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Determinants of Foreign Direct Investment Inflows to Africa: A Panel Co-integration Evidence Using New Analytical Country Classification

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Abstract

Based on a new analytical country classification of African economies as Fragile, and Factor& Investment driven economies, we identified the main determinants of FDI inflows to Africa. Using a panel co integration approach for the period 1996 to 2012,we have found market size, availability of natural resources, openness to international trade, a stable macroeconomic environment, better infrastructure, and effective bureaucracy to have a strong positive impact in attracting FDI to Africa. On the other hand, political and macroeconomic instability, high financial and transfer risk are found to have a negative effect in attracting FDI to the continent. However, the effect of these factors is found to vary significantly across the analytical country classification we have developed. Among all determinants of FDI only government effectiveness and natural resource abundance, for instance, are found to be important across all countries. This suggests the importance of emphasizing different policies in different countries or country groups. Moreover, the analysis also suggests that the new analytical classification scheme developed in this study could also be an important guide to operational and analytical works of continental organization such as the African Development Bank, the Economic Commission for Africa and the African Union, among others.

Key words: *Foreign Direct Investment, Africa, Panel co-integration, Country Analytical Classification, Fragile, Factor Driven, Investment Driven African Economies*

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I.   Introduction

While there exists a large body of literature about the determinants of FDI flows to developing world in general, little has been done to investigate such determinants of FDI flows to Africa. The little available cross-country studies conducted on Africa are generally able to identify the factors that explain FDI flows to the continent. However, they fail to provide an in-depth analysis and country specific factors that are crucial in the attraction of FDI. They generally also deal with the economic determinants of FDI inflows, as if such inflows occur in political and institutional vacuum. They are not theoretically and empirically systematic either. In addition, all studies failed to account for possible cross-section dependence in their econometric analysis. This study, attempts to address this gap in the literature by developing a new analytical country classification scheme, which takes into account cross country differences. We also attempted to offer an in-depth theoretical analysis, used a wide coverage of data and tested for cross section dependence to validate our result.

FDI flows to developing economies reached a new high at US$778 billion, accounting for 54 per cent of global inflows. Developing Asia continues to be the region with the highest FDI inflows (Table 1). Africa's share of world FDI inflows is extremely low. By the second half of the 1990s, the average share of FDI in GDP of African countries was not only very small but also declining. Any positive trends were largely related to investment in countries with newly discovered resources. For instance in 1996, FDI was a mere US$5.5 billion, representing only 1.5% of global investment flows. Its distribution was also extremely skewed, with Nigeria, Egypt, Morocco, Tunisia, South Africa, Algeria, Angola, Ghana and Côte d'Ivoire accounting for over 67% of FDI receipts to Africa. Between 1991 and 1996 ten countries (Nigeria, Morocco, Tunisia, Angola, South Africa, Ghana, Tanzania, Namibia, Uganda and Zambia) received almost 90% of flows, with Nigeria alone absorbing a third. The majority of flows emanated from France, UK, Germany and the US. Favoured recipient sectors included oil, gas, metals and other extractive industries (AfDB, 1998). Total value of FDI inflows to Africa in 2003 was about US$18 billion and this has increased to USD 57 billion by 2013.This constitutes about 4 and 7 percent of world and developing economies FDI inflows respectively (Table 1). In 2013, North Africa managed to attract about US$15 billion while the rest of Africa attracted about US$42 billion, divided between US$14, 8, 6, and 13 billion for West, Central, Eastern and Southern Africa respectively. Intra-Africa investments are also increasing in the continent, this being dominated by South African, Kenyan, and Nigerian firms. According to UNCTAD (2014), between 2009 and 2013, the share of announced cross border Greenfield investment projects originating from within Africa increased to 18 percent, from less than 10 percent in the preceding period. For many smaller, often landlocked or non-oil-exporting countries in Africa, intraregional FDI is a significant source of foreign capital flow (UNCTAD, 2014).

Table 1 FDI Flows by Region in Billions of US $ (2011-2014)

	FDI inflows			FDI Outflows		
Host Region/economy	2011[a]	2012[b]	2013	2011	2012	2013
World	1700	1330	1452	1712	1347	1411
Developed Economies	880	517	566	1216	853	857
European Union	490	216	246	585	238	250
North America	263	204	250	439	422	381
Developing Economies	725	729	778	423	440	454
Africa	**48**	**55**	**57**	**7**	**12**	**12**
Asia	431	415	426	30-4	302	326
Latin America & Caribbean	2448	256	292	111	124	115
Percentage Share of World FDI						
Developed Economies	51.8	38.8	39	71	63.3	60.8
European Union	28.8	16.2	17	34.2	17.7	17.8
North America	15.5	15.3	17.2	25.6	31.4	27
Developing Economies	42.6	54.8	53.6	24.7	42.7	32.2
Africa	**2.8**	**4.1**	**3.9**	**0.4**	**0.9**	**0.9**
Asia	25.3	31.2	29.4	17.8	22.4	23.1
Latin America & Caribbean	14.3	19.2	20.1	6.5	9.2	8.1

Source: UNCTAD, World Investment Report (2014)

In terms of the origin of FDI flows to Africa still FDI flows from traditional sources (the OECD) countries are important. Despite the media focus on China and other emerging economies investment in the continent, the combined share of China and India FDI to Africa in total FDI to the continent is just about 6 percent (Alemayehu, 2013). Generally, we note the following points about FDI in Africa in relation to China and India. First, it is highly unlikely that China and India as a host countries divert FDI that would have been coming to Africa. Second, the level of FDI from China and India to Africa is not only very small but also located in a few countries. Third, these flows from China and India are largely motivated by the desire to secure sources of energy and raw materials and the desire to exploit preferential markets which are accessible to African countries (Alemayehu 2013). Thus, it is imperative to examine the likely impact of all FDI flows to Africa which are dominated by flows from African traditional partners, the OECD countries. Previous empirical studies generally show that relative market size, the existence of mineral resources, and the historical pattern of foreign investment together determine such FDI flows to Africa (see Alemayehu, 2002). Bhattacharya et al (1997) grouped African FDI recipients into three categories: (1) countries that are long-term recipients (Botswana, Mauritius, Seychelles, Swaziland and Zambia); (2) countries that recorded large increases in the 1990s (Angola, Cameroon, Gabon, Ghana, Guinea, Lesotho, Madagascar, Mozambique, Namibia, Nigerian and

Zimbabwe); and (3) countries that have low and/or declining levels of FDI, but with encouraging turnaround, such as Uganda. This pattern at the turn of the century still remains valid by the second decade of this century.

With this general overview the rest of the paper is organized as follows. The next section presents an overview of the theoretical literature on the determinants of FDI flows to a host country with the aim of coming up with factors behind FDI flows to Africa from systemic (theoretical) perspective. Section three discusses empirical regularity about determinants of FDI in existing African literature. Section four discusses the new analytical country classification scheme developed in this study. The scheme is used to frame the modeling of FDI to Africa in this study. The empirical model employed and the results obtained are discussed in section five. Section six concludes the paper by summarizing the main findings of the study and their policy implications.

II. Determinants of FDI Flows: The Theory

This section will briefly examine various theories on the determinants of foreign direct investment, in the hope that this may at least help to explain why this type of investment has not been important in that continent. The early neoclassical approach, summarized in an article by MacDougal (1960), hypothesized that capital flows across countries are governed by differential rates of return (within the neoclassical market setting).[1] It is argued that such capital inflows are welfare enhancing[2] to both parties engaged in the capital movement. The MacDougal model assumes perfect competition, risk free capital movement, mobility in factors of production and no risk of default. The portfolio approach to FDI, presented in reaction to The MacDougal model, emphasizes not only return differential, but also risk (Iversen, 1935 and Tobin, 1958, both cited in Agarwal, 1980). In line with this, Ohlin (1933) was also one of the first to address the issue of determinants of FDI. According to Ohlin (1933), FDI was motivated mainly by the possibility of high profitability in growing markets, along with the possibility of financing these investments at relatively low rates of interest in the host country. Other determinants were the necessity to overcome trade barriers and to secure sources of raw materials (Ohlin, 1933). This is strengthened by a theory which emphasises the positive relationship between FDI and output (sales in host country), along the lines of Jorgenson's (1963) investment model (see Agarwal, 1980; Alemayehu 2002).

A major criticism of these theories is they missed the relevance of market imperfections. Hymer (1960, published in 1976) and Kindleberger (1969) argue that, if foreign firms were able to compete and succeed in the host country, then they must be in possession of a specific and transferable competitive advantage, both over local firms, and other potential entrants into the local market. Kindleberger (1969), building on Hymer's (1960) analysis, posited that instead of multinational firms' behavior determining the market structure, it is the market structure (monopolistic competition) that determines the conduct of the firm, by internalizing its production. Caves (1971)

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1   See also Vos (1994) and Helleiner (1989)for a detailed discussion on this.

2   In contrast to this approach, another strand of the literature focuses on 'immiserization of the recipient'. In their study of the implication of capital flows Brecher and Diaz-Alejandro (1977) showed that capital inflows to small open economies would reduce the recipient's welfare, measured in terms of consumption. This condition is vividly illustrated when foreign profit remittance absorbs the increase in total output due to capital inflow (Brecher and Diaz-Alejandro, 1977: 319). Quibria (1986), using a simple model of 'North' (growing *a la* Solow and saving in a Keynesian way) and 'South' (saving in a Kaleckian way), concluded that capital flows (even in a situation of no distortion) may result in immiserization of the recipient.

based on such analysis, further argued that FDI is also related to trade barriers, and could be taken as a way of avoiding uncertainties in supplies, or as a way of imposing barriers to new firms on the external market. This analysis also focuses on the micro foundations of FDI, by moving from a simple capital movement/portfolio theory to a broader production and industrial organizational theory. Indeed, this school of thought has formed the basis for a whole strand of the literature. According to this line of thinking, some advantages of the competitive foreign firm include cheaper sources of financing, the use of brand names and patent rights, technological, marketing and managerial skills, economies of scale, and, entry and exit barriers (Kindleberger, 1969; Agarwal 1980).

A related micro-based theory of FDI has also emerged with the development of the Vernon's product cycle theory (Vernon, 1966). The product cycle theory represents an advance on previous trade theories, in that it incorporates an analysis of oligopoly and strategic market considerations. Based on Vernon's theory of 'product cycle', and the existence of 'new' and 'old' goods, Krugman (1979) further developed this theoretical avenue for explaining FDI flows. Specifically, he extends the analysis to a North-South framework with innovation (in the 'North') and technology transfer (to the 'South') representing its crucial aspects. Krugman notes that technological progress raises the marginal product of capital and provides an incentive for foreign direct investment (FDI). On the other hand, this process may be reversed through technology transfer (Krugman, 1979: 263-265). Mainstream trade theories usually underlie this type of analysis. Indeed, recent theories of trade, such as that of the 'economies of specialisation' which emphasises the existence of intra-industry (as well as intra-firm) trade, also provides scope for analysis of FDI (See, for instance, Ocampo's survey, 1986: 152-155; Alemayehu, 2002).

Notwithstanding Vernon's contribution, a second wave of refinements to the neoclassical capital movement/ portfolio theory of FDI, building upon Hymer's original contribution came with the emergence of explanations based on the ideas of 'international firm' and 'industrial organization'. The fact that decision-making about foreign direct investment (FDI) takes place within the context of oligopolistic firm structures, - and that such investment includes a package of other inputs, such as intermediate imports and capital flows, - has led to the development of alternative explanations grounded in the theory of industrial organization (see Agarwal, 1980; Helleiner 1989:1452; Dunning, 1993; Porter, 1990). In this approach, as set out originally by Hymer, foreign firms are seen as having an advantage over local ones. The foreign firm's pursuit of FDI is explained by the theory of internalisation. This is characterised by the desire to minimize transaction costs, *a la* Coase (1937), to tackle risk and uncertainty, increase control and market power, achieve economies of scale, and ensure advantageous transfer pricing (Hymer, 1976; Buckley and Casson, 1976). In this approach, oligopoly power is seen as mitigating, rather than creating, market imperfection (Helleiner, 1989). This line of using transaction and related cost internalization as determinants of FDI was also latter emphasized by Buckley and Casson (1976) and Buckley (1985). Their arguments run mainly on the fact that transaction costs of intermediate products would be minimized when markets are integrated by multinational firms (MNFs). They argued that MNFs have proprietary assets with regard to marketing, designs, patents, trademarks, innovative capacity, etc (ie. Ownership advantages) whose transfer may be costly for being intangible assets, or due to a good sense of opportunity, or even because they are diffused, and thus difficult to sell or lease. According to Buckley and Casson (1976) and Buckley (1985), the main strength of the internalization theory is its capacity to address the dilemma between the licensing of production to a foreign agent and own production that can be done through FDI.

The works of Dunning (1993), which he terms the 'eclectic paradigm', represents a culmination of this trend towards a refinement of theories of FDI. Without departing much from the Heckscher-Ohlin-Samuelson theory of trade, in explaining spatial distribution of multinational firms, Dunning's paradigm summarises this strand of theory under an 'ownership-specific, location and internalisation' (OLI) framework (Dunning, 1993). This approach is also in line with Porter's (1990) notion of 'competitive advantage' where firms are believed to engage in FDI to amplify their home-based advantages and offset home-based disadvantages through global strategy that tap selectively into advantages available in other nations that includes big markets, economies of scale, costly domestic policies, global network that add to and sustain home-base advantages, among others (Porter, 1990). Framed in a micro-macroeconomic framework, Dunning's (1981, 1988; 1993) approach provides a flexible and popular framework where it is argued that FDI is determined by three sets of advantages which direct investment should have over the other institutional mechanisms available for a firm in satisfying the needs of its customers at home and abroad. The first of the advantages is the ownership (O) specific one which includes the advantage that the firm has over its rivals in terms of its brand name, patent, or knowledge of technology and marketing. This allows firms to compete with the other firms in the markets it serves, regardless of the disadvantages of being foreign. The second advantage is the location (L)-specific advantages which relate to the importance for the firm to operate and invest in the host country and are those advantages that make the chosen foreign country a more attractive site for FDI than the others. The third advantage is the internationalization (I) advantage which relates to the preference of a "bundled" FDI approach over an "unbundled" product licensing, capital lending, or technical assistance (Wheeler and Mody, 1992; Dunning 1993; Porter, 1990). These refer to the superior commercial benefits for firms resulting from the exploitation of ownership- and location-specific advantages by investing in foreign affiliates that they control, rather than through transactions with unrelated firms located abroad. Helleiner notes that 'this "eclectic" theory of FDI...drawing on firm-specific attributes, location advantages and internalization advantages - is widely accepted' (Helleiner, 1989: 1253)3.

Another strand of literature, which is often overlooked in mainstream analysis, is the Marxist theories of FDI determination. Citing historical and other empirical evidence from Britain and the United States, Baran and Sweezy (1966) argue that FDI represents an outlet for investment-seeking surplus, resulting from stagnation in the centers of capitalism. Indeed, according to Marxist theories, FDI also represents a mechanism for extracting surplus from underdeveloped areas (Baran and Sweezy, 1966:110-111). Thus, Magdoff (1992) argues that the 1970s and 1980s exhibited a slowdown in economic activity- itself an inherent feature of capitalism, according to Marxist theory- and that this slow down spurred capital to seek and create new profit opportunities. Thus, the speeded-up flow of direct investment from one country to another is itself seen as a reaction to stagnation in the capitalist centers (Magdoff, 1992: 9-13).4 According to Magdoff, the 1980s

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3   There also exists an international trade version of FDI determination (termed the macro approach) which is associated with the works of Kojima (Kojima, 1982). Kojima (1982) argues that FDI may be explained by the 'comparative disadvantage' of industry within the investing countries. According to Kojima's theory, this may be mitigated by investing in foreign industry, which may be able to achieve comparative advantage in the production of a particular product and potentially, even export back to the home country. Naturally, this type of FDI will also have the effect of increasing trade volumes (Kojima, 1982). This is, however, similar to Vernon's (1966) and Krugman (1979) approach noted before.

4   Magdoff (1992) provides some statistics on FDI for the recent past. Thus, in 1960, 47 per cent of FDI originated from the US, 45 per cent from Europe and 0.7 per cent from Japan. The figures for 1973 stood at 48 per cent, 39 per cent and 4.9 per cent respectively, and at 28 per cent, 50.2 per cent and 11.5 per cent respectively, for

witnessed world FDI growing at an average annual rate of 29 per cent, and the pattern of such investment increasingly switching to finance and insurance, real estate, advertising and the media (as opposed to the traditional sectors of manufacturing and raw material extraction)5. In spite of such changing patterns, Magdoff sees stagnation in the centre and the search for profit as representing the main reasons for FDI.

In sum, the theory of determinants of FDI covers a range of explanations: the pure capital movement, product cycle, industrial organization, the stagnation thesis and related political consideration. In the African context, the pure capital theory does not work since the assumptions simply do not hold. Neither is Krugman's hypothesis workable, since it is more relevant to countries with a good industrial base and infrastructure such as East Asia. The deterioration in terms of trade in Africa till the year 2002, combined with the debt crisis of the 1980 and 1990s, greatly undermines the relevance of this theory, in the African context. The most probable theoretical explanation seems to be found in the Marxist version, as well as in the 'eclectic' explanations that is based on 'industrial organization' and 'the international firm' perspective. The Marxist version focuses primarily on the consequence of FDI, which is not the prime focus of our empirical study. Besides, its stagnation thesis may not fully explain FDI destination as much as its source and might also be inferred from the industrial organization and international firm based theories. On the other hand, the concentration of Multinational Corporations in the mining sector of most African countries including FDI from the emerging economies of China, India and Brazil, and to a good degree, the importance of the colonial history in determining the spatial pattern of FDI in Africa might be taken as lending support to the importance of the 'eclectic' approach. This theoretical insight will be used in identifying the determinants of FDI for the construction of the model used for empirical analysis in the next section.

III.   Determinants of FDI Flows to Africa: The Recent Evidence

The empirical literature on the determinants of FDI to LDCs is voluminous and has been based both on country case studies (Loree and Guisinger, 1995; Kinoshita, 1998; Bende-Nabende and Slater, 1998; Dar et al., 2004, among others) as well as cross-section analysis (Root and Ahmed, 1979; Wheeler and Mody, 1992; Kumar, 2001; Asiedu, 2002, 2006; Quazi, 2005, among others). An examination of the findings of these studies and how they are related to the theories reviewed above will be informative to our own approach in this study.

The findings from existing studies generally reveal that labor cost, country size, openness, exchange rate regime, return on investment, human capital and political factors are among the most important factors explaining flows of FDI (see Table 2 for a summary). Notwithstanding this general finding, in the discussion that follows, we will focus on the evidence found in African studies which offer some insight for the empirical analysis conducted in this study.

1989. Magdoff also notes that, contrary to popular belief, the bulk of FDI actually goes to industrialized rather than Third World nations, with the latter's share declining from 31 per cent in 1967 to 19 per cent in 1989. In relation to the structure of FDI, in 1990 investments in finance, insurance and banking in LDCs were almost one-third higher than in manufacturing (40.1 per cent versus 31.3 per cent of total investments).
5   See also Jungnickel (1993) on this pattern towards investment in services.

Table 2: Result of Recent Empirical Studies on Major Determinants of FDI Flows to Africa (and other Developing) Countries

Determinant	FDI Destinations	Method	Proxy	Effect	Author(s)
Market size	12 MENA; 24 DCs	Panel data	GDP	+	Mohamed &Sidiropoulos (2010)
	14 SADC	Panel data	GDP	+	Mhlanga et al(2010)
	16 SSA countries	Multivariate regression	GDP per capita	+	Cleeve (2008)
	22 SSA countries	Panel data	GDP	+	Asiedu (2006)
	Africa (SSA and North Africa)	Panel data	urban population, as % of total population and GDP per capita	+	Anyanwu (2012)
	80 DCs	Multivariate regression	GNP per capita	+	Schneider and Frey (1985)
	SSA and 6 other non-SSA African countries	Panel data	total population	+	Abdoul' GaniouMijiyawa(2012)
	DCs	Correlation analysis	Population	+	Nunnekamp (2002)
Openness of the economy	16 SSA countries	Multivariate regression	(X+M)/GDP	+	Cleeve (2008)
	29 African countries	Panel data	(X+M)/GDP	+	Onyeiwu and Shrestha (2004)
	14 SADC	Multivariate regression	(X+M)/GDP	+	Mhlanga et al. (2010)
	12 MENA; 24 DCs	Panel data	(X+M)/GDP	**0**	Mohamed and Sidiropoulos (2010)
	SSA & North Africa)	Panel data	(X+M)/GDP	+	Anyanwu (2012)
	22 SSA countries	Panel data	(X+M)/GDP	+	Asiedu (2006)
	SSA and 6 other non-SSA African countries	Panel data	(X+M)/GDP	+	Abdoul' GaniouMijiyawa(2012)
	81 DCs	Panel data	(X+M)/GDP	+	Ahmed et al(2005)
	DCs	Correlation analysis	(X+M)/GDP		Nunnekamp (2002)
Factor endowments in natural resources	22 SSA countries	Multivariate regression	X fuels+minerals/total X	+	Asiedu (2006)
	12 MENA; 24 DCs	Multivariate regression	X fuels/total X	+	Mohamed and Sidiropoulos (2010)
	14 SADC	Multivariate regression	Investment in extractive	**0**	Mhlanga et al. (2010)

			industry (dummy)		
	29 African countries	Panel data	X fuels/total X	+	Onyeiwu and Shrestha (2004)
	Africa (SSA and North Africa)	Panel data	Oil exporters represent dummy for net oil exporters,	+	Anyanwu (2012)
Macro Economic	14 SADC	Multivariate regression	Inflation rate	**0**	Mhlanga *et al.* (2010)
Stability	22 SSA countries	Panel data	Inflation rate	-	Asiedu (2006)
	12 MENA; 24 DCs	Panel data	Inflation rate	=	Mohamed and Sidiropoulos (2010)
	80 DCs	Multivariate regression	Inflation rate	-	Schneider and Frey (1985)
	29 African countries	Panel data	Inflation rate	-	Anyanwu (2012)
	16 SSA countries	Multivariate regression	Inflation rate	=	Cleeve (2008)
Governance Indicators	22 SSA countries	Panel data	Effectiveness of the Government Index (ICRG)	+	Asiedu (2006)
	16 SSA countries	Multivariate regression	Corruption index	-	Cleeve (2008)
	African countries	Panel data	Rule of Law Index(IGRC)	+	Anyanwu (2012)

Note: DCs is Developing Countries; MENA is Middle East and North African Countries; SSA is Sub-Saharan Africa; SADC is Southern Africa Development Community; X is Export and M is Import

Most studies on Africa reported that FDI to Africa is largely motivated by natural resource endowments of countries in the continents (Morisset, 2000; Basu and Srinivasan, 2002; Asiedu, 2003; 2004; and Asiedu and Gyimah, 2008, among others). Morisset (2000), based on a survey conducted on 29 African countries using both panel and cross-sectional analysis, reported a high correlation between FDI inflows and total value of natural resources in each country. Morisset (2000) further reported that, economic growth and trade openness had a large impact on the level of FDI inflows a given country receives.s Basu and Srinivasan (2002) found that, almost 40 percent of FDI in their African study has found its way in the primary sector, particularly in oil and mineral extraction business. Countries like Angola, Botswana, Namibia and Nigeria have received foreign investment targeted at the oil and minerals sectors of their economy (Basu and Srinivasan, 2002). Though natural resource abundance is a common factor explaining much of the FDI inflows, the few successful African countries have also managed to attract FDI by creating favorable economic, social and political environment for FDI (UNCTAD, 1998; Basu and Srinivasan, 2002). For instance, countries, such as Mauritius and Seychelles have managed to attract FDI by tailoring their FDI policies through liberalization, export orientation, tax and other investment incentives. Moreover, some countries like Lesotho and Swaziland have attracted FDI because they are near to South Africa and investors wishing to serve the large

market in South Africa have located their subsidiaries in these countries (UNCTAD, 1998; Basu and Srinivasan, 2002).

Asiedu (2002) analyzed 34 countries in Sub-Saharan Africa over the period 1980-2000. Using panel-data analysis she found that openness to trade, higher income and better growth prospects, better institutional framework and infrastructure were "rewarded" with more investments. A latter study by the same author, Asiedu (2003; 2006) showed the significant role of the country's market size and natural resource endowment in enhancing FDI. Lower inflation, good infrastructure, an educated population, openness, less corruption, political stability and a reliable legal system are also found to have similar positive effect on FDI flows to the continent in these studies. Asiedu and Gyimah-Brempong (2008) validated these finding to a large extent and noted that countries that are small or lack natural resources can attract FDI by improving their institutions and policy environment.

Based on a co-integration analysis for the period 1970-2000 using data for 19 Sub-Saharan African countries, Bende-Nabende (2002) found market growth, export-oriented policy and liberalization as the most dominant long-run determinants of FDI in Africa. In line with Bende-Nabende (2002), focusing on manufactured goods, primary commodities and services, Kandieru and Chitiya (2003) analyzed the impact of openness on FDI flows to Africa in 51 African countries. Their findings indicate that FDI responds significantly to increased openness in the whole economy in general and the services sector in particular.

Onyeiwu and Shrestha (2004), using fixed and random effects models on a panel dataset for 29 African countries over the period 1975-1999, identified economic growth, inflation, openness of the economy, international reserves, and natural resource availability as important determinants of FDI to Africa. Contrary to conventional wisdom, political rights and infrastructures were found to be unimportant in their study. Krugell (2005) also empirically tested for the significance of a number of hypothesized determinants of FDI in Sub-Saharan Africa. The pooled cross-country and time-series estimation covered the period 1980-1999 for 17 countries. Krugell's results are in line with the above findings, particularly with respect to economic growth and openness.

In Dupasquier and Osakwe (2006) study, factors such as political and macroeconomic instability, low growth rate, weak infrastructure, poor governance, inhospitable regulatory environments, and ill-conceived investment promotion strategies, are identified as responsible for the poor FDI record of the region. Similarly, using a simultaneous-equations method on a panel of West African Monetary Zone (WAMZ) countries over the period 1980 to 2002, Eli and Isitua (2006) found FDI to be attracted by higher market size (measured by per capita income and the growth of GDP) and better infrastructure (measured by public investment).On the other hand uncertainty (measured by political instability) and macroeconomic instability (measured by inflation) are found to be disincentive for inward FDI flows to the region.

Naude and Krugell (2007) employed a cross-country econometric approach, using a dynamic one-step generalized method of moment's estimator in their study. Government consumption, inflation rate, investment, governance and initial level of literacy were identified as important. The authors concluded that geography does not seem to have a direct influence on FDI flows to Africa. Neither market-seeking nor re-exporting motives of FDI seem to be the major determinants of FDI in their study either.. However, institutions, in the form of political stability, showed up as a significant determinant of FDI to the continent. Similarly, Rojid*et al* (2008)

analysed various potential determinants of FDI flows to 20 African economies using a fixed effects panel based model for the period, 1990-2005. Abundance of natural resources (supporting the presence of resource-seeking FDI), openness, the size of the domestic market, stock of human capital, played a positive role while political instability and labour cost have negative effect in attracting FDI.

Among the most recent FDI studies on Africa, Abdoul (2012) estimated a model of FDI determination using a five-year panel data with the system-GMM technique, over the period 1970-2009 for 53 African countries. He found that larger countries attract more FDI. However, regardless of their size, more open, politically stable countries that offer higher return to investment also attract FDI. FDI inflows are also found to be persistent in the sense that countries that manage to attract FDI today are likely to attract more FDI in the future. Anyanwu (2012) also, using a cross country data for 53 African countries for the period 1996-2008, found market size (whose proxy is urban population as percentage of total population and GDP per capita of the host country), openness to trade, rule of law, foreign aid, natural resources, and past FDI inflows (increased agglomeration) to have a positive effect on FDI inflows. He also found domestic financial development to have negative effect on FDI inflows. Furthermore, he found that East and Southern African sub-regions appear positively disposed to obtain higher levels of inward FDI.

Country case studies on Africa, which invariably used time series analysis, have reported a similar result to the recent cross-section based studies reviewed above. Among these, Getinet and Hirut (2005), for instance, examined determinants of FDI in Ethiopia over the period 1974-2001, using a time series analysis. Their empirical analysis showed that economic growth, export orientation (openness) and liberalization have a significant positive impact on FDI, while macroeconomic instability (measured by inflation) and low level of physical infrastructure (measured by telephone lines per 1000 people) have a negative impact. Similarly, Sunday and Lydie (2006) using a time series analysis for Cameroon, showed that the level of infrastructure development (increased electricity production and ratio of paved roads) appears as the most significant determinant of FDI in Cameroon. Market size (GDP per capita), openness, human capital development and the rate of economic growth are also important but are found to be less significant. Exchange rate, political risk, the rate of inflation, debt burden, agglomeration effect and the creation of an export-processing zone do not seem to have any influence on FDI in Cameroon either. Seetanah and Rojid (2011) also examined the determinants of FDI in Mauritius, using reduced-form demand for inward FDI function. In their study openness, wages and the quality of labor in the host country are found to be important. Size of the market is reported to have a relatively lesser impact on FDI, probably related to the limited size of the population and the good export opportunities from Mauritius to other African countries especially in SADEC/COMESA regions. The significant coefficient of the lagged dependent variable in their model suggests the presence of dynamism in the system. Finally, Okpara (2012), using Granger causality and an error correction model investigated the determinants of FDI flows to Nigeria during the period 1970 – 2009. He found that, natural resource abundance, fiscal incentives, favorable government policy, exchange rate and infrastructural development are found to have positive and statistically significant effect on FDI flows to Nigeria. Though statistically insignificant, market size and trade openness are found to have positive sign while political risk is found to have a negative sign. Furthermore, the statistically significant error correction term revealed that past foreign investment flows could significantly stimulate current investment inflows.

In sum, both the theoretical discussion in the previous section and the brief review of empirical studies in this section show that market size, openness of the economy, natural resource endowment and political and macroeconomic stability seem to be important determinants of FDI flows to Africa. We believe these are important factors that any model about determinants of FDI flows to Africa needs to consider. However, when examined in the light of the FDI theoretical literature above, none of these African studies seem to formulate their empirical model by explicitly following one strand of the theoretical literature or the other. The variables used in their model, however, seem to suggest the use of Dunning's eclectic paradigm without stating which variable is used as a proxy for which theoretical concept. This is partly the result of missing theoretical discussion and formulation in almost all these studies.

One important area, emphasized in the theory but not well addressed in the above studies, thus, relate to the issue of location in the OLI framework of the "eclectic paradigm". However, the effects of major determinants of FDI identified in the African empirical literature do vary across countries or group of countries – thus location matters. We believe this is an important omission and some analytical classification of counties could be an important indicator of the location issues emphasized in the OLI theoretical framework. Thus, FDI models need to be fitted to such different country groupings; and theses groupings need to be formed using rigorous analytical classification. With this perspective, in the model developed and estimated in this study, the modeling of the determinants of FDI inflows to Africa is framed in a new country classification framework which is discussed in detail in the next section (and Appendix Ia and Ib). Moreover, in addition to incorporating wider governance indicators, we have also used longer data series and a new panel Error Correction Modeling (ECM) technique that accounts for cross-section dependence which is missing in the existing African literature.

IV.   A New Analytical Country Classification

Country classification schemes are important both for analytical and operation activities of international and regional developmental organizations such as the World Bank, the African development bank (AfDB), among others. A recent study at AfDB (Brixiova and Ndkumana 2011) proposed a new country classification for Africa. The classification scheme suggested serves the dual purpose of providing an alternative to currently in use in Africa from a fresh perspective, guiding continental institutions such as the AfDB's operational and analytical work. This section builds on this classification scheme and forwards some ideas for improved use of it in our modeling of FDI flows to Africa. Brixiova and Ndikumana's (2011) proposed classification scheme for Africa is based on the following four criteria: (a) level of income, (b) growth acceleration and resilience, (c) robust macroeconomic framework and macroeconomic stability and (d) enabling business environment and private sector-driven growth. The proxies used to measure these criteria are not clearly articulated in the proposed study, however. Although the Brixiova-Ndikumana classification scheme provides a fresh perspective on African country classifications, it is not a concrete proposal that can readily be used either for operational (except perhaps the fragile states category) or analytical work. This is so for the following reasons. First, the stages of development used are not characterized in terms of their salient features except at general impression level (like having a stock market, credit rating etc.). Second, it doesn't have systematic and quantifiable proxies that could be used for the purpose (except a limited use of percapita income). Third, It does not have clear analytical basis for classification (see below for a brief look at the literature on undertaking such analytic classification). Finally, there is no dynamic and measurable story that indicates one stage surely

follows or precedes the other (say, along the Rostovian line of 'dynamic theory of production' see below). Notwithstanding these weaknesses, it is an important starting point about classification of African economies. It also offers an opportunity to build on this initiative and come up with a useful classification scheme that is appropriate both for operational and analytical work in the continent. An attempt to do that is made here. This has also informed the FDI model estimated in this study.

The literature on the classification of countries by level of development (referred sometimes as 'stage theories') is rife with debate and unsolved issues. Prominent contributions range from the two famous and dominant classifications schemes of stages of development6 (the Marxian and Rostovian; see Figure 1 below) to that of Michael Porter's relatively recent effort. Departing from the dominant Marxian discourse on stages of development at the time, Rostow, in his '…Non-Communist Manifesto', offered a somewhat different classification of 'stages' of economic development. The Rostovian view, on top of the popular financial market classification schemes such as that of 'Standard and Poor's [S&P]', seems the basis for Brixiova-Ndikumana classification scheme as noted by the terms 'transition', and 'take off' in Brixiova and Ndikumana (2011).

Some of the major weaknesses of the Rostovian approach, which is relevant for our topic here relate to Rostow's failure to elaborate more on the concept of "stages" (defined as a concept indicating the discontinuous aspect of growth), the meaning of "sequence of stages" (defined as indicating the continuous aspect of growth) and of "periodization". He also failed to make an effective application of the "dynamic theory of production" that he claimed to use as an apparatus of stage analysis (see Itagaki, 2007). In short, Rostow's analysis fails to impress his critics regarding the dynamic force that links one stage to the other or what Rostow called 'the inner logic of continuity: the analytic bone-structure'. According to Rostow, this sequence is rooted in a dynamic theory of production and leading sector analysis (see Rostow, 1959, 1960). This latter notion is revisited by Michael Porter in the 1990s. Unlike Rostwo, however, Porter's classification scheme has a lot to offer in classifying African countries at various stages of development.

Porter's (1990) classification of countries is based on his acclaimed7 work: '*The Competitive Advantage of Nations*', where he examined the pattern and characteristics of industrialization and export in the global market place. For Porter (1990), each stage of development represents the development of different industries and industry segments as well as the required policy and company strategy (Porter, 1990: 545)8. He structured his stages in such a way that the ability to transit from one stage to the other is a function of a country's relative position in the global market where without the ability to export the level of production and productivity will not rise

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6   This section doesn't pretend to be exhaustive on stage theory. According to Itagaki (2007) Hans Proeler in 1927 listed more than 30 kinds of stage theory ranging from days of Plato to Max Weber. For our purpose we will be focusing on the dominant discourse in the last five to six decades since this has to some degree informed policy making and international (financial) institutions country classifications schemes today.

7   Porter's work has influenced strategies of a diverse group of countries such as Japan, Finland, Estonia, Portugal, Singapore, Costa Rica, Nicaragua, Mexico and Rwanda as well as the state of South Carolina and various councils and regions in the US (see Woodward, 2004)

8   It seems that Porter has developed this classification schemes based on what are known in the trade literature as ' technological-gap models' where Vernon's (1966) 'product-cycle theory', Posner's (1961) 'imitation and demand lag theories' as well as Krugman's (1979) application of this in the North-South modeling work are insightful contributions (see Alemayehu 2015).

(Porter, 1990:545). It is on the basis of this notion that his stages of development (see Figure 1) are outlined.

Figure 1:   Summary of the Literature on Analytical Basis for Classification
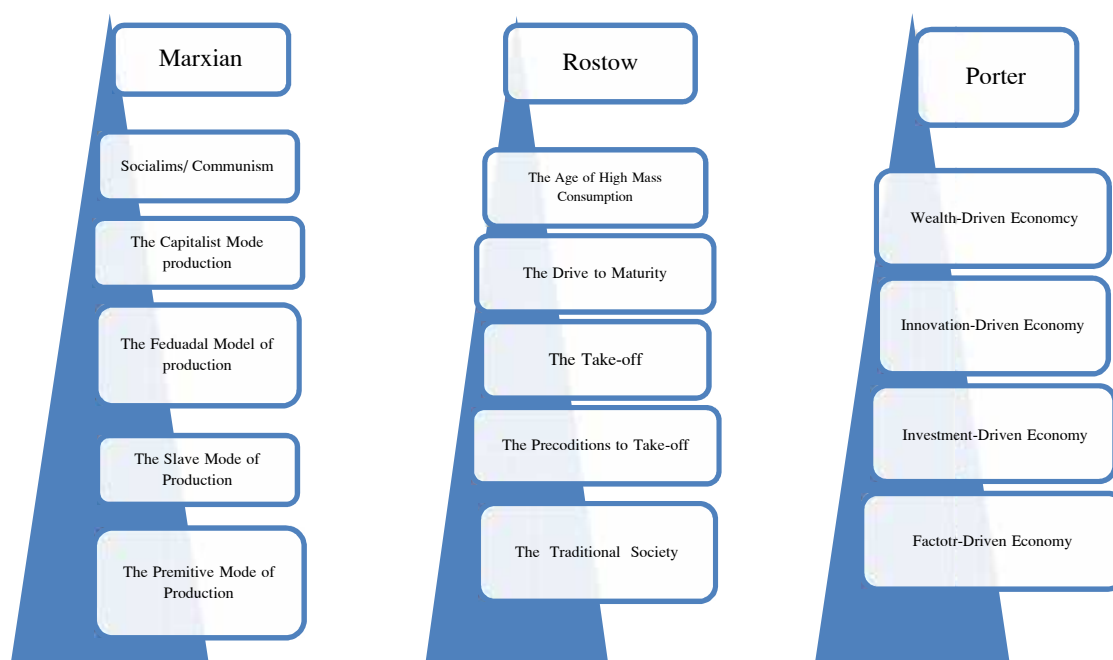
In spite of the depth and breadth of their analytical discourse on country classification, at practical level international financial institutions such as the World Bank, IMF as well as the UN agencies such as the UNDP, in practice, use country classification schemes that are generally purposive to their operational mandate. However, a supporting analytical classification is then, invariably, developed to aid the work required in the operational arena. For instance, according to Nielsen (2011), the UNDP country classification scheme is built around the Human Development Index (HDI), which is a composite index measuring a country's achievement in longevity, education and income. Similarly the classification scheme at the World Bank is guided by operational and analytical work at the bank. The World Bank's country classification is related to identification of credit-worthy and eligible borrowers which initially was based on intuitive rather than analytical measures, but changed later (in 1980) to a rule-based system using gross national income (GNI) per capita. This operational classification scheme took a firm base following the introduction of the concessional financing window of the Bank called the IDA. The analytical classification emerged as a functional tool in 1978 following the development of World Development Indicators (WDI) that categorized9 countries as developing, industrialized, and capital surplus oil-exporting countries (see Nielsen, 2011).

The IMF has also an operational classification which was initially based on the Fund's "Subsidy Account" which was set to cushion the impact of the first oil crisis on member countries. This is a precursor to the Fund's "Structural Adjustment Facility" as well as the current "Poverty Reduction and Growth Facility Trust" which sets eligibility criteria. Its analytical classification also came with the compilation and publication of the International Financial Statistics (IFS) in

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9   Developing countries are further divided into low and middle income categories with percapita GNP level as a threshold; while membership at OECD distinguished the middle income from the industrialized countries.

1948 and the beginning of the publication of the World Economic Outlook (WEO) using the IFS data in the 1980s. The WEO required country classification in support of the analysis contained therein (see Nielsen, 2011). On the final analysis, most of these international classification schemes yielded broadly similar results.

Contrastingly, an analytical classification of African countries is generally absent in the literature. A recent comprehensive study of the political economy of growth in Africa by the African Economic Research Consortium (AERC), using 26 country case studies, identified four political regimes that characterized the political and policy landscape of post-independence Africa –a potential basis for analytical classification. The regimes are: State Controls (SC) regime, Adverse Redistribution (AR) regime, Inter-temporally Unsustainable Spending (IUS) regime, and State Breakdown (SB) regime; also presented is the complementary Syndrome-Free (SF) category (Fosu, 2008). The study noted that the quality of economic policy pursued by each of these regimes has a powerful effect on whether countries seize the growth opportunities implied by global technologies and markets and by their own initial conditions (Fosu, 2008). According to Fosu (2008), this syndrome based classification aggregates multi-dimensional policy into broad patterns that occur repeatedly in African countries. The evidence that syndromes reduce growth is strong in the AERC studies: According to Fosu and O'Connell (2008), being syndrome-free can add as much as 2.5 percentage points per year to per capita growth. While this classification is used for policy analysis, the same AERC study has also come up with an analytic-cum-geographic classification. This classification finds justification in the belief that the potential for growth in the continent is strongly associated with endowments and location (Collier and O'Connell, 2008). As a result countries in Africa are also classified in the AERC study as 'land locked', 'costal', and 'resource rich'.

These two classification schemes ("policy opportunity/syndrome" and "geography") can also be mapped together (Fosu, 2008). In this mapping we note, for instance, that state breakdown is common in land locked economies while costal economies are generally syndrome free. Furthermore, all geographic locations are characterized by the syndrome of being regulatory and redistributive. However, this facet is more dominant in resource rich economies. Although AERC's analytic approach is excellent, it is beleaguered by the same flaws as earlier studies in the literature (i.e. it fails to show the trajectory of development stages for countries examined in the case studies) although the implicit assumption in the study is to point at 'syndrome free' status as the best direction. That makes the AERC classification scheme fundamentally driven by policy analysis. This leaves economic dynamics and shifts in the growth frontier as a result of higher productivity largely untouched.

Finally, it is worth looking at the classification schemes of global financial market players, partly because the Brixiova-Ndikumana classification for Africa categorically borrows archetypal group names (such as 'Emerging Markets', 'Frontier Markets' etc.) from that domain. For instance, Standard & Poor's (S&P) Global Broad Market Index (BMI) classifies countries as 'developed, 'emerging', and 'Emerging Plus', among others, based on the relative size and performance of global stock markets. Nevertheless, it subscribes to the view that classifying countries is no easy task and that the motivation behind S&P's classification is gauging the global financial market. S&P notes that country classification is both an art and a science. Thus, S&P uses quantitative criteria as well as the opinions and experiences of global investors. The S&P methodology document noted that many of the issues in determining if a market is developed, emerging or frontier are not amenable to quantitative decisions. Regulations, rules

and procedures for foreign exchange trading, trade settlement, availability of company financial data and other factors as well as operating costs imposed on investors by these factors vary from market to market and determine the classification of countries (see Standard and Poor's, 2011). Thus,

> …recognizing this, S&P uses a two-step process. First, a series of quantitative criteria provide an initial classification. If this analysis results in a classification change, S&P conducts a client consultation. The final decision is made by the S&P Global Equity Index Committee based on both the consultation and the quantitative criteria. The quantitative criteria cover a range of factors reflecting macroeconomic conditions, political stability, legal property rights and procedures, and trading and settlement processes. The client consultation seeks to incorporate opinions from major institutional investors on a global basis (Standard and Poor's, 2011: 5).

With regard to the relevance of adopting this global financial market based classification scheme to Africa, we note that if a country doesn't have publicly listed companies (with a market capitalization value of over US$100 million), classifications such as 'emerging' and 'frontier' are not usable and hence their usage (as in the case of Brixiova and Ndikumana's study) is problematic. In fact, the 2011 classification by S&P shows only Egypt, Morocco and South Africa as "emerging markets" in Africa – the rest of Africa being totally absent from all S&P's categories.

What are the implications of the discussion so far for classification of African countries? What are the major issues raised in this literature and what lesson can we draw for improving country classification schemes in Africa? More importantly, why care about such analytical basis for stages of economic development in classifying countries on the continent?.

The broad lesson from the analysis so far is that classification of countries by stages of development is an important matter for developmental institutions in Africa and also for analytical work on the continent. This is because countries at various stages of development face different challenges and exhibit diversified outcomes. This may entail different policy and assistance strategies that suit each of the stages (see Porter, 1990; Brixiova and Ndikumana, 2011; Nielsen, 2011; and Lin, 2011). If such classification is important, what then is the lesson from the literature for classifying African countries and what should be the criteria for it? For analytical work such as the FDI analysis in this study, the following criteria are important for classification of African countries in to different categories.

a) There is a need to have both operational and analytical classification of countries in the continent as both are necessary, and also complementary, for the activity of global, continental and regional developmental institutions such as ECA, AfDB etc.

b) Such country classification schemes need to be evolving categorizations that should be evaluated over time (say every two to three years down the line)

Such analytical classification as used in this study, thus,

a) Needs to be guided by the attempt to capture the salient structural features of African economies in the global economy context, including the position of its leading sectors.

b) Needs to be informed by an indication of the existence of levels or stages of development governed by an inner logic of production and export dynamism in each country. It also needs to be forward looking.

c) Should be helpful to identify challenges and evaluate outcomes which are believed to be different at different stages of development and hence call for different intervention strategies.

d) Finally, as much as possible, the classification scheme should be quantifiable so as to avoid arbitrariness.

Building on the works of Porter (1990) which methodically adheres to similar criteria as above and providing an excellent framework to depict the stylized facts of countries, we have proposed below an alternative classification scheme for African countries. The main principle behind this classification scheme is the fact that each stage is a step in the productivity ladder which is qualitatively different in its structure. This could be inferred from the uniqueness of its product sophistication and productivity level in the global economy and market context. Global competitive position is also an indirect measure of domestic economic sophistications once an economy has moved out of, say, the factor-intensive stage of competitive advantage position. Hence, one stage follows the other, in linear or non-linear way, following a qualitative change in a country's economic structure and its accompanied socio-political (soft) and physical (hard) infrastructure10. This conceptualization heavily relies on the pattern of trade because the latter is invariably the best measure of sophistication of the domestic economy and hence a derived indicator of the relative positions of a country vis-à-vis other economies in the world. Bench marked with East Asia's fast growing economies (such as China, S. Korea and Taiwan) such scheme for Africa will help us to see the diversity among African economies. Thus, primarily relying on Porter (1990), we have outlined and briefly defined the following four categories for Africa. These are also summarized, together with their possible proxies, in Annex I.

i) *Factor-Driven African Economies (Aspiring African Economies: Class A&B)*: These are African economies whose source of competitive advantage in the global economy comes from basic factors such as labour and other natural resources. Here, technology is pretty much standard and at best imitated and competition by countries in this stage is sustained through price. The peculiar feature of countries in this stage is the sensitivity of such economies to world economic cycles, exchange rate & interest rate movement and its effect on commodity speculators as well as the loss of factor advantage. This stage is relevant for the majority of African countries. It can also be further divided into agricultural (Class A) and non-agricultural (Class B) factor driven categories as the former is unique and dependent on climate change. In our study here, however, we have used them as one category.

ii) *Investment-Driven African Economies (Emerging African Economies):* These are African economies with the ability and willingness to absorb and modify the best available technology through large investment and that have made themselves competitive in the

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10   The notion of hard infrastructure refers to the prevailing state of rationality, science, technology, the mode of organization and the degree of human development (human capital formation). The soft infrastructure refers the corresponding distribution of income and levels of poverty, the social condition under which production takes place, the mode of thought, ideology, culture and global perspective of citizens (see Baran and Hobswawm, 1961; ECA, 1989; Alemayehu, 2002; Lin, 2011)

global economy. Like that of the factor-driven stage the competitiveness in this stage comes from standardized and price sensitive commodities.

iii) *Innovation-Driven African Economies (Advanced [or Frontier] African Economies):* These are African economies which have created unique value by their firms and cluster of firms that gives them an edge over competitors in the global market. They are also at the world technology frontier with regard to the goods they supply to both large domestic markets and the global economy.

iv) *Fragile and Post-Conflict African Economies:* These are African economies characterized by a debilitating combination of weak governance, policies and institutions, indicated by ranking among the lowest (< 3) on the country policies and institutional performance assessment (CPIA) index of the World Bank. These are states that have failed to provide comprehensive service entitlements to their citizens, and lack authority and legitimacy, owing to failure of either, capacity or, political will or both. The category also entails differing policy needs and assistance compared to countries that are similar in every respect. One distinguishing characteristic is that there is a high(er) risk of reverting back into conflict. Economic performance has an important effect on the weight of this risk. Therefore, economic policy has the *additional* potential of helping reduce the risk of reverting into conflict.

We conclude this section by drawing some implication of the above classification for analytical macroeconomic analysis and cross-country econometrics work on Africa. First, both from the operational and analytical perspective groups such as the 'fragile states' is important. This group has its unique features that require unique analysis, intervention and hence financing mechanism. Thus, macroeconomic/international economic analysis such as the one conducted in this study needs to consider this group as an important and unique category.

Second, the non-fragile states in Africa make up other categories of countries with a different set of economic characteristic and challenges. At specific periods in time, each country may find itself at different stages on the ladder of growth and development. These economies also have unique developmental challenges and financing needs at the various stages of their development (from the factor-driven stage to the 'innovation-driven' stage). This underscores the need to take them as another unique analytical category. This helps us to come up with appropriate development policies, including different financing schemes and financing instruments that are suitable to each group of countries.

Finally, all these categories need to be analyzed and understood in the context of a dynamic global economy where the trade and financing pattern of African countries are fast changing. For instance, the last decade shows the surge of Chinese and Indian economic engagement in the continent. The latter are in the course of significantly replacing the traditional dominant role of OECD countries as a source and destination of trade (market) and finance. Thus, analytical work such as the one reported here and the accompanied modeling strategy needs to bring this issue onboard. This is what is being attempted in modeling FDI flows to Africa in this study as the nature of FDI for each category of countries may have different motivation and attractiveness criteria that are unique for each category. We hope this country classification will be important for similar cross-country studies as well as for operational work of developmental institutions in the continent.

V.   The Empirical Model, Data and Findings of the Study

5.1 The Model, Estimation Method and Data

Following Johansen (1988, 1991) we may consider a VAR model given by equation [1a], where Y represents a vector of variables with *n* lags

$$Y_t \, ℕ \, A_1 Y_{t>1} < A_2 Y_{t>2} < ... < A_4 Y_{t>n} < u_t$$

[1a]

Generally, economic time series exhibit non-stationary process, and, hence, VAR systems like equation [1a] can be expressed as equation [1b] through repeated parameterization to tackle this problem (Alemayehu *et al*, 2012)

$$\Delta Y_t = -\sum_{i=1}^{n}(I - A_i)Y_{t-1} - \sum_{j=2}^{n}A_j\Delta Y_{t-1} - \sum_{j=3}^{n}A_j\Delta Y_{t-2} - ....\sum_{j=i}^{n}A_j\Delta Y_{t-n+1} + ℼD + u_t$$

Where: *D* is a vector of dummy variables and the constant term   [1b]

or $$\Delta Y_t = -\Pi Y_{t-1} + \sum_{j-i+1}^{n-1}\Phi_i\Delta Y_{t-n+1} + ℼD + u_t$$

with

$$\Pi = \left(I - \sum_{i=1}^{n}A_i\right) \qquad \text{and} \qquad \Phi_i = -\left(\sum_{j=i+1}^{n}A_j\right) = -A*(L)$$

The model estimated in this study is based on the VECM formulation given as equation [1b], or specifically equation [7] below, which is a traditional first difference VAR model except for the term X_{t-1}. The Johansen procedure is based on an examination of matrix ɑ, which contains information about long-run relationship. The analysis of long-run relationship in the model is based on examining the rank of this matrix. The most interesting possibility is when 0< rank (ɑ) = *r* < *P*, which implies there are *p* X *r* matrices   (the adjustment vector) and   (the long run cointegration vector) such that ɑ=   ' has r cointegrating vectors. The cointegrating vector have the property that 'X_t is stationary even though X_t itself is non-stationary. The Johansen procedure helps to determine and identify this/these cointegrating vector(s). The empirical study in this study used this approach to identify such cointegrating vector(s).

Equation [1b] is estimated based on auto-regressive distribution lag model (ADL) formulation of the VAR given as equation [1a] which is reparamatrized to offer equation [1b]. The estimable version is given as equation [7] below. In general, in ADL formulation, a long run (equilibrium) relationship between two variables, *Y* and *X*, could be given by equation [2]

$$Y_t = KX_t^\gamma = \gamma_1 + \gamma_1 X_t \quad where: K, \gamma_1 \, and \, \gamma_2 \, are \, constants \, \& \, \gamma_1 = logK \quad [2]$$

As this equilibrium relationship cannot be observed, the observable disequilibrium formulation of this long run (equilibrium) relationship between *Y* and *X*, in a simplified from, can be given by equation [3]. Equation [3] is a simple *ADL (m,n,p)* [where *m* is the number of lags, *n* &*p* the number of endogenous and exogenous variables, respectively], *ADL(1,1,1)*, formulation of equation [2]

$$Y = \beta_0 + \beta_1 X_t + \beta_2 X_{t-1} + \alpha Y_{t-1} + u_t \qquad 0 < \alpha < 1 \qquad [3]$$

With some reparametrization[11], the ECM representation of equation [3], which is the estimable version of equation [1], could be given by equation [4] (Benerjee et al, 1993; Thomas, 1993; Hendry, 1995; Alemayehu, 2002; Morales and Raei, 2013)

$$\Delta Y = \beta_1 \Delta X_t - (1 - \alpha)[Y_{t-1} - \gamma_1 - \gamma_2 X_{t-1}] + u_t \qquad [4]$$

Where:

$\gamma_1 = \frac{\beta_0}{1-\alpha}$; $\gamma_2 = \frac{\beta_1 + \beta_2}{1-\alpha}$; and $\{-(1-\alpha)\}$ is the ECM term and is expected to be negative.

This formulation could be generalized for a general ADL of the form

$$Y_t = \beta_0 + \sum_{i=1}^{m+1} \beta_i X_{t-i+1} + \sum_{i=1}^{m+1} \alpha_i Y_{t-i} + u_t \qquad [5]$$

The estimable ECM formulation of [5] could be derived in similar way as,

$$\Delta Y_t = x_0 + (1 - \sum_{i=1}^{m} r_i)\left[Y_{t-m} - x_0 - \sum_{i=1}^{m} x_i X_{t-m} \right] + \sum_{i=1}^{m} s_i \Delta X_{t-m+1} \qquad [6]$$

Where: $x_0 = \dfrac{s_0}{1 - \sum_{i=1}^{m} r_i}$ is the constant; & the long run coefficients are given by $x_i = \dfrac{\sum_{i=1}^{m+1} s_i}{1 - \sum_{i=1}^{m} r_i}$

The final estimable version of equations [1b or 6] that we estimated as our FDI model is given as equation 7.

$$\Delta Y_t = -\Pi Y_{t-1} + \sum_{j=i+1}^{n-1} \Phi_i \Delta Y_{t-n+1} + wD + u_t$$

$$\text{With } \Pi = \left(I - \sum_{i=1}^{n} A_i \right) \quad \text{and} \quad \Phi_i = -\left(\sum_{j=i+1}^{n} A_j \right) = -A*(L)$$

$$\text{Where: } Y = \begin{bmatrix} FDI_{it} \\ RGDPPC_{it} \\ INVGDP_{it} \\ RES_{it} \\ EXTDEBGDP_{it} \\ OPNESS_{it} \\ ER_{it} \\ INF_{it} \end{bmatrix} \text{ and } D = \begin{bmatrix} POLSTAB_{it} \\ GOVEFFE_{it} \end{bmatrix} \text{ in our FDI model} \qquad [7]$$

The index "i" and "t" refer to countries and time, respectively. Y shows the vector of endogenous variable that include *FDI*, which is measured as the net foreign direct investment inflow and is a widely used measure in the literature (see Adeisu, 2002; Quarzi, 2005**;** Goospeed et al, 2006).   is equal to   ' where   is the co-integrating vector and   the vector of adjustment coefficients. The FDI data series is taken from the African Development Indicators (2014) and World Development Indicators (2014) of the World Bank. For the Political and governance indicators we used the International Country Risk Guide Index (2014).

In specifying equation [7] we have used the theoretical lines of Porter (1990) and Dunning's (1981, 1988; 1993) "eclectic theory" of OLI advantages as determinants of FDI flows to Africa. Our analytical classification of African Economies as Fragile, Factor-driven, and Investment-

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11   Subtracting Yt-1 from either side of equation [3] and adding and subtracting X t-1 in the right hand side of the resulting equation gives equation [4].

driven economies is presumed to capture the location advantage which is unique to each category of countries. Hence, the model is estimated for the three categories of countries discussed in the previous section. In addition to location advantages, Dunning's ownership and internalization (LI) advantages that may attract FDI to Africa could be proxied by market size, natural endowment and stable macroeconomic and political environment as the African empirical literature in the previous section shows. Thus, we have used these variables which are briefly described below as part of our empirical model given as equation [7].

*Market Size (RGDPPC)***: t**he size of the host market, which also represents the host country's economic conditions and potential demand, is an important element in FDI decision-making. Scaperlanda and Mauer (1969) argued that FDI responds positively to market size 'once it reaches a threshold level that is large enough to allow economies of scale and efficient utilization of resources'. This is akin to the concept of I in the OLI framework. The importance of the market size has been confirmed in many previous empirical studies (Kravis and Lipsey, 1982; Schneider and Frey, 1985; Wheeler and Mody, 1992; Tsai, 1994; Loree and Guisinger, 1995; Lipsey, 1999; Wei, 2000). Thus, following the literature, we used real GDP per capita as a proxy for market size. Per capita GDP may also serve as a proxy for capital abundance (Edwards, 1990) and investment climate (Wei, 2000; Aseidu, 2002). The data is taken from African Development Indicators, 2014, of the World Bank. Its expected sign is positive.

Domestic Investment as a percentage of GDP (INVGDP): literature suggests that the availability of strong domestic investment should improve a country's position in the eyes of foreign investors. As noted by Ndikumana and Verick (2007), higher levels of private investment can help attract FDI inflows, possibly due to a signaling effect as higher private investment is seen as an indication of high returns to capital. Higher levels of public investment, particularly in areas like infrastructure, is expected to reduce production and trade costs and hence provide a more profitable environment for foreign investors by raising the marginal productivity of FDI (Ndikumana and Verick 2007).The data is taken from African Development Indicators, 2014, of the World Bank. Its expected sign is positive

Natural Resource Abundance (RES): The availability of natural resources might be a major determinant of FDI to the host country. FDI takes place when a country richly endowed with natural resources lack the amount of capital or technical skill needed to extract or/and sale to the world market. Foreign firms embark on vertical FDI in the host country to produce raw materials or/and inputs for their production processes at home. This means that certain FDI may be less related to profitability or market size of host country than natural resources availability. As posited by the eclectic theory, all else equal, countries that are endowed with natural resources would receive more FDI in line with OLI advantages. As noted by Asiedu (2002), very few studies on the determinants of FDI control for natural resource availability (except Gastanagaet al., 1998; Morisset, 2000 and Noorbakhsh et al., 2001). The omission of a measure of natural resources from the estimation, especially for African counties, may cause the estimates to be biased (Asiedu, 2002). We therefore included the share of minerals and oil in total merchandise exports of a country to capture the availability of natural resource endowments. This measure of natural resources has been employed in several studies, including Warner and Sachs (1995), Asiedu and Esfahani (2001) and Asiedu (2002) among others. The data is taken from African Development Indicators, 2014, of the World Bank.

Openness (OPNESS): openness to international trade, as an indicator of the importance of trade to an economy, is regarded as a very important factor that promotes FDI (Hufbauer et al. 1994). In the literature, the ratio of trade to GDP is often used as a measure of openness of a country. This proxy is also important for foreign direct investors who are motivated by the export market potential of the host country. Empirical evidence (Jun and Singh, 1996; Table 2) shows that higher levels of exports lead to higher FDI inflows. We use the Trade/GDP ratio as a proxy for openness in our model. More-open economies usually also follow "appropriate" trade and exchange rate policies and espouse a relatively liberal investment regime. In Africa, for example, export-oriented economies, such as Egypt, Mauritius, Morocco and Tunisia, have tended to attract large amounts of FDI into their textiles and apparel industries (Ancharaz, 2003).This data is also taken from African Development Indicators, 2014, of the World Bank.

External debt as a percentage of GDP (EXTDEBTGDP): external debt is considered as a component of financial risk, influencing FDI inflows negatively (Nonnenberg and Mendonca, 2004). In addition, heavily indebted countries represent higher future taxes and higher transfer risk – the risk of potential restrictions on the ability to transfer funds across national boundaries. Transfer risk is an important component of country risk and a variable closely monitored by foreign investors. Higher transfer risk may cause foreign capital to move out of a country and new FDI flows to be rerouted to safer locations. We used the debt to GDP ratio as a measure of indebtedness, and hence of transfer risk. This data is also taken from African Development Indicators, 2014, of the World Bank.

Exchange rate, nominal (ER): The effect of changes in exchange rates on FDI flows is ambiguous. Harrison and Revenga (1995) and Elbadawi and Mwega (1998) used the real exchange rate as an indicator of a country's international competitiveness, hypothesizing that a real depreciation would attract larger FDI flows. However, it may be argued that, unless the purpose of FDI flows to a country is to build an export platform; overvalued exchange rates should not represent a considerable hurdle to foreign investors. Quite to the contrary, a real depreciation increases the costs of imported inputs and reduces the foreign-currency value of profit remittances, both of which have adverse effects on the profitability of FDI projects (Aseidu, 2002). This effect will dominate if FDI is undertaken primarily to serve the domestic market. We used the nominal exchange rate (ER) in our model. Exchange rate data is taken from African Development Indicators (2014) of the World Bank.

Inflation rate (INF): is generally used as macroeconomic instability indicator which could affect FDI negatively. Inflation data is taken from African Development Indicators (2014) of the World Bank.

Political Stability (POLSTAB): following the works of Schneider and Frey (1985), Edwards (1990), Loree and Guisinger (1995), Hanson (1996), Jaspersen et al. (2000) and Aseidu (2002), it is argued that political instability and the frequent occurrences of disorder 'create an unfavorable business climate which seriously erodes the risk-averse foreign investors' confidence in the local investment climate and thereby repels FDI away' (Schneider and Frey 1985). We used a political risk rating provided by the International Country Risk Guide (2014) as a proxy for political

stability12. The rating awards the highest value to the lowest risk country as a means of assessing the political and institutional framework of the countries (see ICRG, 2014).

Government Effectiveness (GOVEFFE): finally, in order to take account of the impact of institutional quality of a host country on the inflow of FDI, we included an index of institutional quality using data on "government effectiveness" compiled by the International Country Risk Guide (ICRG, 2014). This variable is rated on a scale of 1 to 6 (where a higher value represents better conditions), and attempts to capture the elements of the political regime institutional quality that are arguably most relevant for foreign investors. This index is effectively a measure of corruption related to bureaucratic quality; a strong rule of law that is usually associated with low risks of expropriation or contract repudiation by the government. It is expected to have a positive coefficient.

5.2 Major Findings of the Study

Three separate models for Factor-driven, Investment -driven, and Fragile African economies are estimated using the model specified above. Our preference for having three models is informed by our finding of statistically significant values for 'country classification' dummies that we incorporated in a single general FDI regression model estimated for all countries (not reported).The latter suggests that the various FDI determining factors seem to have different effect in each country depending in which analytical category the country is located.

The estimation of the models is preceded by all the necessary pre-estimation diagnostic tests that include unit root and cointegration tests. The result justified the use of panel equilibrium error correction modeling technique. In addition, the Hausman test for Random/fixed effect models specification is carried and justified the use of fixed effect modeling in all the three group of countries models. In addition, potential long run relationships in such ARDL based models could also be tested by carrying out Pesaran's bound test (Pesaran and Shin, 1999; Pesaran *et al*, 2001; Giles, 2015). The Peasaran ARDL formulation is advantageous as it could also handle the case of $I(0)$ and $I(1)$ variables. The bound test is basically an "F-test" of the hypothesis, H_0: $(1 - \sum_{i=1}^{m} \alpha_i) = \sum_{i=1}^{m+1} \beta_i = 0$, against the alternative that H_0 is not true. As in conventional cointegration test, the bound test is a test for the absence of a long-run equilibrium relationship between the variables if H_0 is accepted and vice versa. The distribution of the test statistic is non-standard. However, Pesaran et al. (2001) have provided bounds of the critical values for the asymptotic distribution of the F-statistic. The result of this test, further confirmed the existence of long-run relationship among the variables our model.

Having passed all pre-estimation tests, the model, given as equation [7] is estimated using the general to specific approach .The result, from the estimation of this parsimonies FDI model is reported in Table 3. One of the weaknesses of previous cross-section studies in estimating such models is their failure to test for cross-section dependence in their data, in the presence of which the estimated results are problematic (see Pesaran, 2004, 2006, 2007; Holy et al, 2010). In this study relevant cross section dependence tests are carried and no problem of cross section dependence is observed in our data. This test result is given in the final rows of Table 3 below. In addition a test for normality of the error terms shows that all the three models have no non-normality problem.

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12   The index is based on 12 components that include: Government Stability, Socioeconomic Conditions, Investment Profile, Internal Conflict, External Conflict, Corruption, Military in Politics, Religious Tensions, Law and Order, Ethnic Tensions, Democratic Accountability and Bureaucracy Quality

Table 3: Determinants of FDI in Investment-Driven, Factor-Driven and Fragile African Economies

Dependent Variable: (Log of Foreign direct investment[FDI], net inflows)

Method: Fixed Effect Panel Error Correction Model

Sample: 1996-2012

Variables	*Investment Driven Economies (n=62; i=9)*	*Factor Driven Economies (n=136; i=18)*	*Fragile Economies (n=54; i=6)*
	Coefficient	**Coefficient**	**Coefficient**
Short Run effects			
Constant	-10.618	8.760	58.615
(Log of Real GDP per capita)	0.966***	-2.016	0.316
(Log of Natural Resource Abundance)	0.527**	0.124***	1.084*
(Log of Domestic Investment to GDP Ratio)	1.390**	0.532	-0.373
(Log Inflation)	-0.373**	0.057	0.016
(Log of External Debt to GDP Ratio)	0.003	-0.152	-0.999
(Log of Openness)	1.128	0.445	1.415
(Log of Nominal Exchange Rate)	0.967**	-0.409	0.712
ECM^	-0.986***	-0.700***	-0.882***
Long-run effects			
Log of Real GDP per capita (-1)	0.335**	0.544	0.323
Log of Log of Natural Resource Abundance (-1)	-0.012	0.174***	0.657**
Log of Domestic Investment to GDP Ratio (-1)	0.389	0.428	1.468***
Log of Inflation (-1)	-0.509	-0.004	-0.152
Log of External Debt to GDP Ratio (-1)	-0.617***	-0.169	-2.081***
Log of Openness (-1)	5.130***	-0.061	1.721
Log of Nominal Exchange Rate (-1)	0.893	-0.029	0.118
Political Stability	1.279**	0.513***	1.256
Government Effectiveness	2.017*	0.527*	2.816**
Diagnostic Tests			
R-squared	0.902	0.667	0.777
Adjusted R-squared	0.834	0.551	0.581
F-statistic	13.224	5.726	3.968
Prob(F-statistic)	0.000	0.000	0.001
Jarque - Berra	0.143	0.984	2.863
Prob(Jarque - Berra)	0.931	0.611	0.239

Cross section Dependence Tests :(Null hypothesis: Cross-sectional independence)			
Breusch-Pagan Chi-square P-Value	0.3221	1.0000	1.0000
Pearson LM Normal P-Value	0.6870	0.1691	0.8362
Pearson CD Normal P-Value	0.4457	0.5903	0.5007
Friedman Chi-square P-Value	1.0000	0.5903	0.8899

***, ** and * indicates 1 %, 5% and 10% level of significance respectively.

^This also refers to Log of FDI(-1)) in our formulation; and the long-run elasticity values could be obtained through dividing the long-run estimated coefficients above by these values (see section 5.1)

The result (see Table 3) shows that for the investment driven African economies, in the short run, real GDP percapita, natural resource abundance, the level of domestic investment, and exchange rate are found to have a positive impact, while inflation is found to have a negative effect. The adjustment coefficient shows 98 percent of the deviation from the long run equilibrium trajectory will be adjusted in one period. This shows a very fast adjustment in investment-driven countries. This adjustment towards equilibrium becomes slower in fragile economies and factor-driven economies, however. In the long run, real GDP per capita and openness are found to have significant positive impact, while that of external debt is found to have a negative effect on FDI flows to the continent. In addition, political stability and government effectiveness indices are found to have a statistically significant positive relationship with increased inflow of FDI to all economies.

Table 3 further shows that both for the factor-driven and fragile economies, abundance of natural resource is found to have a statistically significant positive impact on the inflow of FDI both in the short and long run. Its effect is also found to be more important in fragile than factor-driven economies. It is also interesting to see that government effectiveness is important in investment-driven and fragile economies while political stability is important in investment-driven and factor-driven economies which are relatively better shaped economies.

Macroeconomic stability (whose proxies are inflation and exchange rate indicators) in the short run and openness in the long run are found to be important only in investment-driven economies. Similarly, market size is found to be important only in the investment-driven economies perhaps indicating that FDI to these economies is market-seeking while it is resource seeking in the factor-driven and fragile economies. Finally, financial risks, as measured by the stock of external debt to GDP ratio, is found to affect FDI inflows negatively in investment-driven and fragile economies only – the effect being stronger in fragile economies. This may suggest that, if a country is rich in resources (i.e. is factor-driven), financial risk may not be an issue.

In summary, the empirical analysis shows a number of interesting findings. One of these findings, which previous studies without country classification scheme could not be in a position to identify, is that among all determinants of FDI only government effeteness in the long run and natural resource abundance in the short run are the factors that are found to be statistically significant in all countries. The second finding is that adjustment towards equilibrium is the fastest in investment-driven (ID) country group followed by the fragile (FR) and factor-driven (FD) country groups. Table 3 also shows that natural resource endowment is not important in ID countries while it is found to be very important in FR economies. Openness is important not for all countries, as the current literature suggests, but only in investment-driven countries.

Similarly, debt is not important for FD countries may be because these countries are rich and investors may not worry about their repayment capacity. Political stability is not important for fragile country groups, which are political in bad shape anyway, while government effectiveness is. However, political stability is found to be important for investment and factor driven country groups which are relatively developed country groupings in the continent.

IV.   Conclusion

In this study, based on a new analytical classification of African economies as Fragile, Factor, and Investment driven economies, we have identified the main determinants of FDI inflows to Africa. The empirical analysis is conducted using a panel co integration approach for the period 1996 to 2012. Our empirical analysis supports the hypothesis that FDI flows to Africa is conditional on the nature of the country in question as outlined in our analytical country classification.

Among all determinants of FDI only government effeteness in the long run and natural resource abundance in the short run are found to be the factors that are found to be important determinants of FDI to all countries in Africa. The second finding of the study is that adjustment towards equilibrium is the fastest in investment-driven (ID) country group followed by the fragile (FR) and factor-driven (FD) country groups. Third, the study also shows that natural resource endowment is not important in the investment-driven countries while very important in the fragile economies. Fourth, openness is important not for all countries as the current literature suggests. It is found to be important only in investment-driven countries. Similarly, financial risk and fund transfer risk, as can be read from the debt to GDP ratio, is found to be unimportant for factor-driven economies. Political instability is found to be not important for fragile country groups while government effectiveness is. However, political instability is found to be important for investment and factor driven country groups.

The findings in this study suggest the importance of emphasizing different policies in different countries/country groups as well as the need to design different FDI related incentive systems in different country groupings. Moreover, the analysis also suggests that the new analytical classification scheme developed could be an important guide to operational and analytical works of continental organization such as the African Development Bank [AfDB], the Economic Commission for Africa [ECA] and the African Union [AU], among others, as it suggest the use of different intervention strategies or policies for different countries.

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Appendix I(a):1Suggested Proxies for Empirical Application of the Country Classification

An Alternative Proposed Country Classification of African Economies

Country's Stage of Development	Suggested Proxies for measuring the Stage
(a) Innovation-Driven African Economies **(Advanced [frontier] African Economies)**	R&D Spending as % of Total Government Spending and also as % of GDP Number of patent application (as proxy for innovation) Number of Leading Global Companies Tertiary Education enrollment share, gross Secondary Education enrollment share, gross Internet users per 100; mobile users(per 100) Private Sector Development (Entrepreneurship: stock market value) Competitive Democracy (Governance Indicator) GDP percapita (in US$) [All Proxy indicators above should be benchmarked/comparable to the level attained by East Asian countries or a sample of them such as China, India and Taiwan]
(b) Investment-Driven African Economies **(Emerging African Economies)**	Investment (GCF) as share of GDP Gross Domestic Saving (share of GDP) FDI as share of GDP Manufacturing sector as the share of GDP Manufacturing Export as the share of total exports Existence of Stock Market and Listed companies Stable Macroeconomic Regime (inflation , CAD and Fiscal deficit % GDP) Private Sector Development (entrepreneurship: stock market value) Competitive Democracy (governance indicator) Road, Kms ;Rail and Mobile per 100 people [All Proxy indicator above should be at least half the level attained by East Asian countries or a sample of them such as China, India and Taiwan]
(c) Factor-Driven African Economies **(Aspiring African Economies)**	Share of Primary commodities in total exports >75% Share of Manufactured Exports in total exports <25% Road, Rail and Mobile per capita (< half the East Asia)
(C1) Agricultural Commodity Driven Economies (Class A) **(C2) Non-Agricultural Commodity Driven Economies (Class B)**	Agricultural commodity exports >75% of Exports Agriculture in GDP (above 40%) [Non-Agricultural Commodity Exports > 75% of Exports] Agriculture in GDP (below 40%)
(d) Post-Conflict and Fragile African Economies	lowest (<3) country policies and institutional performance assessment (CPIA) index value Uncompetitive democracy Emerged from conflict (less than 10 years) Existence of active rebellion

Appendix I (b). Countries Selected based on their Score

Proxy Indicator of African Countries level of development compared to East Asian Countries (Period Average 2005-2009)

Manufacture Exports as share of total exports (>50%East Asia level)	Manufactured good as share of GDP (>50% East Asia level)	FDI share of GDP (Equalt to the East Asian level)		GDS as share of GDP (>50%East Asian level)	Gross Capital formation (Investment) as share of GDP (>50% of East Asia level)		Single digit inflation		Agriculture as share of GDP (<4% is the East Asian level)	Number of listed companies (the East Asian level is 14,209)	Tertiary level enrolment as share of growth enrollment (50% of the East Asian level)	Number of patent applications made (the East Asian level is 876,824)
Botswana	Kenya	Cape Verde		Algeria	Algeria	Libya	Algeria	Mauritania	Botswana	Botswana (18)	Algeria (24.5)	Algeria (680)
Cape Verde	Madagascar	Central African Republic	Sierra Leone	Angola	Benin	Madagascar	Benin	Mauritius	Congo, Rep.	Cote d'Ivoire (38)	Egypt (28.7)	Egypt (1827)
Central African Republic	Malawi	Congo, Dem. Rep.	South Africa	Botswana	Botswana	Malawi	Botswana	Morocco	Djibouti	Egypt (492)	Mauritius (23)	Mauritius (24)
Djibouti	Mauritius	Congo, Rep.	Sudan	Cameroon	Burkina Faso	Mali	Burkina Faso	Mozambique	Equatorial Guinea	Ghana (32)	Morocco (12)	Morocco (878)
Kenya	Morocco	Djibouti	Tanzania	Chad	Burundi	Mauritania	Cameroon	Namibia	Libya	Kenya (51)	Tunisia (32)	Tunisia (338)
Madagascar	Mozambique	Egypt, Arab Rep.		Congo, Rep.	Cameroon	Morocco	Cape Verde	Niger	Seychelles	Malawi (12)		Ethiopia (17)
Mauritius	Namibia	Equatorial Guinea		Cote d'Ivoire	Cape Verde	Mozambique	Central African Republic	Rwanda	South Africa	Mauritius (60)		Kenya (71)
Morocco	Senegal	Gambia, The		Egypt, Arab Rep.	Chad	Namibia	Chad	Senegal		Morocco (70)		Madagascar (56)
Namibia	South Africa	Ghana		Equatorial Guinea	Congo, Dem. Rep.	Niger	Comoros	Seychelles		Namibia (9)		Mozambique (40)
Senegal	Swaziland	Guinea		Gabon	Congo, Rep.	Rwanda	Congo, Rep.	Sierra Leone		South Africa (400)		Sudan (18)
South Africa	Togo	Lesotho		Libya	Djibouti	Sierra Leone	Cote d'Ivoire	South Africa		Tanzania (10)		
Swaziland	Tunisia	Liberia		Mauritius	Egypt, Arab Rep.	South Africa	Djibouti	Sudan		Tunisia (48)		
Togo	Zimbabwe	Libya		Morocco	Equatorial Guinea	Tanzania	Egypt, Arab Rep.	Swaziland		Uganda (6)		
Tunisia		Madagascar		Namibia	Eritrea	Tunisia	Equatorial Guinea	Tanzania		Zambia (16)		
Zimbabwe		Malawi		South Africa	Ethiopia	Zambia	Gabon	Togo		Zimbabwe (219)		
		Mali		Tunisia	Gabon		Gambia, The	Tunisia				
		Mauritania		Zambia	Gambia, The		Guinea-Bissau	Uganda				
		Namibia			Guinea		Lesotho	Zambia				
		Niger, Nigeria			Kenya, Lesotho		Libya, Mali					

Appendix I (c). Final Analytical Country Classification for the Model

Fragile State African Economies (AfDB CPIA <3)	Investment-Driven African Economies (Emerging or Frontier African Economies)	Factor-Driven African Economies (Aspiring African Economies)	Comment
Burundi	**North Africa**	(Rest of Africa)	• No African economy has reached the Innovation Driven stage (Advanced African) , yet (except to some degree South Africa followed by Egypt and Algeria)
Central African Republic	Algeria	Angola	
Chad	Egypt	Benin	• (Libya, Madagascar and Mozambique, on border line scoring 40% while the passing level on the scale of the 10 indicators above is 50%)
Comoros	Tunisia	Burkina Faso	
Congo, Dem Rep	Morocco	Cameroon	
Congo, Rep	**Other Africa**	Central African Republic	
Cote d'Ivoire	Botswana	Equatorial Guinea	
Djibouti	Kenya,	Ethiopia, Gabon	
Eritrea*	Mauritius,	Gambia, Ghana	
Guinea	Malawi	Lesotho, Libya	
Guinea-Bissau	Namibia,	Madagascar , Mali	
Liberia	South Africa	Mauritania	
Sao Tome and Principe	Cape Verde	Mozambique	
Sierra Leone		Niger Nigeria	
Somalia		Rwanda, Senegal	
Sudan		Seychelles, Swaziland	
Togo		Tanzania, Togo	
Zimbabwe		Uganda, Zambia	

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