.

Finally, the coefficient  $\gamma_0$  is negative and significantly different from zero, for countries with lower income levels (specifically those belonging to quintiles 2 and 3), whereas it is positive and significant for the group of countries with higher income (quintile 5). In summary, the results expressed in Table 4 are congruent with those obtained presented in Table 3, which reinforces the hypothesis that countries with lower institutional quality are penalized by the investors, while the nations with higher institutional quality benefit from this situation as they tend to receive an additional flow of direct foreign investments when the terms of trade improve.

## 4 Concluding remarks

This paper is aimed to study differences response of capital inflows to terms of trade shocks. Our main propose is to evaluate the response of foreign direct investment (*FDI*) inflows to

Table 4: **Foreign Direct Investment and Terms of Trade. Different Level of Institutional Quality**

<i>Independent variable</i>	<i>Dependent variable is the FDI per capita</i>				
	<b>IQQ1</b>	<b>IQQ2</b>	<b>IQQ3</b>	<b>IQQ4</b>	<b>IQQ5</b>
<i>FDIpc</i> (-1)	0.6657 (0.0000)	0.6612 (0.0000)	0.6549 (0.0000)	0.6639 (0.0000)	0.6455 (0.1056)
<i>TOT</i>	1.1307 (0.0270)	1.3253 (0.0130)	0.9841 (0.0240)	1.2683 (0.0190)	0.4315 (0.0990)
<i>DQi * TOT</i>	0.0155 (0.9600)	-0.6781 (0.0110)	-1.3811 (0.0230)	-0.3456 (0.3890)	2.6441 (0.0000)
<i>INFL</i>	0.0019 (0.6950)	0.0008 (0.8920)	0.0012 (0.8160)	0.0027 (0.6580)	0.0045 (0.3940)
<i>AC</i>	1.9338 (0.1470)	1.9139 (0.1310)	2.2779 (0.0670)	1.9223 (0.1440)	1.5081 (0.2160)
<i>RD</i>	-3.1074 (0.0320)	-3.0310 (0.0210)	-2.8338 (0.0150)	-3.2922 (0.0200)	-2.0237 (0.0860)
<i>M2GDP</i>	0.9377 (0.0000)	0.8307 (0.1530)	1.0813 (0.1110)	1.0247 (0.0780)	0.7827 (0.0820)
<i>par</i>					

Note: p-value between parentheses. The dependent variable is the Foreign Direct Investment per capita. The list of explanatory variables includes the terms of trade (*TOT*), the rate of inflation (*INFL*), the trade openness (*AC*), the dependency ratio (*RD*) and the quasi money to gross domestic product ratio (*M2GDP*). Source: Own calculations using the `xtabond2` command of software STATA

terms-of-trade shocks in countries with low institutional quality and compare the obtained results with that of more institutional quality. Thus, our main interest is based on addressing the impact of global real cycles on developing economies. We expect the response of *FDI* inflows to terms-of-shocks to be lower in less developed countries.

Our assumption is associated to Lucas [1990], who according to neoclassical theory stated that the differences in production per worker between rich and poor economies are due to differences in the level of capital per worker. What we specifically point out here is that poor countries does not show good fundamentals and they are investment-constrained economies Rodrik [2007]. Alfaro et al. [2008] explains that capital does not flow from rich to poor countries because of the lack of institutional quality (thus, bad fundamentals are tied to a deficient level of institutional quality).

Additionally, poor countries have not access to credit markets because they do not have enough collateral (i.e. the country wealth is less than her capital requirements) to back their liabilities Gertler and Rogoff [1990]. This increases their borrowing rate. On the other hand, rich countries not only take advantage of their fundamentals (given that they are not investment-constrained) but also of their collateral, which cause their borrowing rate to decrease (and as a consequence the investment rises).

Finally, under these assumptions we expect that an increase of terms-of-trade shocks should cause *FDI* inflows to increase in developing countries. Even though the positive shock would increase the country wealth (i.e. the collateral) - which causes the borrowing rate to decrease as it was shown by Barone and Descalzi [2012a] - the economy is investment-constrained and the investment will not rise (furthermore, as Agénor and Aizenman [2004] shows, a (positive) terms-of trade shock would improve the current account balance rather than a deficit).

Our main result suggests that the countries with low institutional quality when terms of trade improve promotes a positive response in the foreign direct investment flows. These business opportunities improve due to the improvement in the terms of trade but does not fully exploited the effect of the terms of trade for its low level of institutional quality. The results suggest that improving the flow of foreign direct investment countries must work hard toward to improve their institutions.

## References

- P. R. Agénor and J. Aizenman. Savings and the terms of trade under borrowing constraints. *Journal of International Economics*, 63(2):321 – 340, 2004.
- L. Alfaro, S. Kalemli-Ozcan, and V. Volosovych. Why doesn't capital flow from rich to poor countries? an empirical investigation. *The Review of Economics and Statistics*, 90(2):347–368, 2008.
- S. Barone and R. Descalzi. Credit constraints and the asymmetric current account response to terms-of-trade shocks: an empirical application to latin american countries. *Asociación Argentina de Economía Política*, 2010.
- S. Barone and R. Descalzi. Endogenous risk premium and terms of trade shocks: evidence for developing countries. *Asociación Argentina de Economía Política*, XLVII(Reunión Anual), 2012a.
- S. Barone and R. Descalzi. Assessing the risk premium determinants in less developed countries: the case of latin american economies. *Revista de Economía*, 19(2):7–39, 2012b.
- S. Barone and R. Descalzi. Capital flows to developing countries and terms-of-trade shocks. *Asociación Argentina de Economía Política*, XLVIII(Reunión Anual), 2013.

- International Monetary Fund. International financial statistics, cd-rom, International Monetary Fund, Washington, DC. 2001.
- K.M. Gertler and K. Rogoff. North-south lending and endogenous domestic capital market inefficiencies\* 1. *Journal of Monetary Economics*, 26(2):245–266, 1990.
- R. Glick and K. Rogoff. Global versus country-specific productivity shocks and the current account\* 1. *Journal of Monetary economics*, 35(1):159–192, 1995.
- R.H. Gordon and A.L. Bovenberg. Why is capital so immobile internationally? possible explanations and implications for capital income taxation. *The American Economic Review*, pages 1057–1075, 1996.
- A. Heston, R. Summers, and B. Aten. Penn world table version 6.1. *Center for International Comparisons at the University of Pennsylvania (CICUP)*, 18, 2002.
- A. Kose. *Financial Globalization and Economic Policies*. Centre for Economic Policy Research, 2009.
- R.E. Lucas. Why doesn't capital flow from rich to poor countries? *The American Economic Review*, 80(2):92–96, 1990.
- E.G. Mendoza, V. Quadrini, and J.V. Rios-Rull. Financial integration, financial deepness and global imbalances. *WP 12909 NBER*, 2007.
- M. Obstfeld and K. Rogoff. Foundations of international economics. *Foundations of international economics*, 1996.
- E. Prasad and R. Rajan. A. subramanian.(2007).“foreign capital and economic growth,”. *Brookings Papers on Economic Activity*, 1:153–230.
- Dani Rodrik. How to save globalization from its cheerleaders. 2007.
- M. Wooldridge, J. *Econometric Analysis of Cross Section and Panel Data*. MIT PRESS, 2002.

## A Statistical Appendix

Annual data for years 1980-2009 for economic aggregates were obtained from World Development Indicators (WDI), International Financial Statistics (IFS), Penn World Table version 7, UNCTAD and The Worldwide Governance Indicators, 2011 Update.

*AC*: Trade openness is calculated as the sum of exports and imports ratio to GDP. Serie code NE.EXP.GNFS.ZS serie name Exports of goods and services (% of GDP) and serie code NE.IMP.GNFS.ZS y serie name Imports of goods and services (% of GDP), WDI

*FDI*: is the foreign direct investment per capita, UNCTADstat. The *FDIpc* is calculated using serie name Population serie code SP.POP.TOTL, WDI.

*INFL*: is the inflation rate serie code NY.GDP.DEFL.KD.ZG, serie name INFLATION, GDP DEFLATOR (% annual).

*M2GDP*: is the M2 to GDP ratio. M2 serie code FM.LBL.MQMY.CN serie name Money and quasi money (current LCU), WDI and Central Bank. GDP serie code NY.GDP.MKTP.CN serie name GDP (current LCU).

*RD*: is the dependency ratio, serie code SP.POP.DPND serie name AGE DEPENDENCY RATIO (per cent of working-age population) WDI.

*TOT*: is the terms of trade, serie code TT.PRI.MRCH.XD.WD serie name NET BARTER TERMS OF TRADE INDEX (2000=100), WDI. For India data were obtained from the UNCTAD.