HUMAN CAPITAL DEVELOPMENT, WAR, AND FDI IN SUB-SAHARAN AFRICA

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Abstract: We use a panel data fixed effect model to identify the determinants of foreign direct investment (FDI) for a large sample of 29 sub-Saharan African countries from 1980 to 2003. We test whether human capital development (HCD), defined by either literacy rates or economic freedom, and the incidence of war affect FDI flows to these countries. Combining these explanatory variables to several widely used control variables, we find that the literacy rate (human capital), freedom (political rights and civil rights), and the incidence of war are important FDI determinants. The results confirm our expected signs: FDI inflows respond positively to the literacy rate and to improvements in political rights and civil liberties; war events, in contrast, exert strong negative effects on FDI. For robustness, we estimate the model for religion groupings of sub-Saharan African countries.

Keywords: FDI, Human capital development, Literacy rate, Freedom, Panel data.

1. Introduction

Foreign Direct Investment (FDI) has been the target by many African countries in their attempt to increase their standards of economic growth. During the last three decades, various African governments have adopted many regulations and policies in order to stimulate foreign investment. In contrast, the evidence in UNCTAD (2005) suggests otherwise: FDI inflows to Africa have failed to be an adequate and consistent source of finance for long-term development. When would FDI be better absorbed into the African economies? This paper argues that the often neglected elements of human capital development (HCD) and peace have a clear role in the process of modeling FDI into African economies.

Despite the increasing numbers of studies focusing on identifying determinants (such as trade liberalization or economic and trade policies) of FDI in Africa, the evidence from these studies has been inconclusive. Examining the role played by FDI inflows given the different trade policy regimes in developing countries, Balasubramanyam et al. (1996) support the general conclusion that the effect of FDI in terms of enhanced economic growth depends on the type of policy a country selects to use in dealing with foreign investment. Morisset (2000) and Gastanaga et al. (1998) demonstrate the relevance and importance of the policies and institutional variables as explanatory variables for FDI inflows in African countries.

Morisset (2000), in particular, develops a “call business climate for FDI” indicator, where he normalizes the value of total FDI inflows by GDP and the total value of natural resources in each country. The estimated results of his panel data regressions indicate that GDP growth rate and trade openness have been positively and significantly correlated with the investment climate in Africa, whereas, the illiteracy rate, the number of telephone lines and the share of urban population do not appear to have any influence on the business climate for FDI in the region. He

also tests the impact of political and financial risks, but these did not come significant in the cross-country regressions. Examining more closely the experience of individual economies, Morisset (2000) concludes that some African countries have been able to attract FDI due to an improvement in their business climates, with pro-active and reform-oriented polices.

Particular attention is given to policy credibility. Asiedu (2002) uses a cross-country regression model and finds that higher returns on investment and better infrastructure have a positive impact on FDI to non-sub-Saharan African countries, but have no significant impact on sub-Saharan African countries. She states that sub-Saharan Africa countries are different from the developing countries and that the relative decrease in FDI flows to Africa was related to an adverse regional effect and liberalization. Asiedu (2004) indicates further that Africa has become less attractive because the reform process in Africa is slower when compared with that of other regions. Using a panel data econometric approach to investigate the determinants of FDI in Africa, Naudé and Krugell (2007) identify a number of robust determinants of FDI: government consumption, inflation rate, investment, political stability, accountability, regulatory burden, rule of law and initial literacy. They show that *both* policy and institutional factors are determinants of FDI flows to Africa.

The African history of anti-colonialism and resistance against reforms has also been identified as a deterrent to potential investors. Moss et al. (2004) indicate that a profoundly deep-rooted skepticism within Africa toward foreign investors related to historical, ideological, and political background of the region deters FDI flows to Africa. Pigato (2001) reviews aspects of the legal, business, and economic environment for FDI in sub-Saharan Africa and recommends that, in order to stimulate FDI, Africa needs to improve its legal and judicial systems, reduce its bureaucracy, and improve its infrastructure.

Regarding the impact of the macroeconomic variables on FDI flows to Africa, Akinkugbe (2005) relates the attractiveness of African countries and the size of FDI volume received by these countries to factors such as higher level of income, higher return on investment, openness, and level of infrastructure. Onyeiwu and Shrestha (2004) find that economic growth, inflation, openness of the economy, international reserves, and natural resource availability are significant determinants, whereas political rights and infrastructure were found to be unimportant for FDI flows to Africa. Bende-Nabende (2002) finds the following determinants for multinational corporations in sub-Saharan Africa: market growth, export orientation policy, and FDI liberalization.

With respect to education and infrastructure, Cantwell (1997) indicates that most African countries lack the skill and technology infrastructure to absorb larger FDI flows in the primary sector. Lall and Kraemer-Mbula (2004) point out that the low level of African countries' industrial capabilities impedes African countries from moving forward in the global environment. Recent works in Oketch (2006) and Gyimah-Brempong et al. (2006) have emphasized that human capital is very important for economic growth in Africa, although have not dealt with their impact on regional FDI.

A possible explanation for the contradictory findings regarding the investigation of FDI determinants is that previous studies suffered from an "omitted variables" problem. The lack of robustness of some previous studies could be related to different methodologies as well. An overview of the literature findings about the determinants of FDI flows to sub-Saharan Africa reveals that - although there are many attempts to investigate the determinant of FDI in Africa - none investigates the complete role of human capital development behind FDI performance. The

common practice behind the poor performance of FDI flows to African countries has been to specify both policy credibility and governance failures.

This study attempts to fill this void and investigates the determinants of FDI into sub-Saharan Africa from a different angle. We systematically control for human capital development (HCD) elements (education level and freedom) and war as the critical determinants of FDI. Previous literature has indicated that the development of human capital as manifested by both education level and human rights has helped make some of the developing countries more attractive than others as investment destinations.[1] Nonetheless, the empirical evidence in support of this argument for low-income countries especially in sub-Saharan Africa is scant.

The investigation of the determinants of FDI in sub-Saharan Africa is carried out as follows through a panel data methodology. First, we investigate the impacts of education level and freedom (HCD variables) as the main and critical determinants of FDI, while at the same time controlling for some traditional macroeconomic variables founded by previous literature as potential and strong candidates for explaining FDI flows to sub-Saharan African countries. Then, as war becomes an indirect means to influence multinational companies and to affect human capital development, we control for war as an additional determinant that may also influence FDI flows to sub-Saharan African countries.

[1] Kravis (1988) and Lucas (1990) indicate that the quality of human capital - both skill and education level of labor - influence both the volume of FDI inflows and the activities of a multinational firm in developing countries. Mody et al. (1999) emphasize the preference of foreign investors for developed human capital as well as their perception of labor quality as key determinants in attracting foreign investors. Miyamoto (2003) states that developing host countries need a minimum of basic schooling for their adult population to demonstrate that they have sound investment climates for potential transnational corporations. Ake (1996) argues that political conditions in Africa are the greatest impediment to development and constitute the major factor for recent years' performance. Harms and Ursprung (2002) show empirically that multinational enterprises appear to be attracted by countries in which civil and political freedoms are respected.

The results show that an increase in education is found to be associated positively with FDI inflows, and an improvement in freedom is found to be associated with larger FDI inflows. The coefficients of the education level variables are very small. The slight literacy impacts on FDI inflows could be related to slower improvements in literacy in many sub-Saharan Africa countries. UNESCO (2006) indicates that, while adult literacy rates have improved in all world regions, they remain relatively low in sub-Saharan Africa during the last twenty years.[2] In sum, our result indicates that both educational level, as proxy by literacy rate, and freedom, as proxy by both political rights and civil rights, are important determinants for FDI in sub-Saharan Africa countries.

Our results also indicate that the war environment affects FDI inflows more than a non-war environment. Collier and Hoeffler (2002) argue that sub-Saharan Africa has experienced a rising trend of conflict during the last two decades. The struggles over the ownership and distribution of natural resources revenue constitute a major instability in the region as shown in Humphreys (2005). Finally, when investigating the impact of HCD indicators on FDI flows across two different groups of sub-Saharan African countries (Muslim and non-Muslim), this article provides evidence that religious groups in sub-Saharan Africa do not seem to influence FDI inflows. The results from testing these groups lend more support to our proposed model and increase the robustness of our main findings.

2. The Data

The dependent variable is FDI as a percentage of GDP. Data for this variable are from World Development Indicators (WDI) provided by the World Bank. Human Capital

[2] According to UNESCO (2006), in sub-Saharan Africa, literacy rates are extremely low in Benin, Burkina Faso, Chad, Mali, Mozambique, the Niger, Senegal and Sierra Leone, and relatively high in the Congo, Equatorial Guinea, Lesotho, Mauritius and Namibia.

Development are measured by two independent variables: the first is the education level, which is measured by adult literacy rate (LIT). While Barro and Lee (1993) and Root and Ahmed (1979) use secondary educational attainment to provide a measure of the human capital stock for a broad number of countries, Hanson II (1996) uses the square of the LIT to represent the level of education and training in poor countries. For sub-Saharan Africa, secondary educational attainment data are not available for most of the countries, which makes us choose LIT as a proxy. The data are from the UNESCO Institute for Statistics.[3] We anticipate a positive relationship between FDI and LIT.

The second HCD variable is freedom (DO). Gastil (1990) defines two components of a freedom system: political rights and civic rights as civil liberties. The extent to which these components are practiced and protected within a state suggests the extent of democratic and free practices. In previous literature, political rights and civil rights are used repeatedly as a proxy for freedom. Political rights and civil rights are measured on a one-to-seven scale, with one representing the highest degree of freedom and seven the lowest. In this research, the same measure will be used to measure freedom. A negative statistical relationship between this variable and FDI is expected. The data for this variable are obtained from Freedom House.

The following control variables are identified from the literature and included in the model: market size (RGDP) and market demand (GDPG), openness (OPEN), liquidity size of the market (LIQ), infrastructure (INFRA) and lag of FDI (LAG-FDI). First, the roles of market size and market demand in attracting foreign investment are well documented in the literature. While most of the studies use GDP per capita and its growth as a proxy for market size and demand, other studies use more measurements to proxy for the attractiveness of the market. For example,

[3] UNESCO Institute for Statistics at http://devdata.worldbank.org/edstats/query/defaultRgn.htm. Political rights and civil liberties: freedoms that protect an individual from arbitrary government interference, as the freedom of speech and movement. See: http://www.freedomhouse.org.

Root and Ahmed (1979) use GDP, GDP per capita, and GDP growth as proxies for market demand and market-size variables. They find that both GDP growth and GDP per capita significantly discriminate between groups of different countries, but absolute GDP does not. They indicate that the problem with using absolute GDP is that the absolute value may reflect the size of the population rather than the size of the income. The use of GDP per capita also may induce population bias in the level of income per capita. To avoid all of these possible size bias errors, we introduce logarithms to minimize the level of income bias so that the logarithm of GDP per capita based on purchasing power parity (PPP) is used to control for the income level. The use of PPP helps to control for the distortions due to anomalies of the exchange rate (non-tradable goods and service, tariff and taxes). GDP growth, which is the percentage change in GDP, is used to control for market growth. Data for GDP and GDP per capita PPP are obtained from the WDI. We expect to see a positive relationship between FDI and each of these two variables.

Openness (OPEN) is measured by imports plus the export of goods and services as a percentage of GDP. Following Culem (1988) and Edwards (1998), we expect to see a positive relationship between FDI and OPEN. Data for this variable are obtained from the WDI. For the liquidity size of the market (LIQ), Beck et al. (2000) indicate that the correlation between private credit and liquid liabilities is high and significant and that these variables are good indicators of liquidity size. This research uses quasi-liquid liabilities[4] as a percentage of GDP as a proxy for liquidity size of the market for these sub-Saharan African countries. This proxy represents the broadest indicator of intermediate financial liquidity. To the extent that multinational firms

[4] Quasi-liquid liabilities are the sum of currency and deposits in the central bank (M0) plus time and savings deposits, foreign currency transferable deposits, certificates of deposit and securities repurchase agreements, travelers checks, foreign currency time deposits, commercial papers, and shares of mutual funds or market funds held by residents.

prefer a conservative management of monetary policy, we anticipate a negative relationship between FDI and LIQ. The data for this variable are obtained from the WDI. Total main telephone lines per 1,000 persons is used to measure the infrastructure variable (INFRA): the number of telephone lines per 1,000 persons for the entire country. The source is the WDI database. For the use of this variable in the literature, see Mollick et al. (2006) and Loree and Guisinger (1995). A positive relationship between FDI and INFRA is expected. Finally, the proxy for existing business environment is measured by the lag of FDI (LAG-FDI). This can supply information about business climate and operating economic conditions. Pfeffervnann et al. (1992) indicate that potential foreign investors make their decisions according to the level of foreign business availability and investment already in place. It is obvious to expect a positive relationship between the lag of FDI (LAG-FDI) and FDI, consistent with empirical studies of persistence. The sample covers the period 2003 and involves 29 sub-Saharan African countries. Some countries were not included because of data from 1980 to limitations. The full list of countries is as follows: Burundi, Botswana, Central African Republic, Congo Republic, Ethiopia, Ghana, Kenya, Lesotho, Mauritius, Malawi, Rwanda, Swaziland, South Africa, Zambia, Zimbabwe, Benin, Burkina Faso, Cote D'Ivoire, Cameroon, Comoros, Mali, Mozambique, Mauritania, Niger, Nigeria, Senegal, Chad, Togo, and Uganda.

3. Methodology

The empirical estimation is based on the following pooled regression equation:

$$FDI_{it} = \alpha_i + \beta_1 \ln(RGDP_{it}) + \beta_2 LIT_{it} + \beta_3 DO_{it} +$$

$$\beta_4 \text{OPEN}_{it} + \beta_5 \text{LIQ}_{it} + \beta_6 \text{GDPG}_{it} \beta_7 \text{INFRA}_{it} + \beta_8 \text{LAG-FDI}_{it} + \in_{it} \quad (1)$$

(i = 1,2……,29) and (t = 1,2……24,) (1980 to 2003)

$$\beta_1 > 0,\ \beta_2 > 0,\ \beta_3 < 0,\ \beta_4 > 0,\ \beta_5 < 0,\ \beta_6 > 0,\ \beta_7 > 0 \text{ and } \beta_8 > 0,$$

where: subscript i refers to an individual country; subscript t refers to the time series factor, and α_i refers to the intercept. For a detailed description of the variable abbreviations used, see Table 1. We apply the panel data fixed effect model to (1), to control for omitted variables that differ between countries, but constant over time, so that we can use the changes in variables over time to estimate the effects of the independent variables on the dependent variable. In alternative tests, we also treat the countries' specific effects as random variables, but the results from these tests do not hold. We estimate equation (1) in first difference; estimating the first-differences allows one to investigate whether the growth rate of FDI is determined by the growth rate of these explanatory variables. Table 2 contains the correlation matrix for the (RHS) variables used in the analysis. There is only one variable (INFRA) that has a relatively high level of correlation with RGDP (.71). To control for this issue, we estimate the equation with and without this variable.

4. Empirical Analysis

Using a fixed effect method to estimate (1), we apply the cross-section weights technique (CSW), assuming the presence of cross-section heteroskedasticity and contemporaneously uncorrelated residuals. We also apply the seemingly unrelated regression (SUR) weighted least squares technique, assuming both cross-section heteroskedasticity and contemporaneous correlation. In all of the tests, we base the final result on comparing the estimated results of these two techniques. Although both techniques come up with similar results, the coefficient values under the SUR technique are larger. Table 3 shows the results of the basic model. All of the

variables in (1) are included as explained earlier. Literacy rates (LIT) and freedom (DO) are used as proxies for HCD. The following control variables are used in the model: RGDP, GDPG, OPEN, LIQ, INFRA, and LAG-FD. Because of high the correlation between INFRA and RGDP, INFRA was entered separately as well as simultaneously with RGDP in the model.

Columns 1 and 2 of Table 3 present the results of the basic model with HCD variables and the following control variables: RGDP, OPEN, LIQ, and GDPG. The results show that, under both the CSW and SUR techniques, all of the coefficients for all variables (RGDP, LIT, DO, OPEN, LIQ, GDPG) are significant and have the correct signs. Regarding the tests for serial correlation, the t-test results are significant under both CSW and SUR techniques, indicating the presence of serial correlation. The LM-NR^2 test results are insignificant, indicating the absence of serial correlation under both CSW and SUR techniques. Then, the INFRA variable is introduced into the model, and the result is displayed in columns 3 and 4 of Table 3. All coefficients estimated are statistically significant and have correct signs under the CSW technique as well as under the SUR technique. In columns 5 and 6, we drop INFRA from the analysis, but we include LAG-FDI. The results show significant coefficients and correct signs for all included variables.

Finally, we include both INFRA and LAG-FDI variables in the regression equation. The results are displayed in columns 7 and 8. Regarding our critical HCD variables, the coefficients for LIT and DO variables are significant and have correct signs under both techniques. The coefficients for all control variables are significant and have the expected signs except INFRA, which, however, is very small. Except for the result for the INFRA variable, based on the results in column 8 the relationship between FDI and all suggested independent variables in the model come out as indicated in our model.

Although the coefficients for HCD variables (LIT and DO) are small, both variables have positive and statistically significant impacts on FDI inflows to sub-Saharan African countries. Any increase in LIT increases FDI inflows, and any decrease in DO's coefficients (which means that a country experiences a positive status change to a better freedom) will increase FDI inflows. Moosa and Cardak (2005) indicate that, even if theoretical reasoning is valid for a particular country or group of countries, it may not be valid for other countries or groups of countries. Avik (2001) indicates that the lack of robustness of some previous studies could be related to the different methodologies, different types of sample selection methods, and different analytical tools.

Differencing the independent variable and the dependent variables, the results are not consistent and could have been affected by the small and negative values in the data. The results, available upon request, indicate very clearly that the growth rate of FDI is not determined by the growth rate of these explanatory variables. Including an endogenous variable in a regression also may complicate the understanding of the relationship of interest and create a spurious result. Similarly, there is a concern that GDP growth is endogenously determined; therefore, the estimated coefficients will be biased and inconsistent. To see how our model is sensitive to information change in the tests, we drop years 2003, 2002 and 2001 consecutively from the data and rerun the analysis. The results are very robust to these modifications. Dropping the countries with upper-middle income and leaving only the countries with low-income, the results remain very robust.

To control for certain important but unobservable political and cultural heterogeneity that may affect FDI flows to sub-Saharan Africa, we classify the countries used in this chapter into two groups: Muslim and non-Muslim countries. The classification is based on African countries'

historical demographic characteristics provided by the World Bank: Muslim[5] and non-Muslim[6]. There are 14 Muslim countries in Group 1 and 15 non-Muslim countries in Group 2. Similarly, a panel regression was done on equation (1) using both CSW and SUR techniques. For the two groups, the results are displayed in Table 4. For Group 1, the Muslim countries group, the results for the HCD variables shows that LIT variables have significant coefficients under both methods. DO variable coefficients are insignificant but have correct signs. Both the t-test and the LM-NR^2 tests indicate that there is no serial correlation under both CSW and SUR techniques. For Group 2, the non-Muslim countries group, the coefficients for LIT and DO variables are significant and have the correct signs under both techniques. Again no serial correlation is detected.

The comparison of the results for HCD variables between these two groups suggests that the difference in significance for the DO variable could be related to the scale used to measure the variable. Freedom is measured by a scale from one to seven (one-to-seven scale), with one representing the highest degree of freedom and seven the lowest. Countries are classified into three categories: countries whose combined average ratings for political rights and for civil liberties fell between 1.0 and 2.5 were designated "Free," between 3.0 and 5.5 designated "Partly-Free," and between 5.5 and 7.0 designated "Not-Free." There are six countries classified as "Partly-Free" from each group of sub-Saharan African countries over the test period used in this research. The "Partly-Free" window has a long range, where a discerning trend about the countries and about weight given to classify these countries in this window which may cause the insignificance in the results. We conjecture that this drives the insignificant result for Muslim. Religious grouping appears not to influence FDI inflows.

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[5] Muslim Countries: Benin, Burkina Faso, Cote D'Ivoire, Cameroon, Comoros, Mali, Mozambique, Mauritania, Niger, Nigeria, Senegal, Chad, Togo, and Uganda.

[6] Non-Muslim Countries: Burundi, Botswana, Central African Republic, Congo Republic, Ethiopia, Ghana, Kenya, Lesotho, Mauritius, Malawi, Rwanda, Swaziland, South Africa, Zambia and Zimbabwe.

We run the Chow test for no differences at all between the groups: Muslim and non-Muslim. To account for heteroskedasticity in this test, we construct interaction terms between these groups and main researched variables and do an F-test. Finally, we compare the size of the coefficients in these groups to see if there is any economic value from using the groups. While all these tests and evaluations do not show any different in the results between the groups, the tests of the relationship between FDI inflows and these independent variables for these groups increases the robustness and plausibility of the model. The t-test for serial correlation for both groups turns insignificant, indicating that the present of the serial correlation in previous tests is related to the influence of the sample size.

To quantify the impact of political turmoil and conflict (war) on FDI inflows, following Kravis and Lipsey (1982), we create a dummy variable with a value of 1 if there is a conflict in a particular year and 0 if not. We expect that war will have a negative impact on FDI inflows. The results show that war explains some of the variation in FDI flows to sub-Saharan African countries. War has a negative and significant impact on FDI flows to sub-Saharan Africa. By including war as an explanatory variable in the model, most coefficients of other explanatory variables improve in values. There is also an improvement in Adjusted R^2 values. Based on the results displayed on columns 2 and 4 in Table 5, the relationship between FDI and all independent variables in the model comes out as indicated in our model. Many countries in sub-Saharan Africa have been disintegrated by domestic conflicts, which also have severe effects on many foreign businesses in these countries.[7]

[7] For example, the Cameroon-Nigeria conflict started in 1994 with regard to fishing settlements on the Bakassi Peninsula. In Chad, the military conflict between the regime in power and armed opposition groups, continued between 1989 and 2003, and intensified after the discovery of oil. The erupted conflict over natural resources in the western region of Sudan-Darfur started in the 1980s and has intensified in the 1990s. All of these conflicts, as well many others not mentioned here, have contributed to the instability of the supply of primary commodities and therefore to the uneven and sluggish inflows of FDI into Africa.

5. Concluding Remarks

The recent contributions in Oketch (2006) and Gyimah-Brempong et al. (2006) have emphasized that human capital is very important for economic growth in Africa, although they have not dealt with their impact on regional FDI. Naudé and Krugell (2007) contain a treatment of institutions in the context of FDI into Africa. It has been widely mentioned that one of the critical hindrances to Africa's economic performance has been the continuation of military and armed conflicts. The 1990s were the most disruptive years since independence and previous literature indicates that sub-Saharan Africa has experienced a rising trend of conflict during the last two decades as pointed out by Collier and Hoeffer (2002). The struggles over the ownership and distribution of natural resources revenue constitute a major instability in the region as well, according to Humphreys (2005).

We incorporate these issues into this study on the determinants of FDI for a large sample of 29 sub-Saharan countries over 1980-2003. The findings in this paper indicate that literacy rate (as a proxy for educational level), political rights and civil liberties (as a proxy for freedom), and political turmoil and conflict (as a proxy for war) are always consistent and significant determinants of FDI flow to sub-Saharan Africa. There is a positive relationship between FDI inflows and the literacy rate and an improvement in political rights and civil liberties is found to be associated with an increase in FDI inflows. War events are shown to have a significant and negative effect on FDI flows into those countries. The mechanism is likely to operate as follows: Multinational enterprises, which work primarily in exporting of primary commodities in sub-Sahara Africa, appear to be affected in their investment decisions when their political and civil rights are not respected and when armed conflict is at place.

The slow-growing literacy rate and continuing political instability should be the major concern for the development of effective FDI policies for sub-Saharan African countries. Literacy can be a way to access technical knowledge and civic engagement, which contribute to the quality of public policies, freedom and democracy. Graff (1987) indicates that literacy can act as a mechanism to train people to participate in a political system, and it can enhance political awareness, empowerment, and community action, which mitigate internal conflicts. This research suggests that policies promoting a stable and peaceful environment in which basic education and freedom are encouraged will serve as basic FDI strategies.

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Table 1

Descriptive Statistics

	Mean	Median	Std. Dev.	Observations
FDI	1.7628	0.6544	3.9887	667
RGDP	1982.1760	1147.7590	2173.9220	667
LIT	50.6011	51.0894	21.3690	667
DO	4.9925	6.0000	1.7514	667
GDPG	0.0321	0.0358	0.0556	667
OPEN	67.2901	56.6691	36.1133	667
LIQ	11.4558	8.1656	12.8274	667
INFRA	21.3595	5.0014	58.1679	667
WAR	0.2639	0.0000	0.4411	667

FDI: Foreign direct investment, net inflows % of GDP

RGDP: GDP per capita, PPP (constant 2000 international $); Gross domestic product per capita converted to international dollars PPP.

LIT: Literacy rate is adult total % of people ages 15 and above.

DO: Freedom (political rights and civil liberties) where a country is classified on 1-7 scale where 7 indicates less freedom.

GDPG: Growth of GDP (constant 2000 US$) which is calculated as percentage Change in GDP.

OPEN: Trade open is measured by import plus export of goods and services as the percentage of GDP.

LIQ: Quasi-liquid liabilities as percentage of GDP.

INFRA: Telephone mainlines (per 1,000 people).

LAG-FDI: Lag FDI is used as a proxy for operating economic conditions.

WAR: For the impact of political turmoil and conflict, a dummy is that has a value of 1 if there is a conflict in a particular year and zero otherwise.

Table 2

Correlation Matrix

	RGDP	LIT	DO	GDPG	OPEN	LIQ	INFRA	WAR
RGDP	1.0000							
LIT	0.5253	1.0000						
DO	-0.4310	-0.2825	1.0000					
GDPG	0.0751	0.0804	-0.1570	1.0000				
OPEN	0.3097	0.4511	-0.1665	0.1333	1.0000			
LIQ	0.6039	0.5703	-0.3681	0.0997	0.3699	1.0000		
INFRA	0.7110	0.3886	-0.4217	0.0393	0.2301	0.5294	1.0000	
WAR	-0.1984	-0.2094	0.2261	-0.0776	-0.1481	-0.2132	-0.1488	1.0000

Table 3

Model 1

$$FDI_{it} = \alpha_i + \beta_1 \ln(RGDP_{it}) + \beta_2 LIT_{it} + \beta_3 DO_{it} \beta_4 OPEN_{it} + \beta_5 LIQ_{it} + \beta_6 GDPG_{it} + \beta_7 INFRA_{it} + \beta_8 LAG\text{-}FDI_{it} + \in_{it}$$

(i = 1, 2 …… 29) (t = 1, 2 ……24)

	1	2	3	4	5	6	7	8
Method	FEM CS-Weight	FEM Sur Weight	FEM CS-Weight	FEM Sur Weight	FEM CS-Weight	FEM Sur Weight	FEM CS-Weight	FEM Sur Weight
β_1	1.8526	5.4750	1.7834	0.3466	1.3042	1.1042	1.3552	0.9307
	(17.0849)***	(54.7300)***	(16.1847)***	(7.5617)***	(8.8444)***	(5.8444)***	(8.7807)***	(737.4050)***
β_2	0.0055	0.0888	0.0054	0.0412	0.0094	0.0104	0.0109	0.0419
	(3.8938)***	(21.2342)***	(3.5232)***	(31.8462)***	(7.2100)***	(6.2100)***	(6.9728)***	(126.0000)***
β_3	-0.0714	-0.1911	-0.0672	-0.2348	-0.0292	-0.0292	-0.0274	-0.0037
	(-9.8745)***	(-19.4421)***	(-9.1878)***	(-62.7174)***	(-3.2016)***	(-4.1011)***	(-2.9631)***	(-434.2494)***
β_4	0.0193	0.0150	0.0193	0.0015	0.0093	0.0053	0.0094	0.0031
	(21.1062)***	(21.8554)***	(21.0874)***	(4.3282)***	(7.8373)***	(6.3323)***	(7.8175)***	(443.3110)***
β_5	-0.0209	-0.0668	-0.0225	-0.0307	-0.0146	-0.0046	-0.0151	-0.0059
	(-7.7936)***	(-25.7921)***	(-8.3113)***	(-24.6872)***	(-4.9678)***	(-7.9578)***	(-5.1195)***	(-336.5460)***
β_6	0.4327	0.8924	0.4550	1.7992	0.2573	0.1573	0.2286	2.5435
	(5.9058)***	(78.7631)***	(6.0883)***	(26.7213)***	(3.7334)***	(4.1334)***	(3.1442)***	(228.4000)***
β_7			0.0018	0.0280			0.0001	-0.0002
			(2.6227)***	(64.3623)***			(0.1261)	(-172.5930)***
β_8					0.4600	0.4193	0.4523	0.4487
					(8.3864)***	(5.3361)***	(8.0481)***	(122.9500)***
ADJ R^2	0.1844	0.2890	0.1864	0.1615	0.3964	0.4264	0.3904	0.5270
N	29	29	29	29	29	29	29	29
T	24	24	24	24	24	24	24	24
DW	1.3518	0.7549	1.3648	0.6520	2.1881	3.1881	2.1707	1.5881
RESIDUAL-TESTS								
T-TEST	(7.8139)***	(369.5441)***	(7.4925)***	(358.9186)***	(-5.1586)***	(-4.1386)***	(-5.2451)***	(-2.8582)***
LM-NR^2	(5.7256)	(10.9967)	(10.6895)	(2.9586)	(0.8838)	(0.2338)	(0.9120)	(2.5922)

Notes: Annual frequency is from 1980 to 2003 for 29 countries (N). FEM stands for fixed effects model. Both cross section weights and seemingly unrelated regression are used. White heteroskedasticity covariance matrix is employed. T-Statistic is reported in parenthesis. Two residual tests: (i) The t-statistic is associated with the lagged residual within a standard Lagrange Multiplier test on the residuals of the panel data regression. (ii) LM – NR^2 statistic: is the value derived from N and R^2 computed in this auxiliary regression. This statistic follows a chi-squared distribution with degrees of freedom equal to the number of estimated parameters (p) in the auxiliary regression. The LM NR^2 statistic is calculated under the null hypothesis of no serial correlation up to lag order 1, which is reasonable for annual data. The asterisks *, **, and *** indicate significance levels of 10%, 5% and 1%, respectively.

Table 4

Model 1

$$FDI_{it} = \alpha_i + \beta_1 \ln(RGDP_{it}) + \beta_2 LIT_{it} + \beta_3 DO_{it} \beta_4 OPEN_{it} + \beta_5 LIQ_{it} + \beta_6 GDPG_{it} + \beta_7 INFRA_{it} + \beta_8 LAG\text{-}FDI_{it} + \in_{it}$$

(i = 1, 2 …… 14 for Muslim countries)

(i = 1, 2 ……15 for. Non-Muslim countries)

(t = 1, 2 ……24)

	Muslim Countries		Non-Muslim Countries	
	1	2	1	2
Method	FEM CS-Weight	FEM Sur Weight	FEM CS-Weight	FEM Sur Weight
β_1	0.8691	1.4392	1.3314	3.2624
	(1.9611)*	(3.9759)***	(4.5288)***	(11.6673)***
β_2	0.0386	0.0522	0.0067	0.0325
	(2.8595)***	(5.7064)***	(1.9269)*	(6.1396)***
β_3	-0.0135	-0.0200	-0.0564	-0.1190
	(-0.6670)	(-0.6473)	(-3.8741)***	(-6.1181)***
β_4	0.0132	0.0204	0.0134	0.0078
	(2.9134)***	(3.8310)***	(5.8149)***	(4.0322)***
β_5	-0.0176	-0.0227	-0.0207	-0.0423
	(-2.2176)**	(-2.4074)**	(-3.4168)***	(-8.1394)***
β_6	0.4566	0.3974	0.5325	0.4134
	(0.9892)	(0.5050)	(3.3141)***	(1.5829)*
β_7	0.0104	0.0276	0.0000	-0.0032
	(1.2201)	(1.7179)	(-0.0157)	(-6.6444)***
β_8	0.5939	0.5160	0.3672	0.4393
	(4.4592)***	(9.6399)***	(4.4262)***	(11.1889)***
ADJ R^2	0.5742	0.5949	0.2918	0.5205
N	14	14	15	15
T	24	24	24	24
DW	2.0415	1.2507	2.1548	2.0542
RESIDUAL-TESTS				
T-TEST	(-1.0874)	(2.1420)	(-1.5854)	(-2.4343)
LM-NR^2	(0.0944)	(0.9809)	(0.1648)	(0.1169)

Notes: Annual frequency is from 1980 to 2003 for 29 countries (N). FEM stands for fixed effects model. Both cross section weights and seemingly unrelated regression are used. White heteroskedasticity covariance matrix is employed. T-Statistic is reported in parenthesis. Two residual tests: (i) The t-statistic is associated with the lagged residual within a standard Lagrange Multiplier test on the residuals of the panel data regression. (ii) LM – NR^2 statistic: is the value derived from N and R^2 computed in this auxiliary regression. This statistic follows a chi-squared distribution with degrees of freedom equal to the number of estimated parameters (p) in the auxiliary regression. The LM NR^2 statistic is calculated under the null hypothesis of no serial correlation up to lag order 1, which is reasonable for annual data. The asterisks *, **, and *** indicate significance levels of 10%, 5% and 1%, respectively. *Muslim Countries* are: Benin, Burkina Faso, Cote D'Ivoire, Cameroon, Comoros, Mali, Mozambique, Mauritania, Niger, Nigeria, Senegal, Chad, Togo, Uganda; and *Non-Muslim Countries* are: Burundi, Botswana, Central African Republic, Congo, Rep., Comoros, Ethiopia, Ghana, Kenya, Lesotho, Malawi, Rwanda, Swaziland, South Africa, Zambia, Zimbabwe.

Table 5

Model 1

$$FDI_{it} = \alpha_i + \beta_1 \ln(RGDP_{it}) + \beta_2 LIT_{it} + \beta_3 DO_{it} \beta_4 OPEN_{it} + \beta_5 LIQ_{it} + \beta_6 GDPG_{it} + \beta_7 INFRA_{it} + \beta_8 LAG\text{-}FDI_{it} + \beta_9 WAR_{it} + \in_{it}$$

(i = 1, 2 …… 29) (t = 1, 2 ……24)

Method	1 FEM CS-Weight	2 FEM Sur Weight	3 FEM CS-Weight	4 FEM Sur Weight
β_1	1.3552	0.9307	1.3205	2.8031
	(8.7807)***	(737.4050)***	(8.6794)***	(50.1484)***
β_2	0.0109	0.0419	0.0109	0.0641
	(6.9728)***	(126.0000)***	(6.7111)***	(84.4805)***
β_3	-0.0274	-0.0037	-0.0182	-0.0175
	(-2.9631)***	(-434.2494)***	(-1.6561)*	(-5.5420)***
β_4	0.0094	0.0031	0.0096	0.0085
	(7.8175)***	(443.3110)***	(8.0910)***	(30.9357)***
β_5	-0.0151	-0.0059	-0.0157	-0.0305
	(-5.1195)***	(-336.5460)***	(-5.2422)***	(-33.0624)***
β_6	0.2286	2.5435	0.2055	1.8495
	(3.1442)***	(228.4000)***	(2.8706)**	(31.0199)***
β_7	0.0001	-0.0002	0.0003	-0.0024
	(0.1261)	(-172.5930)***	(0.2168)	(-19.1824)***
β_8	0.4523	0.4487	0.4539	0.6333
	(8.0481)***	(122.9500)***	(8.0670)***	-103.7641
β_9			-0.0549	-0.4730
			(-3.1873)***	(-49.5659)***
ADJ R^2	0.3904	0.5270	0.3911	0.5700
N	29	29	29	29
T	23	23	23	23
DW	2.1707	1.5881	2.1734	2.0580
RESIDUAL-TESTS				
T-TEST	(-5.2451)***	(-2.8582)***	(6.2342)***	(8.9186)***
LM-NR^2	(0.9120)	(2.5922)	(1.6895)	(2.9586)

Notes: Annual frequency from 1980 to 2003 for 29 countries (N). FEM stands for fixed intercept, using both cross section weights and seemingly unrelated regression. White heteroskedasticity covariance matrix is employed. T-Statistic is reported in parenthesis. Two residual tests: (i) The t-statistic is the t-statistic associated with the lagged residual within a standard Lagrange Multiplier test on the residuals of the panel data regression. (ii) LM – NR^2 statistic: is the value derived from N and R^2 computed in this auxiliary regression. This statistic follows a chi-squared distribution with degrees of freedom equal to the number of estimated parameters (p) in the auxiliary regression. The LM NR^2 statistic is calculated under the null hypothesis of no serial correlation up to lag order 1, which is reasonable for annual data. The asterisks *, **, and *** indicate significance levels of 10%, 5% and 1%, respectively.