

FDI DETERMINANTS IN LEAST RECIPIENT REGIONS: THE CASE OF SUB-SAHARAN AFRICA AND MENA

Abstract

This paper explores the determinants of FDI into least recipient regions. Panel data for 20 SSA and 11 MENA countries are used for the period 2000-2010. The findings suggest that FDI inflows into these regions were largely influenced by trade openness, infrastructure, return on capital, basic literacy skills and control of corruption. Conversely, the exchange rate negatively affects FDI inflows and natural resource endowments do not significantly influence FDI for this sample. In order to ensure that natural resources are a significant factor, minimum threshold requirements are necessary in terms of political stability and trade openness. In addition, the null hypothesis that both regions are not behaviourally and structurally different in terms of FDI determinants was rejected. When considered separately, SSA performed poorly compared with the MENA countries with the latter group attracting more FDI inflows compared to those in SSA.

Key words: FDI, Least Recipient Regions, Natural Resource Endowments

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1 Introduction

Sub-Saharan Africa (SSA) and the Middle East and North Africa (MENA) receive the lowest levels of FDI inflows in the world with the SSA and the MENA regions receiving around 2% and 5% respectively of all global FDI inflows (World Bank, 2012). The poor record of FDI flows into these regions is surprising considering the quality and quantity of natural resource endowments and their strategic location. It is often argued that the high levels of instability and corruption, weak governance and poor quality infrastructure account for their inability to attract FDI (Kandiero and Chitiga, 2006). Data from the World Bank support with average indicators of corruption control and political stability at about 40% and 30% respectively in both regions. However, over the last couple of years efforts have been focussed on attracting more FDI. For example, in the late 1980s the MENA countries began a significant shift toward trade and FDI openness and the creation of an environment that is more favourable to FDI and exports (AbuAl-Foul and Soliman, 2008). In Sub-Saharan Africa, structural adjustments programmes were also introduced at the same time to attract investment after years of policies that deterred foreign investment due to fears that this would result in a loss of political sovereignty, a negative impact on domestic firms and economic degradation with respect to the natural resource sectors (Dupasquier and Osakwe, 2005; Pigato, 2000).

Table 1 reports levels of FDI inflows. In Panel A it is clear that the countries in SSA have received by far the lowest amount of inward investment over this period, followed by the MENA countries. Interestingly, the coefficient of variation for all regions, with the exception of Europe and Central Asia is very similar, suggesting that the dispersion of foreign investment activity is uniform. Panel B in the table shows some encouraging growth in inward FDI for both regions in the present study although SSA lags behind the MENA countries to a considerable extent.

Table 1: FDI Inflows to Developing and Emerging Regions (\$ billions)

Panel A FDI Inflows (2000 – 2010)					
Regions	Mean	Std. Dev.	Coef of Var.	Minimum	Maximum
SSA	5.92	9.11	1.54	0.74	28.70
East Asia & Pacific	66.30	104.00	1.57	1.39	328.00
Latin America & Caribbean	30.60	42.90	1.40	0.61	122.0
MENA	13.00	27.10	1.40	-0.02	87.50
Europe & Central Asia	190.00	286.00	2.08	4.31	852.00

Panel B Growth in FDI Inflows for SSA and MENA Regions			
Regions	2000-2002	2003-2006	2007-2010
SSA	11.040	15.524	31.736
MENA	9.295	45.759	87.886

Source: World Bank Indicators

FDI inflows can play a critical role in providing capital for investment, high quality managerial skills and technology transfer while creating employment, increased competition, export development and enhances opportunities for growth and development, particularly in developing countries (Asiedu, 2002; Assuncao et al, 2011; Akinlo, 2004; Mohamed and Sidiropoulos, 2010; Adams, 2009). Hence, it is important that Sub-Saharan Africa and the MENA region attract sustained foreign investment that can be used to assist in their development programmes and achieve higher levels of growth. In addition, both regions would benefit from increasing their capacity for domestic investment. FDI inflows can bridge the shortfall caused by low savings ratios and bring valuable foreign exchange into the economy (Ajayi, 2006; Mohamed and Sidiropoulos, 2010), while both the OECD and NEPAD have stressed the importance of FDI in filling these resource gaps (Okojie and Shimeles, 2006). Regrettably, as the data suggest, the regions are still at the lower end of the distribution when it comes to receiving FDI, which suggests that the reforms over the last couple of decades to attract FDI are still inadequate or have not sent the right signals to foreign investors.

This paper is largely motivated by Asiedu (2002), who examined the determinants of FDI to developing countries and questioned whether Africa is different. However, the present study differs in a number of ways. Firstly, it focuses specifically on the determinants of FDI into the two least recipient regions that embarked upon trade liberalisation and reforms at same

period, rather than using a sample of developing countries with a huge disparity in characteristics, levels of trade liberalisation and reforms. Secondly, it incorporates an investigation of the differences between the regions that arise from structural and behavioural factors. In addition, the paper departs from much of the literature by using FDI per capita as the dependent variable as this allows for country size in a way that is not possible in the standard FDI inflows as a percentage of GDP. Finally, comparing FDI flows between both regions contributes to the literature as while there are several shared characteristics some factors differ, which presents a platform for further incentives, reforms and complementarities.

Panel data estimation is applied to a sample of 20 SSA and 11 MENA countries to determine the factors that determine FDI inflows. Findings suggest that trade openness, infrastructure, return on capital, basic literacy skills, availability of labour and control of corruption positively influence FDI inflows. Surprisingly, natural resource endowments do not significantly influence FDI while the exchange rate and cost advantages that host competitors benefit through credit availability negatively affects FDI. A further examination of the insignificant relationship between natural resource endowments and FDI find that countries that have not yet attained the minimum required threshold in terms of political stability and openness fail to make their natural resource sectors significantly attractive to foreign investors. In addition, the null hypothesis that both regions are not behaviourally and structurally different in terms of FDI determinants was rejected. When considered separately, SSA performed poorly compared with the MENA countries with the latter group attracting more FDI inflows compared to those in SSA.

The paper is organised as follows. Section 2 reviews the theoretical and empirical literature on the determinants of FDI. Section 3 develops the hypotheses to be tested. Section 4 describes the variables and presents the preliminary data analysis. Section 5 specifies the models and reports the results followed by a discussion of the implications. The final section concludes.

2 Determinants of FDI

a) A brief review of the theoretical literature

Braunerhjelm and Svensson (1996) note the complex nature of the theoretical foundation of FDI and the literature is now fragmented across different areas of economics and international

business. The earliest explanation of FDI inflows was from a neoclassical trade theory perspective. The Heckscher-Ohlin model assumed that since commodities vary in relative factor intensities and countries vary in relative factor abundance, capital will move to those countries where the return to capital is higher and the return to labour is lower (Jones, 1957; Hodd, 1967; Calvet, 1981; Faeth, 2009). Aliber (1970) extended the discussion of why capital moves across borders to include differences in the premium associated with exchange rate risk. Multinational firms in countries with stronger currencies have an advantage over local firms in countries with weaker currencies since they can borrow capital with a lower exchange rate risk premium (Harvey, 1990).

The neoclassical approach was criticised because of its inability to clarify the nature of FDI flows (Faeth, 2009) and was replaced with the concept of oligopoly by Kindleberger (1969) and Hymer (1976) to provide a better explanation of why firms move across borders. In this view, firms will only operation internationally when they possess certain advantages over local firms and where the market to explore these advantages is imperfect (Denisia, 2010). Buckley and Casson (1976) formulated a theory of multinational enterprise within a broad-based intellectual framework defined as internationalisation. This theory suggests that firms internalise markets by bringing the activities linked by the market under common ownership and control and move abroad if the expected benefits exceed the expected costs (Calvet, 1981; Buckley and Casson, 2009). Dunning (1979) combined these two concepts to create the eclectic paradigm, which is a combination of the traditional trade economics and internalisation theory, which assumes that the likelihood of a firm investing abroad is based on three main factors: the degree to which a firm owns an asset that its competitors do not; whether the firm can benefit from selling or leasing these assets to other firms; and the level of rents that can be earned by exploiting these assets. In all cases, the locational characteristics of the host country are important, where these include market size/market growth, skilled labour, labour costs, synergistic/knowledge-related assets, availability/quality of infrastructure and natural resources (Dunning, 1998; Sun et al, 2002; Dunning, 1980). It is the locational aspects of the eclectic paradigm that separates this theory of FDI from the earlier market structure approaches based on oligopoly and monopoly (Faeth, 2009).

In addition, national policies have had an impact on the determinants of FDI and these have tended to concentrate on attracting investment from abroad rather than emphasise differences in market structure. Hence, FDI can be regarded as a game between the multinational firm and the host government, complicated by the competition between host countries for inward

FDI and various inducements and incentives are frequently offered with the intention of influencing the decision of the firm to invest in a particular location (Faeth, 2009). Exchange rates, tariffs and other trade barriers, taxes and the ease with which capital can be repatriated are some of the ways through which host governments influence FDI activity (Calvet, 1981; Lim, 2002). In terms of negative influences, host governments that neglect to ensure a stable environment can deter investment as political risk is a disincentive for firms wishing to undertake FDI (Khrawish and Siam, 2010). In summary, several factors impact the FDI decision (Kandiero and Chitiga, 2006) and account for the significant variations in the volume of FDI inflows to different countries and regions (Lydon and Williams, 2005).

b) Empirical studies of FDI determinants

There is a vast empirical literature on FDI that includes developed and developing countries, focussing on various sectors and for different time periods. However, the papers reviewed here focuses solely on developing countries and regions as this is the context of the present study. Many papers suggest that firms seeking to exploit their own firm-specific advantages are more likely to invest across borders, however, due to difficulties collecting firm-level data most of these are country level studies (Lei and Chen, 2011). The topics specific to developing countries tend to concentrate on the impact of corruption, rate of return, trade openness and natural resources with mixed findings on their relationship with FDI. Most emphasis has been on market size, education and economic growth. For example, Tsen (2005) attribute the positive significance of human capital to FDI to the fact that foreign investment does not only seek to reduce costs but also acquire access to technology and innovative capacity. Conversely, Oke et al (2012) find an insignificant relationship between education and FDI because of a lack of training and integration in the pool of human capital in their sample. Akin (2009) argued that their finding that FDI is not related to GDP per capita suggests that the small size of the market in low income countries is not an important determinant in the decision to invest internationally, although again this is sample specific. Kahai (2004) argued that the significant relationship between FDI and per capita income shows that their study supports the market size hypothesis. Srinivasan (2011) claimed that the efforts by governments to increase economic growth and GDP per capita are successfully attracting market seeking FDI.

With respect to infrastructure variables, there is further controversy. Adefeso and Agboola (2012), and Soremekun and Malgwi (2012) find a positive and significant relationship

between infrastructure (mobile users) and FDI inflows are due to the fast penetration and adoption of mobile phones in the sample of developing countries they studied. However, Wadhwa and Sudhakara (2011) used internet access as a measure of infrastructure and found a negative relationship to FDI, explained by the fact that developing countries have started using internet services extensively only in the last couple of years and hence are yet to have a positive influence on FDI.

Finally, governance measures have been used extensively in FDI studies, and in particular with developing country samples. Woo and Heo (2009) find a negative relationship between FDI and corruption in a sample of developing Asian countries and suggested this was due to weak economic reforms, monopolistic power and rent-seeking behaviours of government officials, all of which deters investors. Political instability was found to have a significant and negative impact on FDI in a study by Buthe and Milner (2008) and explain this by increases in the uncertainty of the political environment that heightens the risk of policy change and thus discourages FDI. Basemera et al, (2012) argue that the influence of free trade has been responsible for increased levels of FDI in a sample of sub-regional governments. A summary of these empirical studies are in Table 2.

Table 2: Summary of Some Empirical Findings on FDI Determinants

Determinants of FDI	Insignificant	Positive	Negative
Corruption			Mathur and Singh, (2011) Woo and Heo, (2009) Dhingra and Sidhu, (2011)
Natural Resources		Asiedu, (2006) Kinyondo, (2012) Hailu, (2010)	
Infrastructure		Shahmoradi and Baghbanyan, (2011) Soremekun and Malgwi, (2012) Adefeso and Agboola, (2012) Rutihinda, (2005)	Wadhwa and Sudhakara, (2011)
Human Capital	Oke et al. (2012)	Tsen, (2005) Suliman and Mollick, (2009) Ramirez, (2010) Noorbakhsh et al. (2001)	
Inflation	Asiedu, (2002) Busse and Hefeker, (2005)		Mohamed and Sidiropoulos, (2010) Hussain and Kimuli, (2012)
Market Size/Growth	Akin, (2009)	Khrawish and Siam, (2010) Srinivasan, (2011) Kahai, (2004) Ang, (2008)	
Political Instability	Asiedu, (2002)		Buthe and Milner, (2008) Bandyopadhyay et al. (2011) Oke et al, (2012)
Trade Openness		Kok and Ersoy, (2009) Ang, (2008) Liargovas and Skandalis, (2012)	

Low Labour Costs	Chen, (1996)	Basemera et al. (2012) Ranjan and Agrawal, (2011) Seetanah and Rojid, (2011) Chunlai, (1997)	
Exchange Rate	Nyarko et al. (2011) Ruiz and Pozo, (2008)		Coleman and Tettey, (2008)
Rate of Return		Ivohasina and Hamori, (2005)	

3 Hypothesis Development

The framework for the hypotheses was developed mainly according to the OLI paradigm although with more emphasis on locational factors. The literature on the location-specific variables of FDI suggests that infrastructure, human capital, natural resources, market size, exchange rate, country risks and production costs really influence the patterns of FDI inflows (Tsen, 2005).

H1. *Larger market size/growth is positively associated with FDI inflows*

The size of the market can be measured by GDP growth rate or GDP per capita. It is expected that a positive relationship will exist between market size and FDI inflows especially if FDIs target market-seeking activities (Ranjan and Agrawal, 2011). However, while the growth rate of GDP or growth rate of per capita GDP is often argued to be a poor indicator for market seeking FDI activity in developing countries, the study nevertheless hypothesises a positive relationship with FDI will be found (Akin, 2009).

H2. *Human capital accumulation has a positive impact on FDI inflows*

An educated workforce has been recognised as an important determinant of FDI especially when firms are efficiency seeking. Srinivasan (2011) notes that a higher level of education in the workforce can promote higher levels of FDI. The measures of human capital this study uses include the primary school enrolment rate, the number of technical education students per capita and the labour force, that is working age adults.

H3. *FDI is positively related to the abundance of the natural resource endowment*

Natural resources have been found to be important in attracting FDI, particularly in developing countries (Asiedu, 2006). The regions under review in this study are rich in natural resources and this is the sector that has historically attracted large amounts of FDI, especially the mineral and oil sectors. This study uses three measures of natural resources

(proven crude oil reserves, volume of gold production and mineral rent as a percentage of GDP).

H4. *Infrastructure development stimulates FDI inflows*

Available infrastructure increases productivity and thus the return on investment. Therefore a positive relationship between infrastructure and FDI is expected (Asiedu, 2002; Akin, 2009). However, the quality of infrastructure in these countries is highly variable and a quality adjusted measure would be preferred. Unfortunately, data constraints limit the construction of this variable and in common with the literature, infrastructure availability and or development is used. This is proxied by per capita mobile phone users, as is established in similar studies.

H5. *Trade liberalisation has a positive impact on FDI inflows*

Countries with greater levels of trade openness and with more links to the world economy attract foreign capital and welcome overseas investment (Srinivasan, 2011; Owusu-Antwi, 2012). Using the established measure of openness (exports minus imports as a share of GDP), the study hypothesises a positive relationship with FDI. Evidence of this has been provided by numerous empirical studies for the regions under review. This is particularly important because both SSA and MENA have embarked on adjustment programmes and trade liberalisation over the past two decades and few barriers to trade remain in these regions.

H6. *There is a negative relationship between country risks (corruption and political instability) and FDI inflows*

The previous five testable hypotheses are considered positive factors in the growth of FDI inflows. However, considerable barriers remain. Corruption impedes investment directly and indirectly (Habib and Zurawicki; Al-Sadig, 2009) although the relationship between political instability and FDI is not unresolved (Asiedu, 2002). Several countries in this study are characterised by a high degree of instability, such as frequent military interventions and religious and ethnic conflicts (Owusu-Antwi, 2012). Thus, this study hypothesises a negative relationship between both corruption and instability and FDI.

H7. *Foreign investors invest in developing countries that offer high rates of return*

The level of return on capital invested influences the choice of location for foreign direct investment. However, the incomplete and weakly efficient capital markets in developing countries present difficulties in measuring the risk adjusted rate of return on capital. Using the

inverse of GDP as a proxy for return on capital has been justified in the literature since poor, and thus capital scarce, countries tend to offer higher return on capital. If this is the case, GDP per capita should be inversely related to FDI and has been used as a proxy for return on capital (Asiedu, 2002; Ivohasina and Hamori, 2005). This measure is used here.

H8. *Foreign investors with strong domestic currencies invest in host countries with weak currencies*

Both the Aliber (1970) currency hypothesis and the structural adjustment programmes proposed by the IMF and the World Bank, suggests that for countries in SSA and MENA to develop and achieve high growth rates they, subsidies should be removed, currencies devalued and trade regimes liberalised (Anyanwu, 1992). By the late 1980s developing countries had embraced such adjustment policies and liberalisation was considered inevitable given their very low economic growth rates and the financial support offered by the World Bank and the IMF. The resulting exchange rate devaluation followed by most countries was intended to boost competitiveness in the trade-goods sectors and attract foreign investments (Noorbakhsh and Paloni, 1999). No empirical studies appear to investigate the impact of the exchange rate devaluation on the competitiveness and FDI in either of these regions and so it is important to test this hypothesis here.

4 Sample and Data

a) *Sample countries*

Table 3 shows the sample of countries used in the analysis. The initial sample included all countries but due to missing data or because some of the values were outliers that would bias the estimates, a few countries were removed. For example, Bahrain and Qatar were excluded from the analysis on account of high GDP per capital and thus they do not fit with the developing country profile of the sample.

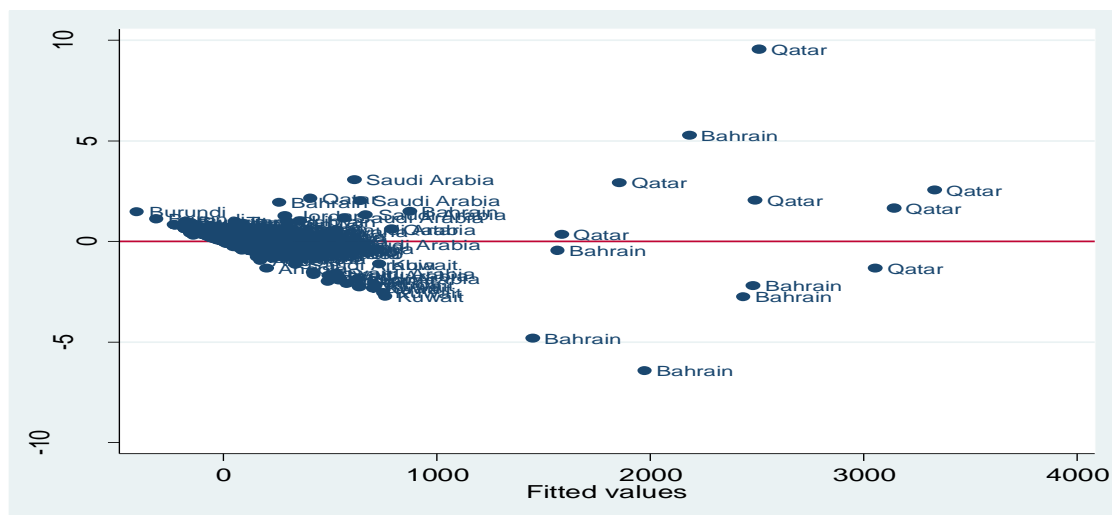
Table 3 Sample Countries

MENA Region	Algeria, Bahrain*, Egypt, Iran, Jordan, Kuwait, Libya, Morocco, Qatar*, Saudi Arabia, Syria, Tunisia and Yemen
SSA Region	Angola, Botswana, Burkina Faso, Burundi, Chad, Ethiopia, Ghana, Guinea, Kenya, Lesotho, Mali, Mauritania, Mozambique, Niger, Rwanda, Senegal, South Africa, Sudan and Uganda

Note: * These countries are outliers and excluded from the analysis.

A preliminary regression provides a plot of the standardised residuals against the fitted values, shown in Figure 1. This confirms that Bahrain and Qatar are outliers and should be excluded from the sample in the subsequent analysis.

Figure 1 Plot of Residuals



b) *Variable description*

Given the widely different sizes of the countries under review it is important that the variables used take account of population size in order that comparisons are valid and useful. In addition, levels of development are not constant and some countries have higher income levels than others. Thus, the majority of variables in the modelling are considered on the basis of percentage of total population or values per capita. Data on FDI inflows, pupils in technical education, and mobile users are expressed in per capita terms while the primary education enrolment rate, GDP and population are in percentage terms. The data were obtained from the World Development Indicators, UNCTAD, World Bank Governance Indicators, United States Geological Survey Mineral Resources, and the United States Energy Statistics. Data definitions and sources are in Table 4.

Table 4 Variable Definitions

FDI inflows per capita	FDI inflows by country divided by the total host country population (\$) (UNCTAD 2012)
% of Population in vocational or technical education	% of population enrolled in technical and vocational education (World Bank Development Indicators 2012)

Primary School Enrolment Rate	Rate of enrolment in primary education to proxy basic literacy, as in Marimuthu et al, 2009; Dae-Bong, 2009 (WDI, 2012)
Natural Resources	Raw materials used in production or consumption, measured: i Crude Oil Proven Reserves in billions of barrels (US Energy Stats, ii Gold Production in Kilograms (US Geological Survey), iii Mineral Rent % GDP (WDI, 2012)
% Population of Mobile Phone Users	% population using mobile telephones either on a post-paid or prepaid basis, proxies infrastructure (WDI, 2012)
Trade Openness	Sum of imports plus exports as % of GDP, proxies the degree of liberalisation, as in Srinivasan, 2011
Control of Corruption	Measures the extent to which public power for personal gain is controlled (World Bank Governance Indicators, 2012)
Domestic Credit to Private Investors (% of GDP)	Financial resources offered to domestic and private investors, including loans, trade credits and accounts receivable that can be claimed for payment (WDI, 2012)
% Population Growth	Growth rate of population (WDI, 2012)
Political Stability	The likelihood government will be destabilised or overthrown by unconstitutional and violent means (WGI, 2012)
Exchange Rate	Domestic exchange rate with respect to US\$ (WBI, 2012) 1
Inflation	Annual % change in the cost of consumer goods and services (WDI, 2012), as in Griffiths and Wall, 2004 (WDI, 2012)
Labour Force (% of Population 15+)	% of population 15 + who meet the ILO definition of economically active persons (WDI, 2012)
Rate of Return	Yield on capital investment, measured as the reciprocal of GDP per capita, as in Asiedu, 2002 (WDI, 2012)
GDP Growth Rate	Annual percentage growth rate of GDP at market prices based on constant local currency (WDI, 2012)

b) Preliminary data analysis

Table 5 reports the descriptive statistics for the variables used in the estimation. It is clear that the MENA region has a higher level of development at the mean, with many values greater than SSA. In particular, the extent of FDI, human capital, infrastructure and domestic credit level are greater in the MENA sample. The distribution of natural resource endowment differs with MENA having high oil reserves and SSA greater mineral deposits. The mean trade liberalisation is similar although the SSA sample has a much higher dispersion. The institutional governance variables, that is, control of corruption and political stability, are higher in the MENA region although the differences are not great and are anyway a fairly crude measure.

Table 5 Summary Statistics

Sample Countries		Total			MENA		SSA	
Variable	Mean	Std. Dev.	Min	Max	Mean	Std. Dev.	Mean	Std. Dev.
FDI	72.396	161.392	-169.1	1458	138.405	242.387	36.091	67.192
Voc & Tech education	0.539	0.819	0	4.599	1.119	1.12	0.221	0.261
% Primary Sch. Enrol*	96.8	21.573	32.608	156.31	104.675	8.957	92.469	25.01
Crude Oil Reserves	4.917	4.613	0	11.426	9.381	1.78	2.462	3.772
Gold Production	2.093	1.761	0	5.634	1.09	1.483	2.645	1.657
Mineral Rents	1.864	5.744	0	54.163	0.415	1.199	2.661	6.974
Mobile Phone Users	28.877	35.312	0.019	187.86	47.434	44.788	18.671	23.278
Openness	75.906	35.07	27.688	202.85	78.216	22.197	74.635	40.434
Rate of Return	-3.411	0.509	-4.721	2.496	-3.869	0.366	-3.159	0.386
Population Growth	2.3	0.895	0.131	6.577	2.095	0.88	2.413	0.884
GDP Growth Rate	5.152	3.896	-4.933	33.629	4.723	2.669	5.389	4.417
Domestic Credit	26.946	28.144	2.014	161.98	37.531	24.389	21.125	28.422
Control of Corruption	38.025	21.08	2.392	85.854	42.451	19.792	35.591	21.412
Political Stability	31.244	19.731	0	85.096	32.703	16.946	30.441	21.1
Exchange Rate	583.92	1578.569	0.269	10254	722.742	2370.73	507.56	878.93
Inflation	9.287	21.554	-9.798	325	5.142	5.547	11.567	26.262
Labour Force	62.639	14.359	40.2	85.9	48.992	6.88	70.145	11.604

* This value is > 100% because of the addition of over-aged and under-aged students who entered education early or late.

Correlation coefficients are listed in Table 6. The only collinear variables are user of mobile phones and the internet and thus the former measure is used in the analysis.

Table 6 Correlation Matrix

		Voc. & Technical Education.	Primary School Enrolment	Crude Oil Reserves	Gold Prod.	Mineral Rents	Mobile phone Users	Internet Users		
FDI	1									
Voc. & Tech. Educ.	0.1411	1								
Pri. Sch. Enrol.	0.1258	0.2995	1							
Crude Oil Reserves	0.2474	0.4647	0.1809	1						
Gold Prod.	-0.0468	-0.3405	-0.3499	-0.2174	1					
Mineral Rents	-0.0031	-0.1215	-0.0529	-0.0833	0.2779	1				
Mobile Users	0.6208	0.1685	0.2868	0.3540	-0.0380	0.1163	1			
Internet Users	0.5014	0.1226	0.2683	0.3740	-0.1505	-0.0810	0.8126	1		
Openness	0.2420	-0.0429	0.2633	0.0682	-0.4487	0.1286	0.2116	0.1452		
Rate of Return	-0.4319	-0.4451	-0.3937	-0.6551	0.2758	0.0653	-0.6574	-0.5934		
GDP/Capita Growth	-0.0535	0.0306	0.1330	0.1072	-0.1515	-0.0697	-0.0630	-0.0058		
GDP Growth Rate	-0.0700	-0.0260	0.0729	0.0926	-0.1325	-0.0658	-0.1014	-0.0367		
Domestic Credit	0.2143	0.1350	0.1975	0.2611	0.1103	-0.0091	0.4616	0.4717		
Control of Corruption	0.2270	-0.0576	0.1487	-0.0592	0.0230	0.0082	0.3271	0.3137		
Political Stab.	0.2034	0.1461	0.0979	-0.1223	-0.1202	0.0178	0.2832	0.1504		
Exchange Rate	-0.1078	0.0268	0.0137	0.0169	0.1505	0.0902	-0.0581	-0.0543		
Inflation Rate	0.0029	-0.0532	0.1080	0.0713	-0.0590	0.0019	-0.1029	-0.0992		
Labour Force	-0.2474	-0.3839	-0.0539	-0.6036	0.1797	-0.0891	-0.3058	-0.3391		
	Openness	Rate of Return	GDP/Capita Growth	GDP Growth Rate	Domestic. Credit	Control of Corruption.	Political Stability	Exchange Rate	Inflation	Labour Force
Openness	1									

Rate of Return	-0.2798	1								
GDP/Capita										
Growth	0.0796	-0.0100	1							
GDP Growth Rate	-0.0011	0.0589	0.2363	1						
Domestic Credit	0.0342	-0.4679	-0.2699	-0.0886	1					
Control of										
Corruption	0.1898	-0.4281	-0.2752	-0.0899	0.5346	1				
Political Stab.	0.3008	-0.3907	-0.1877	-0.0479	0.2373	0.6748	1			
Exchange Rate	-0.1958	0.0035	-0.1150	-0.0493	-0.0947	-0.1552	-0.2664	1		
Inflation Rate	0.1936	0.0662	0.0576	0.0107	-0.1334	-0.2060	-0.1944	0.0638	1	
Labour Force	-0.2050	0.5572	0.3190	0.1639	-0.3401	-0.0665	-0.0206	-0.0376	0.118	1

5. Models, estimation and results

a) *Panel specification*

The modelling uses a balanced panel of 20 SSA and 11 MENA countries. The data are annual for the period 2000-2010. Pooled OLS and Fixed Effects estimation were used as in the majority of models the random effects estimator was rejected on the basis of the Hausman test. Panel models are valuable for a number of reasons. Firstly, panel data allow both the cross-section and the time series aspects of the data to contribute to the parameter estimates. Many variables can be more accurately measured at the micro level, and biases resulting from aggregation over countries are eliminated. Secondly, panel data suggest that countries are heterogeneous. Time series and cross-section studies not controlling for this heterogeneity run the risk of obtaining biased results. Panel data are able to control for any country- and time-invariant variables whereas a time-series study or a cross-section analysis cannot. Not accounting for country-specific differences in economic or behavioural assumptions, such as countries operating under different political systems or more or less restrictive regulations, can cause serious mis-specification. Thirdly, it may be important to incorporate dynamic effects and these models provide a means to study the dynamics of adjustment. Cross sectional distributions that look relatively stable can hide a multitude of changes and in particular, the rate of change is only identified in panel estimation. Furthermore, it is reasonable to assume that there is variation in the parameters across countries. However, this raises a further question. If the coefficients are found to differ in the cross section, should these differences be attributed to random variation, and thus part of the disturbance term, or to fixed parameters that simply are different? The random coefficients model corrects some of the inefficiencies of the classical regression although tests of the constancy of the parameters are frequently not conclusive (Greene, 1995). Finally, studies using panel data find the Between estimator (based on the cross sectional component of the data) tends to give long-run estimates while the Within estimator (based on the time series aspects of the data) gives short-run estimates. This supports

the conventional wisdom that cross-section studies tend to yield long-run responses while time-series tend to yield short-run responses (see Kuh, 1959, and Houthakker, 1965). Baltagi and Griffin (1984) suggest that in panel data models, the difference between the Within and Between estimators is due to dynamic mis-specification, and even with a rich data set, the shortness of the time elements allows dynamic under-specification of long-lived lag effects owing to measurement error.

In this study, several advantages were found to using panel data models compared to pooling or cross section, as discussed in detail in Baltagi (2005). Given the differences between the regions, highlighted by the descriptive statistics summarised in Table 5, models required consideration of heterogeneity across countries to reduce the risk of obtaining biased estimates. Some variables measured inter-temporal changes and these were incorporated into the model while increasing the degrees of freedom, variability and efficiency (Gujarati, 2004). The Fixed Effects Model used allows the intercept to vary for each individual country but still assumes that the slope coefficients are constant across the sample. The estimating equation can be expressed

$$y_{it} = \alpha_i + \beta X_{it} + \mu_i + v_{it} \quad (1)$$

where y is FDI inflows per capita in country i at time t , X is a matrix of independent variables and α and β are coefficients to be estimated. μ_i and v_{it} represent the decomposed disturbance term where μ_{it} are country specific effects and v_{it} are random errors distributed iid (Gujarati, 2004).

Equation (1) was first estimated using OLS on the pooled sample, with and without a SSA dummy. This was followed by a panel fixed effects estimation of the whole sample with two specifications. Finally, the sample was divided into the two regions and each estimated using a fixed effects panel estimation.

b) Results and discussion

The results are in Table 7. Model 1, OLS for the pooled sample, is the least preferred estimation and thus the discussion will be confined to Models 2 to 6. H1 tested the importance of market size. As expected this is ambiguous as it is not possible to differentiate in the data the strategic imperative behind FDI. The growth of GDP per capita is largely

insignificant in all the estimation with the exception of the individual MENA Model 7, which most likely reflects the higher levels of disposable income in the MENA region attracts FDI for market seeking opportunities. H2 tested the importance of human capital as a predictor of FDI and these measures produced mixed results. The results of the fixed models (3, 4 and 6) show literacy and basic education is a positive and significant determinant of FDI. Surprisingly, the exception is the MENA region. Also unexpected is the insignificant coefficient on further training, including vocation and technical education, suggesting that marginal differences in education levels are not important. However, the coefficient on the size of the labour force is positive and significant in the full fixed effects Model (3). To further support this claim, the per capita number of technical students was interacted with the labour force in Model 4. These combined variables suggest a positive although not significant impact on FDI inflows. This implies that the labour force available in the regions is not yet embodied with the required threshold of technical education to stimulate efficiency and skilled seeking FDI. Thus H2 is not unambiguously accepted.

Three measures were used to test the impact on natural resource endowments in FDI inflows (H3). Surprisingly, few models show a significant impact, with only gold production positive in Model 2 and mineral rents negative in the fixed effects estimation for the whole sample (Model 3). To further investigate this hypothesis natural resource variables were interacted with political stability and with trade openness. The former is justified as political stability can have an impact on the exploration or production of natural resources while the latter can influence firms' decisions to enter natural resource sectors. Model 4 shows that only the interaction with political stability is negative and significant. A reasonable explanation is that these two regions have not attained the required threshold in political stability and trade openness to fully attract FDI into their natural resource sectors. In the longer term, further liberalisation of trade regimes and the improvement of the political environment, the abundance of natural resources available in the regions can positively influence FDI.

Infrastructure development is clearly important as a determinant of FDI inflows and is positive and significant in both OLS and fixed effects estimation. This is expected and supports the literature on FDI, particularly investment from developed to developing countries. Thus H4 is accepted for the all models using the total sample and the regional samples, although SSA has a lower elasticity. Likewise, trade openness is positive and significant for the total sample using both fixed effects although only in the MENA region is trade liberalisation important. This may be explained by the high trading barriers that exist in

some SSA countries and this should improve with time and further improvements in the institutions. But in general, H5 is accepted.

The results for political and country risk show that control of corruption has a positive influence on FDI inflows however, political stability is insignificant. The explanation for this may be found in Model 4, where political stability is included in a composite variable along with natural resource endowments, which has a negative and significant coefficient. The problems in SSA around these factors, political stability and oil reserves, are well known and have resulted in a highly skewed development pattern. Thus, H6 is supported in the broad sense of better governance is a positive influence on FDI inflows but when these measures are disaggregated there is some ambiguity in the results. However, foreign investors perceive genuine efforts against corruption as an incentive to investment.

The final two hypotheses consider crucial factors in the FDI decision for multinational enterprises, access to finance and the costs of funds. Unfortunately, measurement is inadequate with respect to these variables. However, using the accepted metrics in these models the return on capital is a positive and significant determinant of FDI in all models and using the total and regional samples. This suggests that foreign investors are influenced by the likelihood of an acceptable return on capital, which is important as both SSA and the MENA regions are perceived as being characteristically risky, and thus require a premium to undertake higher risk. Related variables, such as the exchange rate and inflation are negative and significant and insignificant respectively. The findings confirm that the exchange rate devaluation that is part of most adjustment programmes actually deters rather than attracts FDI. The negative and significant coefficient on the availability of credit in the pooled OLS model for the whole region (2) shows that FDI in the region is likely to fall as firms will not be able to exploit their ability to access funds from their home country and thus compete favourably with host country firms but accessing funds at a lower rate. Thus, while H7 is accepted, H8 cannot be supported for these data.

With respect to statistical tests on the robustness of these models, the fixed effects estimation has a higher explanatory power than OLS and the Chow Test showed that SSA and the MENA countries are behaviourally and structurally different based on the F test and critical values. The value of the F test was 17.350 hence, both regions were divided and investigated separately in models 5 and 6 since the null hypothesis of no structural change between both regions was rejected both at the F distribution, 10% (1.49), 5% (1.67) and 1% (2.04) critical

values. In addition to the correlation matrix showing no likelihood of multicollinearity, the mean VIF of 2.43 (which is < 10) also confirms no serious multicollinearity between the variables. In the specification tests, all models are significant. A Breusch-Pagan/Cook-Weisberg Test for heteroskedasticity indicated the presence of heteroskedasticity and therefore robust standard errors were used to relax the assumptions that the errors were both independent and identically distributed

6. Conclusion and Policy Implications

This study investigates the determinants of FDI inflows into two of the least recipient regions, SSA and MENA. The findings reveal that return on capital, corruption control, availability of infrastructure, trade openness, and basic literacy skills encourage FDI in the regions. On the other hand, the exchange rate deters FDI while natural resource endowments have not significantly attracted FDI. Some of these findings are not consistent as hypothesised. While both regions include developing and emerging economies, there are high levels of dispersion between the countries in terms of trade liberalisation, the quality of the institutions and thus national governance and the extent of achieved economic growth. Thus, the analysis considered whether the regions are behaviourally and structurally different and if so, how they compare in their FDI determinants. The results confirmed differences between the two regions and that the marginal benefits from increases in the quality of FDI determinants will be less for SSA countries compared to the MENA countries.

A number of policy implications follow from these findings. First, with the exception of the exchange rate devaluation, the adjustment programmes countries in the region may be detrimental to FDI and contribute to inflation and should be reconsidered if foreign investment is to contribute to growth and enhanced incomes in these countries. Therefore, exchange rate policies in the regions should be given serious reconsideration. However, trade liberalisation and corruption control as contained in the adjustment programme policies are very important determinants of FDI. Second, to attract more FDI into the natural resource sectors, the regions need to improve their political environments and governance, in particular, the control of corruption and these are a major concern for potential foreign investors.

Table 7: Pooled OLS and Fixed Effects Estimations (Robust standard errors)

FDI Inflow Per Capita	Pooled OLS	Pooled OLS SSA Dummy	Fixed Effects	Fixed Effects Variables Interaction	Fixed Effects MENA Countries	Fixed Effects SSA Countries
Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
GDP Per Capita Growth Rate	-0.419 (1.528)	0.458 (1.620)			7.374* (4.034)	0.003 (1.377)
GDP Growth Rate			1.018 (1.325)	2.258 (1.642)		
Primary School Enrolment Rate	0.046 (0.233)	0.021 (0.233)	1.306** (0.549)	0.960* (0.581)	0.656 (3.126)	0.519* (0.298)
% of Population in Voc. & Tech. Educ.			0.876 (31.718)	-197.018 (142.831)		
Labour Force (% of Population 15+)			6.828* (3.739)	-1.289 (4.312)		
% of Population in Voc. & Tech. Educ. * Labour Force (% of Population 15 +)				4.018 (2.932)		
Crude Oil Reserves	2.017 (1.791)	-0.362 (2.130)	0.321 (6.309)	7.808 (5.340)		
Gold Production	6.534 (5.562)	11.264* (6.386)	9.098 (11.457)	6.573 (11.912)	-137.715 (119.425)	16.407 (11.074)
Mineral Rents (% of GDP)			-5.992*** (2.073)	-3.266 (3.258)		
Crude Oil Reserves * Gold Production * Trade Openness				0.035 (0.027)		
Crude Oil Reserves * Gold Production * Political Stability				-0.262*** (0.098)		
% Population of Mobile Users	4.592*** (0.914)	4.488*** (0.904)	4.317*** (0.699)	4.295*** (0.656)	5.112*** (0.943)	1.482** (0.636)
Trade Openness	0.558*** (0.203)	0.706*** (0.233)	2.496*** (0.622)	1.625*** (0.509)	4.895*** (1.420)	0.230 (0.347)
Control of Corruption	0.367 (0.572)	0.181 (0.558)	2.577*** (0.819)	2.416*** (0.782)	2.906* (1.580)	0.775* (0.404)
Political Stability	-0.335 (0.629)	-0.239 (0.609)		1.268 (0.957)		
Rate of Return	44.683* (26.967)	51.323* (27.767)	568.234** (224.338)	851.334*** (231.299)	2394.033*** (582.970)	320.987** (151.938)
Exchange Rate			-0.011*** (0.004)	-0.012** (0.005)	0.003 (0.006)	-0.002 (0.006)
Inflation Rate			-0.124 (0.301)			
Domes. Credit	-1.151** (0.474)	-1.125** (0.469)	1.862 (1.414)			
SSA Dummy		-44.801* (23.872)				
Cons.	116.619 (71.836)	164.277** (81.555)	1335.212* (757.446)	2826.634*** (890.833)	8824.289*** (2219.014)	1053.997** (507.374)
No. of Obs.	341	341	341	341	121	220
F Stat	4.73	8.64	7.83	7.50	11.16	6.64
Prob. > F	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
R-Squared	0.4866	0.4391	0.7635	0.7859	0.8334	0.6026

Robust Standard Errors are in Parentheses; *Significance at the 90% Level; **Significance at the 95% Level; *Significance at the 99% Level**

Notes: Data on important variables, such as labour costs, R&D, rail lines or road networks were not available. This could probably explain why the constants for the fixed effects model were positively significant. The constant here suggests the amount of FDI per Capita the regions will nevertheless receive even in the absence of the estimated variables.

Possible ways forward are to pursue policies that reduce the causes of political instability and embark on full deregulation, including privatisation of the natural resource sectors, although this is highly problematic in many countries a loss of sovereignty will result. The full deregulation of the natural resource sectors when implemented can reduce unnecessary

barriers and monopolistic activities in the region's natural resource sectors. Third, serious attention should be paid to technical education because countries with high levels of low-skilled labour are less likely to be attractive to FDI that is associated with high value-added industries or efficiency and productive seeking FDI's hence, lag behind in economic growth. This is enhanced by the fact that the spillovers flowing to host country firms from FDI to high skilled sectors contribute more value added than that from low-skilled sectors. This is the case for the regions at the moment since findings show that the availability of labour in the regions is generally not skilled but at the basic educational level only. Fourth, countries and sub-regional blocs in SSA must progress with programmes that improve their image as international partners and introduce credible policies targeted at restoring and maintaining global relationships, thus countering the negative perception of SSA as a region in which international investment is not inherently risky. Such policies will not only promote FDI into these regions but have direct and indirect benefits on the prosperity of these economies.

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