Islamic Development Bank, Foreign Aid and Economic Growth in Africa: A Simultaneous Equations Model Approach

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Received: April 9, 2012 Accepted: May 5, 2012 Published: June 1, 2012

doi:10.5539/ijef.v4n6p94 URL: http://dx.doi.org/10.5539/ijef.v4n6p94

Abstract

This study is an empirical investigation on the role of the Islamic Development Bank (IDB) Group through its foreign aid activities in contributing to the economic growth of African countries, especially the African Muslim Countries (AMCs). The AMCs, which is serving as the sample countries for this study constitute more than two-third of the IDB member countries from Africa. Therefore, this study provides empirical evidences from AMCs like Algeria, Burkina Faso, Egypt, Senegal, Niger, Morocco and Tunisia among others, on the impact of its development assistance (DA) on the economic growth of these countries using balanced panel data of six years average from 1987-2010. In order to accomplish the objectives of this paper, Simultaneous Equations Model (SEM) was adopted and Seemingly Unrelated Regressions Estimate (SURE) method was utilized for its estimation. In view of this, the findings from this study revealed that the DA of IDB has positive impact on the economic growth of AMCs through investment as the major transmission mechanism. Moreover, the impacts of the DA on human capital were more than that of investment and growth. This paper hereby recommends that the IDB should give more attention to these important transmission mechanisms, since they are among the expected gains of foreign aid to LDCs as theoretically advanced in the literature and empirically established. Evidently, this study is perhaps the first of its kind to empirically investigate the impact of the foreign aid activities of IDB in Africa, especially in AMCs.

Keywords: foreign aid, AMCs, IDB, economic growth, SEM, Africa, SURE method

JEL Code: H27, H30, F35, F43, N17

1. Introduction

The Islamic Development Bank is a multilateral development bank (MDB) and the largest trade and financing institution in the Muslim world. It was established in pursuance of the Declaration of Intent issued by the first Conference of Finance Ministers of Muslim Countries held in Jeddah (1973). However, the formal establishment and commencement of activities of the Bank was in 1975. Against this background, the purpose of the Bank is to foster the economic development and social progress of member countries and Muslim communities individually as well as collectively in accordance with the principles of Shari'ah i.e. Islamic Law. It engages in a wide range of specialized and integrated activities, which include: resource mobilization, investment, public and private sector financing, trade financing, technical assistance for capacity building, technical cooperation among member countries, debt relief, emergency relief and a host of others (IDB, 2009, 2011a). The Bank is made up of 56 member countries with spread across four continents i.e. Africa, Asia, Europe and Latin America. The member countries have approximately 1.55 billion people as at 2010, which represents over one-fifth of the world's population. All the member countries are part and parcel of Organization of the Islamic Conference, which is the umbrella body and the Bank serves as its financial wing as noted by (Pramanik, 2003). The main shareholders of the Bank are presented in the Table 1.

Table 1. The Major Shareholders of IDB

S/N	COUNTRY	CONTINENT	SHARES (%)
1.	Saudi Arabia	Asia	23.6
2.	Libya	Africa	9.47
3.	Iran	Asia	8.28
4.	Nigeria	Africa	7.69
5.	Qatar	Asia	7.21
6.	Egypt	Africa	7.10
7.	Turkey	Europe	6.48
8.	U.A.E.	Asia	5.81
9.	Kuwait	Asia	4.48
10.	Other Member Countries	Various Continents	16.87

Source: Adapted from IDB (2011a).

Importantly, the Bank in almost four decades of its inception and operations has been contributing immensely to the socio-economic advancement of its member countries and the world at large through its numerous activities and indeed, Africa has been one of the major beneficiaries. Africa alone has 27 countries as members of the Bank and thus, in the Bank classification of Least Developed Member Countries (LDMCs) of 28 countries, 18 of these countries are African (IDB, 2008a). By virtue of being members of this special group, they enjoy a lot of privileges in terms of allocations and projects execution of the Bank, which aimed at poverty alleviation, boosting economic growth and enhancing institutional capacity so as to manage and sustain development projects and programs. More so, most of the activities in the LDMCs are concentrated in education, health, agriculture and water supply sectors (IDB, 2004). Notwithstanding these developmental efforts and initiatives, the African continent contains the largest number of backward and least developed countries, while almost half of its population lives in poverty. Africa comprises 32 of the world's 48 least developed countries and 34 of the 45 lowest-ranked countries for human development in UNDP Human Development Report of 1998 and the HDI for Sub-Saharan Africa (SSA) in 2001 was 0.47. In the same vein, the 2007/2008 Human Development Report also revealed that 22 countries suffer from low human development and that 11 African member countries of IDB are affected (Dowden, 2011; Easterly & Levine, 1997; Gyimah-Brempong & Wilson, 2005; IDB, 2007; Kasekende, 2008). Similarly, the HDI of 2010 by the UNDP listed 42 countries with HDI of 0.8 and above. Unfortunately, there is no African country that fall within the highest level except in the category of low human development with Zimbabwe at the bottom of the ladder. The continent also suffers high level of growth deficits over the last four decades (Agubuzu, 2004; Gambari, 2004; UNDP, 2010). It needs to be stressed also that on current trends, growth is still inadequate in most African countries, particularly with respect to achieving the Millennium Development Goals (MDGs). In view of the foregoing submissions, it should be made clear that among the theoretical expectations and assumptions on foreign aid, which is also known as development assistance (DA) in the IDB parlance is that it should serve as a potent fiscal tool to stimulate and enhance the economic growth of developing countries and more especially LDCs like African countries. Hence, foreign aid is considered to be necessary and beneficial to the economies of LDCs, especially in the areas of promoting growth, poverty-reduction, increasing investment, human capital development, supporting good governance and a host of others. More particularly, it has been noted by Adeoye (2006) as well as Loxley and Sackey (2008) that among the most important factors and ingredients required to propel Africa's growth process are investment in physical and human capital. Hence, for meaningful and purposeful growth and sustainability in the continent, substantial investment are necessary in these important determinants of growth. In view of this, multilateral development and financial institutions like the Islamic Development Bank (IDB) Group has long been involved in the promotion and fostering of the economies of LDCs and developing countries in various continents like Africa, Asia and Latin America among others. In view of the fact that 2015 draws closer, implementation of policies to meet the Millennium Development Goals (MDGs) in Africa, especially for SSA is now more urgent and important than ever. This scenario of revenue bottlenecks in the continent underscores the seriousness of financial resource gap, which foreign aid is expected to fill, especially as the continent battles with the great desire and desperation to realize MDGs by 2015 and IDB Vision 1440H. Hence, there is the urgent need to mobilize domestic and external resources to achieve these noble initiatives and programs have become more imperative. As a matter of fact, for Africa to achieve sustainable development in the real sense, collaboration with various global financial institutions, organizations and agencies are necessary, especially the ones that are genuinely interested in the development of the continent like the IDB has become more imperative. Basically, the IDB since 1976 to 2010 has cumulatively expended over US$70.321 billion (i.e. net approval) as the DA to both member and non-member

countries in various parts of the world. However, according to IDB (2011b), the Bank's activities are dominated by trade financing which accounts for 52.5 percent of total financing, followed by project financing, which was 46 percent, special assistance was 1percent and technical assistance was 0.5 percent. All these mode of financing represent the four major classification of DA in IDB.

However, despite the fact that the IDB is the most leading and prominent Islamic multilateral financial institution and aid agency in the Muslim world and especially with its almost four decades of foreign aid activities; it is surprising to note that no empirical study is available on the impact of its foreign aid activities on the economies of African countries, particularly the African Muslim Countries (AMCs). Hence, our empirical investigation examined the impacts of the DA of IDB on the economic growth, investment drive and human capital development (HCD) of selected African countries, which we refer to as "African Muslim Countries-AMCs". The AMCs constitute more than two-third of the member countries of IDB from Africa. In view of this, the study utilized the panel data approach of 6years average with SEM adopted as the base model with SURE method used as the estimating technique as against the OLS procedure, which often exhibits simultaneous bias in the face of simultaneity. This adoption is in line with the position of Zellner and Theil (1962), Zellner (2006) and Arazmuradov (2011) in their studies. In fact, Zellner (2006) posits that SURE method guarantees improved hypothesis tests regarding regression coefficients and the values of other parameters in the SEM equations are better estimated. To this end, the entire paper is divided into five sections with this introduction serving as section one. Issues on the conceptual and theoretical framework as well as the DA of IDB in Africa form the contents of section two. Section three presents the research methodology and data analysis; while empirical findings are presented in section four. The conclusion and recommendations of this study are presented in section five.

2. Conceptual and Theoretical Framework

2.1 Conceptual Framework

2.1.1 Foreign Aid

It involves transfer of resources or wealth from the developed countries or multilateral development institutions like World Bank, IMF, OECD, AsDB, AfDB, IDB and a host of others to LDCs or developing countries for the purpose of promoting economic development. Foreign aid is also referred to as foreign assistance, development assistance/aid or external aid from various International Financial Institutions and Agencies like DFID, CIDA and USAID among others. Easterly (2003) submits that the standard definition of foreign aid according to the Development Assistance Committee (DAC) implies grants and concessional loans net of repayment of previous aid loans. This is a measure that treats forgiveness of past loans as current aid and this may be regarded as a reasonable measure of the actual transfer to liquidity-constrained governments. Thus, the foreign aid emanating from OECD is referred to as ODA (i.e. Official Development Assistance) and it has always been the major reference point when discussing about foreign aid (Riddell, 2007; IDB, 2008b). Therefore, foreign aid in simple terms means the transfer of resources/wealth from developed nations or international financial institutions or agencies to less developed countries, which could either be through bilateral or multilateral means for the purpose of promoting economic growth and development in LDCs. This transfer may be in the form of grants that do not need to be repaid or loans that carry lower rates of interest or no interest as it is obtainable in IDB and also, longer period of repayment than normally would be allowed. Nevertheless, Arnold (1985) and Shah et al. (2005) identified various types of foreign aid to include: financial aid which could be either tied or untied (such as loans and grants), commodity aid, technical aid, foreign direct investment (FDI), bilateral aid, multilateral aid, emergency assistance, project aid, program aid and military aid. Foreign aid may also come in a variety of physical forms such as technical assistance, programs, projects such as infrastructural development and supplies of food or food aid (Moreira, 2003; Riddell, 2007). Other forms include debt forgiveness, sector assistance and investment. Against this backdrop, this study was largely concerned about those types and forms of foreign aid (known as development assistance – DA in the parlance of IDB), since the focus of this study is about the impact of the foreign aid activities of IDB on AMCs. Therefore, the four major categorization of DA by the IDB are: i. Project financing; ii. Trade financing; iii. Technical assistance; and iv. Special assistance (IDB, 2008c, 2011b). It is based on this categorization that our data on foreign aid from the IDB were gathered and analyzed.

2.1.2 African Muslim Countries (AMCs)

Africa is a complex and heterogeneous continent that is made up of ethno- linguistic and religious diversities. For instance, Nigeria which is often described as "the Giant of Africa" has more than two hundred and fifty (250) ethnic groups speaking over four hundred (400) languages and dialects. The ethnic groups have diverse cultural and religious backgrounds but the two most dominant religions are Islam and Christianity (Central Intelligence Agency - CIA, 2011). Other types of religions include: traditional worshippers and free thinkers (secularists). This picture is

perhaps true for most African countries, especially in the SSA region. Essentially therefore, the concept of African Muslim Countries (AMCs) is a new concept introduced by this study to mean countries in Africa whose Muslim population is at least 50 percent (see Table 2), since there are other religious groups in the countries. However, the fact that an African country is a member of OIC or its head of government is a Muslim does not automatically qualifies such a country to be regarded as a Muslim country, rather the yardstick or criterion used in this research is the population parameter. The submission of USAID (2004) corroborates this position of what connotes a Muslim country: "The Muslim world is extensive and diverse, comprising 48 countries where at least 50 percent of the population is Muslim. It extends from West Africa (Morocco and Mauritania) to East Asia (Indonesia)". The table below provides more information on some selected basic indicators of AMCs.

Table 2. Basic Indicators for AMCs (2010)

Country	Population (000s)	Land area (000s of km2)	Pop. Density (pop/km2)	GDP (PPP, USD million)	GDP per Capita (PPP, USD)	Annual real GDP growth (average over 2002-10)	Muslim Pop. (%)
Algeria	35,423	2,382	15	234,572	6,622	3.9	99
Burkina Faso	16,287	274	59	20,986	1,289	5.5	60.5
Chad	11,506	1,284	9	17,469	1,518	8.4	53.1
Comoros	691	2	309	845	1,223	1.8	98
Djibouti	879	23	38	2,131	2,424	4.1	94
Egypt	84,474	1,001	84	501,752	5,940	5.1	90
Gambia	1,751	11	155	3,525	2,031	5.2	90
Guinea	10,324	246	42	11,672	1,131	2.5	85
Libya	6,546	1,760	4	93,233	14,244	5.2	97
Mali	13,323	1,240	11	15,243	1,144	4.9	90
Mauritania	3,366	1,026	3	8,250	2,451	4.1	100
Morocco	32,381	711	46	156,306	4,827	4.6	99
Niger	15,891	1,267	13	10,979	691	4.7	80
Nigeria	158,259	924	171	384,084	2,427	9.1	50
Senegal	12,861	197	65	22,009	1,711	3.9	94
Sierra Leone	5,836	72	81	5,128	879	8.7	60
Somalia	9,359	638	15	N/A	N/A	N/A	100
Sudan	43,192	2,506	17	92,741	2,147	6.9	70
Tunisia	10,374	164	63	100,606	9,698	4.5	98

Source: OECD (2011) and CIA (2011).

Note: N/A means data is not available.

Considering the fact that out of the 27 African countries that are members of IDB, 19 of them qualify as African Muslim Countries based on the population parameter of 50 percent earlier stated above. Therefore, there is the need for new vistas to be explored and new perspectives introduced in the ongoing economic and political debate of a richly endowed continent but caught in a "series of interlocking development traps" as posited by Collier (2006, p. 189). As a matter of fact, the concept of AMCs is a new economic and political concept introduced by this study as a contribution to the debate on the African growth and development process.

2.1.3 Theoretical Framework

Among the most popular and often quoted theories in the Aid-Growth nexus literature is the Financial Two-Gap model also known as the Double Deficits Model (DDM). The model was propounded by Chenery and Strout (1966). The model is based on the notion that economic performance and economic growth is stimulated and enhanced by foreign aid (Easterly, 2003; Ali & Isse, 2005). Basically, the model assumed that a gap exists either between savings and investment or between export and import, which LDCs could not overcome these gaps on their own due to their limited resources or shortage of investment and foreign exchange requirements, which are considered as two growth deficits. The rationale of the model therefore, is that foreign aid should make up the differences between either the export-import gap (M-E) or the saving-investment gap (I-S). According to Easterly (2003), the model predicted a strong growth effect for foreign aid through its role in promoting and boosting domestic investment beyond what domestic savings can achieve. As a matter of fact, this model has continued to be one of the most prominent and

relevant models and theories being used and often quoted in aid-growth nexus discourse (Easterly, 2003). However, Easterly (1999, 2003) criticized the model on the basis of its two basic assumptions. He argued that a linear relationship existing between investment and growth over the short and medium run is doubtful on the theoretical grounds. Furthermore, the second assumption that aid fills a financing gap and allows for greater investment will only hold if investment is liquidity-constrained. As such, if incentives to invest are unfavorable, aid will actually finance consumption, especially if the reason for low investment is due to poverty. Essentially, another model which is also dominating the literature is the Solow Growth Model, which is a standard neoclassical model of economic growth propounded by Robert Solow in his classic 1956 article. The model posits that economic growth is an outcome of capital accumulation, which is basically one of the objectives of foreign aid in LDCs. It assumed that countries that experience per capita growth have increasing capital-labor ratios, which in turn leads to high return rate of savings to compensate for the cost of capital depreciation and population growth. Therefore, the model is based on three basic sources or determinants of growth (GDP) i.e. labor (L), capital (K) and knowledge or technological progress (A) (Solow, 1956). He proposed that the study of economic growth should be based on a standard neoclassical production function (Mankiw, Romer & Weil, 1992). However, in view of the fact that this study aims at investigating the impact of foreign aid on economic growth with special attention given to the investment (physical capital) and human capital determinants of growth, we hereby adopted the Augmented Solow Growth Model proposed by Mankiw et al. (1992). They posit: "an augmented Solow model that includes accumulation of human as well as physical capital provides an excellent description of the cross-country data" (p.407). In the same vein, recent study by Cheng and Zhang (2008) also revealed that the driving force behind economic development is human capital, which is stimulated by foreign aid. In view of the fact that an Augmented Solow Model allows for the incorporation of the human capital variable, which is not possible in the Financial Two Gap Model, this study therefore adopted the model. Also, this study is based on the underpinning theoretical proposition of Bjerg, Bjornskov and Holm (2011), which states that the impact of foreign aid on growth is an indirect relationship with investment and human capital variables as transmission mechanisms. Loxley and Sackey (2008) did not mince words when they submit: "It is common to think of aid's impact on growth to be an indirect one with aid exerting a positive impact on some key variables in the growth process. One of such variables is investment" (p. 12). Against this background, we hereby present the theoretical framework for this study in the following diagrammatical format:

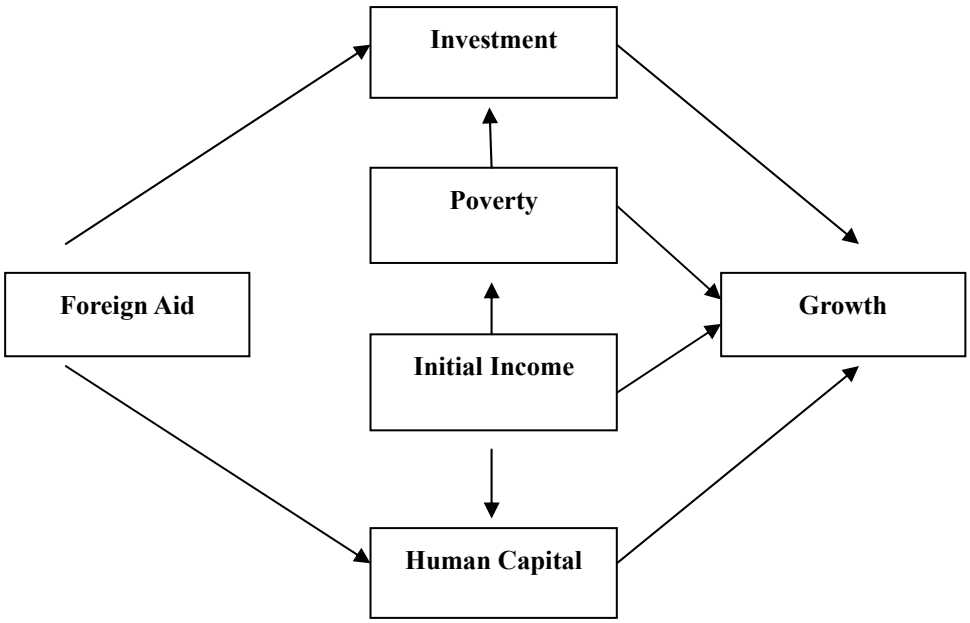

Figure 1. The Theoretical Framework for this study.

Source: Adapted from Bjerg, Bjornskov and Holm (2011).

2.2 IDB and Foreign Aid Activities in Africa: An Overview

The IDB initiated numerous development policies and programs in recognition of the socio-economic challenges facing member countries in sub-Saharan Africa. One of such policies and initiatives has been tagged as "Special Program for the Development of Africa (SPDA)" and five critical sectors have been identified for its operational activities: i. productivity growth in agriculture to achieve food security; ii. education projects to generate skilled workforce; iii. health projects focusing on the fight against major communicable diseases; iv. water and sanitation projects to improve quality of life; and v. power generation and distribution projects (IDB, 2008b). The focus of SPDA is expected to support investments in social and infrastructural areas, which are meant to fast track development in Sub-Saharan Africa. Similarly, the Bank allocated $2 billion within five years for supporting development efforts in 27 African member countries. Also, the Bank joined the Global anti-poverty efforts and allocated an ambitious $10 billion to fight this devastating phenomenon in member countries. This effort was tagged "the IDB Anti- Poverty Initiative" and it will among other things address the "root cause of terrorism" by fighting poverty, illiteracy and unemployment, which hopefully will reduce social tensions and foster better relations among nations. The Bank is also in its fifth year of a $2 billion African program, which included $50 million for the reduction of prices for anti-malaria medicines. The Bank has equally accepted the recommendations made at its annual symposium on "Capacity Building for Promoting Trade and Investment in Africa", as noted in IDB (2008a, p. 85): i. Enhancing its assistance for capacity building and developing innovative instruments and programs for technical assistance, taking into account the needs of African countries, particularly those related to supply-side; ii. helping African countries in involving their nationals living abroad in their capacity building activities and programs for promoting trade and investment; iii. assisting African member countries to acquire adequate skills in structured finance for trade and investment; and iv. enhancing its collaboration with regional and international institutions active in providing technical assistance to African countries in the areas of trade and investment. The IDB also launched a new 5-year Special Program for the Development of Africa (SPDA), which covers the period 2008-2012 and the sum of US$4 billion has been allocated to be spent. All in all, the table below presents an overview of the DA of IDB in Africa from 1976-2010.

Table 3. Cumulative Development Assistance of IDB to Member Countries in Africa from 1976-2010 (values in US$ million)

Country	Project Financing	Technical Assistance	Trade Financing	Special Asst.	Grand Total
Algeria	591.7	4.0	1887.7	5.6	2489.1
Benin	227.3	7.1	35.0	1.4	270.8
Burkina Faso	347.0	12.6	206.1	8.8	574.5
Cameroon	185.4	3.6	17.0	1.7	283.4
Chad	312.3	6.3	3.2	10.8	332.5
Comoros	11.1	4.9	7.5	1.1	24.5
Cote d'Ivoire	279.8	0.4	76.3	1.2	357.7
Djibouti	242.9	3.7	12.0	2.3	260.9
Egypt	907.8	3.9	2323.4	1.5	3236.7
Gabon	409.5	2.2	0.0	0.0	411.8
Gambia	165.2	4.5	103.0	1.8	274.6
Guinea	327.9	10.7	48.8	7.8	395.2
Guinea Bissau	2.2	3.8	15.0	1.2	22.3
Libya	386.0	3.3	299.8	3.8	692.8
Mali	446.5	12.0	199.8	16.5	674.9
Mauritania	523.4	23.0	84.5	11.1	642.0
Morocco	1619.7	5.5	2389.3	1.5	4016.0
Mozambique	126.6	2.3	15.0	2.2	146.1
Niger	271.6	14.5	138.3	12.2	436.6
Nigeria	90.5	0.3	205.0	7.9	303.7
Senegal	588.7	11.3	272.6	14.2	886.8
Sierra Leone	121.8	7.1	5.0	3.6	137.5
Somalia	24.1	4.0	46.2	13.3	87.6
Sudan	1065.8	5.4	372.4	23.5	1467.0
Togo	113.2	2.2	6.0	1.7	123.1
Tunisia	757.2	2.5	1094.9	4.2	2208.6
Uganda	69.9	4.4	13.9	4.5	92.6
Net Approval	**10,515.**	**165**	**10,003.7**	**165.5**	**20,849.3**

Source: Extracted from IDB Annual Report 2010.

From Table 3 above, it is glaring that member countries of IDB from Africa have benefitted from its development assistance over the years of its operations, especially the AMCs. For instance, among the topmost beneficiaries according to the highest allocation are Morocco ($4016.0m), Egypt ($3236.7m), Algeria ($2489.1m), Tunisia ($2208.6m) and Sudan ($1467.0m) among others. Notwithstanding this financial support from the IDB, more financial commitments are even most needed now that Africa is faced with many developmental challenges, particularly the twin-challenges of the MDGs and IDB 1440H Vision, which are all meant to fast track the development process of the continent. However, it is important to state that the AMCs received the total sum of US$19.142 billion from IDB as development assistance since 1976 through 2010. This amount represents 27.2 percent of the total sum of the DA by IDB to all member countries and non-member countries.

3. Research Methodology

It needs to be stated that most studies on foreign aid and economic growth focus on LDCs and developing countries, which are largely from Africa, Asia and Latin America continents. It was however observed that previous studies classified Africa into two broad regions i.e. Sub-Saharan Africa (SSA) and North/Tropical Africa (see Collier & Gunning, 1999; Loxley & Sackey, 2008). This research therefore combined Muslim countries from these two broad regions. This is in view of the fact that no specific empirical study is available on these Muslim countries, most especially as it relates to foreign aid and economic growth in the continent. More so, these sample countries (i.e. 19) are all members of IDB whose database on foreign aid in Africa was used for this study. As a matter of fact, the choice of this sample size was based on four reasons: i. the sample countries meet the population parameter of 50 percent, which is also in line with USAID (2004) submission on what constitute a Muslim country; ii. these countries are more than two-third of the entire member countries of IDB from Africa; iii. majority of the African

countries are the most backward and least developed countries in the world, especially the Muslim countries as posited by Aznan (2008) and IDB (2006); and iv. these countries because they are Africans, share similar demographic and economic characteristics to some extent as noted by Collier and Gunning (1999). It is however important to state that due to data paucity for some variables and countries, we therefore reduced the sample size to 14 countries and the following countries served as the sample countries: Algeria, Burkina Faso, Chad, Comoros, Egypt, Gambia, Guinea, Mali, Mauritania, Morocco, Niger, Senegal, Sierra Leone and Tunisia. Hence, the sample countries provide an excellent opportunity to investigate the impact of the DA of IDB in accounting for growth in these selected African countries.

3.1 Hypotheses and Model Specification

In view of the foregoing presentation and discourse about foreign aid and IDB's role in the African continent, we therefore identified that among the leading challenges confronting the AMCs in particular and Africa in general are related to growth, investment and human capital development among others. Against this background, we therefore seek to investigate what impact does DA of IDB has on the growth of AMCs, its contribution to the investment drive in these countries and the impact of the DA on human capital in the sample countries. Hence, we adopted the following hypotheses:

H1: The DA of IDB contributes positively to the economic growth of AMCs.

H2: The investment drive of AMCs is positively affected by the DA of IDB.

H3: The DA of IDB impact positively on the human capital development of AMCs.

Moreover, in order to achieve the set objectives for this study, Simultaneous Equations Model (SEM) using proxy variables was adopted as the base model for this study and Seemingly Unrelated Regressions Estimate (SURE) method was utilized for the estimation of the model based on balanced panel data of 6years average. The use of SEM is in line with the submissions and adoptions by Gyimah-Brempong (1992), Abiola (2003) and Sullivan, Tessman and Li (2011), who noted that the best approach for understanding the interdependencies that exist among variables, which give feedback loops, is to use SEM. This is because single equation overlooks these interdependencies. Thus, in the SEM specification therefore, investment and human capital are regarded as proxy variables through which the impacts of the development assistance of IDB were measured. In the same vein, the use of SURE method for the estimation of SEM was applied by Zellner and Theil (1962), Zellner (2006) and Arazmuradov (2011). In fact, Zellner (2006) noted that SURE techniques guaranteed improved tests of hypothesis regarding regression coefficients and the values of other parameters in the SEM framework. Against this backdrop, the SEM framework for this study is based on the Augmented Solow growth model propounded by Mankiw et al. (1992). In view of this, the SEM framework is hereby specified below:

$$G_i = \beta_1 + \beta_2 \ln S_{ki} + \beta_3 \ln S_{hi} + \beta_4 \ln y_{0i} + \beta_5 \ln POV_i + \varepsilon_i \tag{1}$$

$$\ln S_{Ki} = \alpha_1 + \alpha_2 \ln AID_i + \alpha_3 \ln S_{hi} + \alpha_4 G_i + \alpha_5 \ln POV_i + u_i \tag{2}$$

$$\ln S_{hi} = \gamma_1 + \gamma_2 \ln AID_i + \gamma_3 \ln S_{ki} + \gamma_4 G_i + \gamma_5 \ln EDU_i + v_i. \tag{3}$$

Where G, ln S_k and ln S_h are endogenous variables while ln y_0, ln *POV*, ln *AID* and ln *EDU* are exogenous variables; and ε, u, and v are the stochastic error terms. Therefore, equation 1 was used to estimate for hypotheses 1 while equations 2 and 3 were used to estimate for hypotheses 2 and 3 respectively. It is important to state that our model satisfied the requirements for identification based on Order condition (i.e. Justly identified) and the Rank condition based on equation 1 at $\gamma_{21}\gamma_{34} \neq 0$; equation 2 at $\gamma_{12}\gamma_{34} \neq 0$; and equation 3 at $\gamma_{12}\gamma_{23} \neq 0$.

3.2 Definition of Variables and Sources of Data

There are basically three endogenous and four exogenous variables in the SEM framework adopted in this study. The endogenous variables are: G means the economic growth which is proxy by GDP per capita growth; S_k implies investment (physical capital) with proxy as gross fixed capital formation and S_h means human capital and its proxy is infant mortality. All other variables are regarded as exogenous variables and they include: y_o i.e. initial income proxy by GDP per capita of every panel period; AID represents aid from IDB proxy by the four major categories of DA; POV stands for poverty proxy by GDP per capita; and EDU means education proxy by primary school enrolment rate. The table below provides summary information for all the variables including their sources of data.

Table 4. Definition of Variables and Sources of Data

S/N	Variable	Indicator	Source
1.	Growth	GDP per capita growth (annual %)	World Bank & IMF
2.	Investment	Gross fixed capital formation (% of GDP)	World Bank & IMF
3.	Human Capital	Mortality rate, infant (per 1000 live births)	World Bank & IMF
4.	Initial Income	GDP per capita (First year of every average period)	World Bank & IMF
5.	EDU	Primary school enrolment, (% gross)	World Bank & IMF
6.	AID	The four major categorization of DA in IDB	IDB
7.	POV	GDP per capita	World Bank & IMF

4. Data Analysis and Empirical Findings

4.1 Spearman Rank-Order and Correlation Analysis

Among the most interesting aspects of diagnostic test, especially with the spearman rank correlation is the easiness it provides in the identification of the strength and direction for each pair-wise relationship (i.e. whether the correlation is negative or positive). The correlation result which is provided in Table 6 below shows that among all the major variables, AID demonstrates high level of correlation with economic growth at around 20 percent. Investment also shows correlation of 12 percent while human capital with its negative sign shows no correlation. The human capital variable shows the highest level of correlation with AID at more than 53 percent while investment shows almost 49 percent correlations and there is also correlation between investment and human capital. Against this background, we therefore submit that there is correlation between growth and AID as well as investment. To this end, we conclude by rejecting the null hypothesis of no correlation among variables. This finding concurs with similar finding by Arellano et al. (2009).

Table 5. Spearman rank-order and correlation analysis (1987-2010)

Correlation	Growth	AID	Investment	Human Capital
Growth	1.000			
	____			
AID	0.196***	1.000		
	(0.000)	_____		
Investment	0.125**	0.489***	1.000	
	(0.022)	(0.000)	_____	
Human Capital	-0.019	-0.535***	-0.509***	1.000
	(0.729)	(0.000)	(0.000)	_____

*The null hypothesis is no correlation among the variables. With the exception of growth, all other variables are in natural logarithm. The probability values are reported in parentheses. Note that ***, ** and * indicate that the coefficient is significant at 1%, 5% and 10% levels respectively.

4.2 Empirical Findings and Discussions

4.2.1 Growth as the Dependent Variable

Table 6 below shows the result for growth as the dependent variable and four other variables as the regressors or explanatory variables. The choice of these variables for inclusion as determinants of growth is based on theoretical and empirical evidences. For instance, investment (representing physical capital) is regarded as a major determinant of growth in standard growth model as espoused by Solow (1956) and Mankiw et al. (1992). In the same vein, infant mortality which is a proxy for human capital is considered as a flash indicator for human capital development in LDCs (Boone, 1996) and especially for Africa in view of its peculiarities (World Bank, 2010). Hence, the human capital variable is now been regarded as an important determinant of modern growth (Cheng & Zhang, 2008; Henderson & Russell, 2005). Also, Asiedu, Jin and Nandwa (2009) as well as Clist (2011) adopted GDP per capita

as the indicator for poverty and among the reasons advanced were its strongly correlated with most poverty indicators and as such this indicator could be considered as a broad measure of poverty in recipient countries and a better replacement for poverty headcount as a proxy for poverty. In the same vein, one of the most prominent growth variables i.e. initial incomes has been adopted to account for the income convergence in AMCs in line with the convergence thesis as noted by Ali and Isse (2005) and Burnside and Dollar (2000). To this end, it was observed as in Table 6 below that investment positively and significantly impact on economic growth at 1 percent significance level. Thus, it implies that a percentage increase in the Investment/GDP ratio results in 2.27 points increase, which connotes .02 percent increase in the economic growth rate of GDP. On the other hand, human capital which is often regarded as the twin sister of investment carries the anticipated negative sign but with no significance even at 10 percent significance level. The Table below provides detail information on the results.

Table 6. Panel result with Growth as dependent variable

Variable	Coefficient	T-ratio	P-value
Investment	2.271	3.448	0.001***
	(0.659)		
Human capital	-0.096	-0.115	0.909
	(0.836)		
Poverty	21.947	6.358	0.000***
	(3.452)		
Initial income	-22.724	-6.776	0.000***
	(3.354)		

Mean = 1.738; SD = 2.569; S.E. = 1.700; Adj. R^2 = 0.519; Observations = 56

Notes: The estimates are made based on SURE method. The standard errors are reported in parentheses. All the regressors are in natural logarithm. The parameters for all variables are significant at 1% significance level (i.e. ***) and only human capital is insignificant even at the least significant level of 10%.

However, poverty proxy by per capita GDP was significant at 1 percent but with positive sign. It is however not surprising for African countries, which suffers from high level of systemic corruption and fiscal recklessness that with high level of poverty, growth rate increases. Unfortunately, most African countries declare high growth yet; there is high level of poverty in the continent. A good case in point is Nigeria, which perhaps has the highest level of average growth among the AMCs (see Table 2) but suffers from high level of poverty of almost 60 percent i.e. "poverty amidst plenty". Certainly, this is the paradox of development in African countries as noted by Collier (2006) and Desai (2002). Notwithstanding the above analysis on poverty, the result of initial income indicates a level of convergence in AMCs. This is because, the initial income coefficient shows the anticipated negative sign and with a very significant p-value at 1 percent significance level. This finding is consistent with theoretical proposition and empirical findings, which is indeed a validation of the convergence thesis as noted in the works of Burnside and Dollar (2000), Levine et al. (2000) and Ali and Isse (2005). Moreover, the adjusted R^2 shows that the explanatory variables employed account for 51.9 percent growth rate. To this end, it could be concluded that the DA of IDB positively impact on the economic growth of AMCs through investment as a transmission mechanism. This conclusion is consistent with previous findings, which observed that foreign aid positively impact on the economic growth of African countries through investment as the major transmission mechanism, which is a confirmation of the aid effectiveness hypothesis in Africa. This finding is consistent with previous findings as evidenced in the works of Gyimah-Brempong (1992) and Loxley and Sackey (2008).

4.2.2 Investment as the Dependent Variable

From Table 7 below, the result for investment as the dependent variable in our SEM framework is presented. The growth variable shows a symbiotic and bidirectional relationship and causality with investment as evident on our earlier submission about the positive impact of investment on growth (see Table 6). Now, growth also shows positive and significant impact on investment at 5 percent significance level; although, the impact of investment is higher (i.e. at 1 percent significance level). On the other hand, the result of human capital proxy by infant mortality carries the expected negative sign but with no significant impact on investment even at 10 percent significance level. In the same vein, the poverty variable also has the anticipated negative sign but with no significance. The plausible reason for this result could be that investment was largely financed by foreign aid and not from the domestic savings. This is what the result of AID impact on investment implies in the table presented below. The impact of AID on

investment indicates positive and significance level at the best significance level of 1 percent, which is highly commendable and certainly good for the economic growth process of AMCs.

Table 7. Panel result with Investment as dependent variable

Variable	Coefficient	T-ratio	P-value
Growth	0.036	2.093	0.041**
	(0.017)		
Human capital	-0.181	-0.155	0.254
	(0.157)		
Poverty	-0.014	-0.180	0.858
	(0.076)		
AID	0.116	2.989	0.004***
	(0.039)		

Mean = 2.923; SD = 0.394; S.E. = 0.297; Adj. R^2 = 0.374; Observations = 56

Notes: The estimates are made based on SURE method. The standard errors are reported in parentheses. With the exception of growth, all the regressors are in natural logarithm. The parameters of growth and AID are both significant at **(5%) and *** (1%) significance levels respectively.

The coefficient of AID, which is 0.116 connotes that a one-unit increase in the AID/GDP ratio results in an average of 0.12 percent increase in the investment rate of AMCs. By extension, it means that AID increased the investment rate of AMCs by an average of 0.12 percent, which is a commendable boost for AMCs economies in view of the poverty level and poor culture of savings, which are serving as impediments to the investment drive of most AMCs economies in the last few decades. Therefore, our result that foreign aid positively impact on the investment drive of AMCs is consistent with the findings of Gyimah-Brempong (1992), Hansen and Tarp (2001) as well as Loxley and Sackey (2008). In view of this finding, we conclude therefore that the DA of IDB positively impact on the investment drive of AMCs.

4.2.3 Human Capital as the Dependent Variable

The results in Table 8 presents the impacts of the various variables utilized in regressing human capital as an endogenous variable in the SEM framework. The growth variable shows a positive sign with no significant impact on human capital even at the 10 percent significance level. This shows that the contribution of growth to human capital is not commensurate with investment; whereas both are major contributors and engines of growth. Also, investment carries negative sign with no significant impact on human capital, which is similar to our earlier result in Table 7 of no significant impact of human capital on investment. Notwithstanding, the education variable which is the proxy for primary school enrolment indicates a negative sign at a strong significance level of 1 percent. In fact, the coefficient and parameter of this variable show the best result with respect to infant mortality. Thus, the result implies that the higher the level of primary school enrolment the lower the infant mortality in AMCs. This finding is consistent with conventional economic wisdom that high level of literacy impacts positively on the well-being of the society, especially in terms of health matters, which confirmed the view of Gujarati (2006). This result lends credence to the empirical findings of Boone (1996) as well as Gyimah-Brempong and Asiedu (2008) that foreign aid contributes to human capital development. The detail results are presented in Table 8 below.

Table 8. Panel result with Human Capital as dependent variable

Variable	Coefficient	T-ratio	P-value
Growth	0.025	1.410	0.165
	(0.017)		
Investment	-0.185	-1.318	0.194
	(0.141)		
EDU	-0.555	-4.717	0.000***
	(0.118)		
AID	-0.148	-3.655	0.001***
	(0.041)		

Mean = 4.281; SD = 0.516; S.E. = 0.314; Adj. R^2 = 0.591; Observations = 56

Notes: The estimates were made based on SURE method. The standard errors are reported in parentheses. With the exception of growth, all the regressors are in natural logarithm. The parameters for EDU and AID are both significant at 1% significance level (***).

5. Conclusion and Recommendation

The main objective of this study is to empirically investigate whether the DA of IDB impact positively and significantly on the economic growth of AMCs, which is perhaps the first study of its kinds on IDB foreign aid activities and operations in Africa. Importantly, from the foregoing presentations of the SEM results for the three endogenous variables i.e. growth, investment and human capital, it is obvious that the outcomes demonstrate positive and significant result for all the three endogenous explanatory variables. This means that foreign aid has positive and significant impact on growth in AMCs and it occurred through investment as the major transmission mechanism. In the same vein, foreign aid demonstrates positive and significant impact on investment and hence, our hypothesis that the DA of IDB positively impact on the investment drive of AMCs is confirmed. More so, the direct impact of foreign aid on human capital shows a significant contribution of an average of 0.15 percent decrease in the infant mortality, which according to Boone (1996) is a flash indicator for human capital development. Therefore, we also conclude that the DA of IDB has positive impact on the human capital development in AMCs. This result is consistent with the finding of Gyimah-Brempong and Asiedu (2008) and more particularly with the submission of Pramanik (2003) that IDB needs to focus primarily on the development of human capital in its member countries, in order to attain the goal of competitive cooperation and maximization of economic efficiency in Muslim countries. To this end, the central thesis of this research is that since the development assistance of IDB contributes positively to the economic growth and development process of African Muslim Countries, it implies therefore that foreign aid has a positive impact on economic growth, which confirms the aid effectiveness hypothesis in Africa. Interestingly, our empirical findings confirmed our theoretical proposition that the impact of foreign aid on economic growth is an indirect relationship through investment and human capital transmission mechanisms/channels. To this end, Africa development partners like the IDB should therefore make it a policy priority to scale-up aid by making a "big push" into the continent, so as to fast track the growth and development process and more especially for the realization of the Africa's twin challenges of MDGs and the IDB 1440H Vision. Against this background, we recommend that problems like endemic corruption, bad governance and collapse of basic infrastructures among others in AMCs should be areas of major focus by the IDB and other development partners of the continent like OECD, DFID, OPEC and a host of others. This is to preclude the African growth paradox of "excessive wealth, excessive poverty" from its continuous occurrence and damage. Therefore, for the development assistance of IDB to continue to make meaningful and purposeful contributions to the growth and development process of the African continent, the principle of aid selectivity must be adopted and adhered to. This is necessary and highly important if foreign aid must be delivered to reinforce a virtuous cycle of development in contradistinction to promoting a vicious cycle of poor governance and economic backwardness as noted by Brautigam and Knack (2004). This scenario is likely to be the fate of the DA of IDB in the nearest future if the principle of aid selectivity is not incorporated as a substantive principle in the IDB policy philosophy on its development assistance in view of the endemic corruption and bad governance that are almost becoming permanent characteristics of most African countries.

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