

Public Governance, Health and Foreign Direct Investment in Sub-Saharan Africa

Céline Azémar and Rodolphe Desbordes*
University of Glasgow, University of Strathclyde

Using 1985–2004 yearly panel data for 70 developing countries, including 28 from Sub-Saharan Africa (SSA), the paper finds that once market size is accounted for, SSA's foreign direct investment (FDI) deficit with other regions of the world is mainly explained by the insufficient provision of public goods: relatively low human capital accumulation, in terms of education and health in SSA. On the basis of additional cross-sectional data, the paper finds that in the absence of HIV and malaria, net FDI inflows in the median SSA country could have been one-third higher during 2000–2004, with slightly more than one-half of this deficit explained by malaria.

JEL classification: F23, H11, H41

Developing countries are eager to attract foreign direct investment (FDI) to boost their productivity and economic growth. However, they diverge widely in their ability to attract FDI. Whereas the median FDI to GDP ratio over the 1984–2004 period was 1.8% in South-East and East Asia (SEA) and 1.72% in Latin America and Caribbean (LAC), FDI inflows represented less than 1% of GDP in a median Sub-Saharan Africa (SSA) country. As other studies have argued, this disappointing performance of SSA reflects its poor record in terms of public governance. When discussing alternative explanations for the SSA 'growth tragedy' (Easterly and Levine, 1997), Collier & Gunning (1999) conclude that 'while the binding constraint upon Africa's growth may have been

* Corresponding author. Department of Economics, Sir William Duncan Building, University of Strathclyde, 130 Rottenrow, Glasgow G4 0GE, UK. Telephone: +44 1415483961. E-mail: rodolphe.desbordes@strath.ac.uk

externally-oriented policies in the past, those policies have now been softened. Today, the chief problem is those policies which are ostensibly domestically-oriented, notably poor delivery of public services. These problems are much more difficult to correct than exchange rate and trade policies, and so the policy reform area needs to be intensified' (p. 20). Both growth and FDI tend to share the same determinants; for instance, while Kaufmann & Kraay (2002) and Rodrik *et al.* (2004) demonstrate the strong impact of public governance on growth, Globerman & Shapiro (2002, 2003) show that better-governed countries receive more FDI. Hence, it is likely that the low FDI to GDP ratio in SSA results at least partly from inadequate domestically and externally oriented policies, especially in comparison with those prevailing in other developing regions.

Although many papers have investigated the determinants of FDI in developing countries,¹ the majority of them exclude SSA countries from their sample, use an early and short period of investigation, focus only on one factor of attractiveness, omit non-traditional determinants such as democracy or human capital, and sometimes fail to differentiate between long and short-run FDI dynamics with appropriate panel econometric techniques. Furthermore, the overly narrow view of public governance mainly restricted to the protection of property rights, which diverges from the broad definitions of La Porta *et al.* (1999) and Kaufmann *et al.* (1999), obscures the overwhelming role of governments in shaping the attractiveness of their country. In this paper, we first seek to remedy to these deficiencies. We provide a comprehensive literature review that proposes that public governance provides a useful framework within which to capture most traditional and new determinants of FDI in developing countries both at the macroeconomic level and in a global context. The impact of each public governance dimension is tested using yearly panel data for 70 developing countries, including 28 SSA countries, over the 1985–2004 period. Proxies for each public governance dimension have been carefully chosen, distinguishing, for instance, between liberal and illiberal democracies. The choice of a fixed effects panel model allows the investigation of short-run FDI dynamics, where the estimates solely indicate how FDI responds to policy

¹ See Asiedu (2002) and Rogoff & Reinhart (2003) for a summary of the literature.

reforms over time, regardless of history or geography. Our findings contribute to the recent literature on new FDI determinants by showing that, in addition to better macroeconomic policies and higher security of property rights and contracts, the adoption of a liberal democratic regime and improvements in the health and education of the population increase FDI strongly.

However, this kind of econometric analysis provides little guidance as to which public governance dimension should be the priority for SSA countries seeking to close their FDI gap with other developing countries. Hence, this paper is novel in comparison with previous FDI studies by its inclusion of a second stage in which the sources of SSA's FDI gap with other developing regions are decomposed. Such a decomposition shows that SSA's FDI deficit is mostly explained by market size and insufficient public goods provision. Depending on the benchmark developing region, about 100–140% of inter-regional FDI gaps can be explained by low human capital accumulation in SSA, education and health, once market size has been taken into account. Differences in the degree of democracy, quality of macroeconomic policies and security of property rights matter much less. The elasticity of FDI to these determinants is smaller and contrary to common wisdom, the quality of SSA governance in these areas is not much different from that of other developing regions.

Finally, taking as a starting point, the large contribution of poor health to SSA's FDI deficit, this paper explores the indirect impact of infectious diseases on FDI, through their direct effects on health. The determinants of life expectancy include three well-known scourges prevalent in many SSA countries: HIV/AIDS,² malaria and tuberculosis. We find that a 1% point rise in HIV prevalence in the adult population is associated with a decrease in net FDI inflows of 3.5%, while a country in which 100% of the population is at risk of contracting deadly malaria receives about 16% less FDI than a similar country located in a malaria-free region. Once HIV-related mortality effects are accounted for, tuberculosis has no additional incidence on health, and by extension, on net FDI inflows. Overall, if HIV and malaria had not existed, yearly net FDI inflows in the median SSA country would have been

² HIV is the acronym for Human Immunodeficiency Virus and AIDS is the acronym for Acquired Immunodeficiency Syndrome.

predicted to be one-third higher during the 2000–2004 period. The estimated FDI losses induced by these diseases are therefore very large and can be seen as another channel through which they reduce the growth in SSA.

The remainder of the paper is constructed as follows: Section 1 examines, through a review of the literature, the theoretical and empirical impact of public governance on foreign direct investment. Section 2 presents the econometric model, describes the data used and discusses the estimation techniques employed. Section 3 provides the empirical results and calculates the relative contribution of each public governance dimension to the FDI gap between SSA and other developing regions. Section 4 estimates the indirect impact of infectious diseases on FDI through their direct effects on health. Section 5 concludes.

1. Public Governance and FDI

Public governance can be defined as ‘the exercise of authority through formal and informal traditions and institutions for the common good’ (Thomas *et al.* 2000, p. 137). At the macroeconomic level, four dimensions of government performance can be outlined: degree of democracy, provision of public goods, macroeconomic policies and security of property rights and contracts. Each one may contribute to the generation of an attractive business climate for foreign investors for the following reasons.³

1.1 Degree of democracy

A democracy can be defined as a regime in which the government is vertically and horizontally accountable (Merkel, 2004). Free and fair competitive elections and a politically active civil society allow citizens to choose, monitor and periodically replace their government. In addition, the existence of checks and balances constraining the discretion of political actors, especially the executive, ensures that elected representatives possess effective power to govern and that policies are intertemporally credible. In the

³ Whenever possible, only econometric studies that limit themselves to a sample of developing countries are discussed. As underlined by Blonigen & Wang (2005), we do not expect countries that have dissimilar structures to exhibit the same parameters.

absence of any one of these three democratic pillars, the democracy is defective, giving rise, for instance, to an illiberal democracy in which governments are initially elected but are otherwise non-accountable.

FDI should be attracted to democratic countries. First of all, democracy tends to reduce the political and economic uncertainty. Politically, it is assumed that regular elections and free circulation of information within civil society serve as a disciplining device of public officials, improve the transparency of political decisions and decrease the risk of public dissatisfaction being expressed through violent means (Rivera-Batiz, 2002). Economically, democratic countries have been shown, for instance by Almeida and Ferreira (2002), to be more predictable in the long-run, more stable in the short-run and to handle adverse shocks better. Furthermore, democracies may be more open to FDI (Jakobsen and De Soysa, 2006). On the one hand, workers are likely to gain from higher FDI as multinational firms tend to pay higher wages and provide better working conditions than their local counterparts (Brown *et al.*, 2003). On the other hand, increased competition from foreign firms means that local firms will lose some market share and see their profits shrink. Workers, as opposed to capital-owners, represent the bulk of the population in developing countries. Hence, as democratisation progresses, a growing share of the electorate should support open FDI policies since they benefit from them. Finally, thanks to the Internet, non-governmental organisations defending human rights have been able to expand their international audience. Multinational companies are increasingly likely to avoid investing in a repressive regime, to prevent damaging their brand name and image. Empirically, Harms & Ursprung (2002), Jensen (2003), Busse (2004) and Jakobsen & De Soysa (2006) show that, since the beginning of the 1980s, FDI has been directed to developing countries that have granted political and civil freedom to their citizens, China being an obvious exception.⁴

⁴ On the contrary, Li & Resnick (2003) find that once property rights are controlled for, democracy exerts a negative and significant effect on FDI. However, Jakobsen & De Soysa (2006) demonstrate that their results are the product of sample selection and model misspecification. Once they have added 46 countries to the sample and taken the logarithm of FDI flows, they find a robust positive effect of democracy on FDI.

1.2 Provision of public goods

As La Porta *et al.* (1999) point out, governments play a large role in delivering health, education and infrastructure, particularly when the consumption of these goods cannot be confined to certain individuals and generates large positive externalities.

A cheap labour force and a high-quality infrastructure are common determinants of FDI in developing countries since their availability influences both its feasibility and profitability. The best measure of labour costs is unit labour costs, i.e. labour compensation divided by labour productivity. In line with the hypothesis that multinationals take advantage of international differences in factor prices, they find that FDI is more attracted to developing countries offering low unit labour costs. As health and education enhance a worker's productivity, and therefore lower the unit labour cost, a positive link is likely to occur between multinational location and human capital (Alsan *et al.* 2006). The setting-up of a foreign plant may also require a certain amount of skilled labour (Markusen, 2002).

Noorbakhsh *et al.* (2001), Asiedu (2002, 2006), Carr *et al.* (2004) and Alsan *et al.* (2006) confirm that the availability of physical infrastructure and the level of human capital (health and education) are important determinants of FDI.

1.3 Macroeconomic policies

The goals of macroeconomic policies are to maintain both the internal and the external balance of the macroeconomic system. Internal equilibrium refers to the full use of factors of production and to price stability. External equilibrium implies that the trade balance is high enough to allow the country to pay back its foreign debts.

Sound macroeconomic policies are important determinants of FDI since rampant inflation, a volatile/overvalued exchange rate and high external debt increase the cost of doing business in developing countries and create uncertainty over future returns. For instance, a high foreign debt to GDP ratio makes a country highly vulnerable to external shocks and creates uncertainty for investors by increasing the possibility of a debt overhang problem. In turn, this may result in the levying of new taxes on corporations or the

imposition of capital controls (Patillo *et al.*, 2004). When considering trade policies, it is important to emphasise that their impact depends on the type of FDI. Vertical and export-platform FDI, which involve the international trade of intermediate and final goods, should be concentrated in relatively open countries. On the other hand, horizontal FDI tends to arise when trade costs (tariff and transport costs) are high and/or when domestic profits are abnormally larger due to a lower exposure of domestic firms to international competition.

Numerous studies have established that FDI prefers macroeconomically stable countries. Schneider & Frey (1985) and Ahn *et al.* (1998) find a negative relationship between FDI and inflation or an overvalued currency. Other works, such as Benassy-Qu  re *et al.* (2001) and Aizenman & Marion (2004), bring to light the importance of a stable nominal/real exchange rate. Finally, Gastanaga *et al.* (1998), Lehmann (1999) and Asiedu (2002) show, through various trade indicators, that multinational enterprises (MNEs) favour open economies, suggesting that the bulk of FDI in developing countries may be export-oriented rather than market-seeking.

1.4 Security of property rights and contracts

North (1990) defines property rights as 'the rights individuals appropriate over their own labour and the goods and services they possess. Appropriation is a function of legal rules, organisational forms, enforcement, and norms of behaviour that is, the institutional framework' (p. 33). The creation, protection and enforcement of property rights and contracts are particularly important because without them the scope for market transactions is limited (World Bank, 2002). North (1990), and more recently Clague *et al.* (1999), emphasise the crucial role of the State as a third party that secures property rights and enforces contracts, since this function cannot usually be devolved to the market. In order to carry out this task, the State makes use of the judiciary system and its 'monopoly of legitimate violence'. Obviously, this power to maintain peace also allows a predatory government to expropriate private agents, i.e. to confiscate their property rights, if it so desires.

Foreign investors demand the protection of their property and contract rights, especially when their ownership advantage is

technological; otherwise, they are denied the return on their investment and without this profit incentive, they will not be inclined to take risk and invest in the potential host country (Li and Resnick, 2003). Overall, higher transaction and transformation costs, induced by low security of property rights and contracts, reduce the profitability and feasibility of economic activity (North, 1990).

Using qualitative measures of political instability, bureaucratic corruption or judicial inefficiency, many studies, such as Globerman & Shapiro (2002) and Bénassy-Quéré *et al.* (2007), assert that FDI is attracted to countries in which there is a strong rule of law.

2. Econometric Model

This literature review suggests that, with the exception of market size, most of the determinants of FDI can be gathered roughly under the heading of one of the four public governance dimensions outlined above. In order to investigate the determinants of FDI into developing countries, the following fixed effects model will be estimated:

$$\begin{aligned}
 \text{Ln(FDI)}_i^t = & \beta_1 \text{Negative FDI}_i^{t-1} + \beta_2 \ln(\text{Market size})_i^{t-1} \\
 & + \beta_3 \ln(\text{Degree of democracy})_i^{t-1} \\
 & + \beta_4 \ln(\text{Public goods provision})_i^{t-1} \\
 & + \beta_5 \ln(\text{Macroeconomic policies})_i^{t-1} \\
 & + \beta_6 \ln(\text{Security of property rights})_i^{t-1} \\
 & + T^t + C_i + \epsilon_i^t
 \end{aligned} \tag{1}$$

where T^t are country-invariant time-specific t fixed effects, C_i are time-invariant country-specific i fixed effects, and ϵ_i^t is the error term. Each explanatory variable is lagged by one year to reduce any endogeneity bias and to take into account the fact that foreign investors base their location choices on past information.⁵

⁵ Changes in some public governance dimensions may take a long time to influence FDI, implying that the β s may only capture the short-run elasticity and not the long-run elasticity. In that case, the β s would certainly underestimate the full impact of public governance reforms. Estimations of finite distributed

When applicable, variables are measured in logarithmic values. This has two advantages: such transformation reduces the influence of large values and coefficients can be directly interpreted as elasticities.

FDI: Data on net FDI inflows come from the UNCTAD/FDI database.⁶

Although FDI flows are a poor proxy of MNEs' real activity, they are the only measure available for all countries over a long time period. This explains why they have been used in most studies of FDI. The current USD values are converted into constant 2000 USD, by multiplying the current FDI inflows by the ratio of constant price GDP to current price GDP. Since the logarithm of net FDI inflows is taken, negative values of the dependent variable (8% of total observations) cannot be utilised;⁷ however, lagged values of these are included as an explanatory variable.

Negative FDI: The occurrence of past negative net FDI inflows may send a strong negative signal about operating conditions and economic prospects to potential foreign investors, especially in the limited information context characterising developing countries (Kinoshita and Mody, 2001). A negative FDI dummy is therefore included in the model among other determinants of FDI. It takes the value of 1 if a country has experienced negative net FDI inflows the previous year.⁸

Market size: In empirical studies of FDI determinants, it is common to normalise FDI flows by GDP. Such a transformation is intuitive, as larger markets should, *ceteris paribus*, receive

lag models of order up to five (i.e. lagged values of independent variables are included in equation (1)), indicate that only in the case of the dummy 'High civil rights' can the equality between short- and long-run elasticities be rejected at the 5% level; after five years, its impact is about twice as large as after one year. In addition, although the estimated impact of the degree of democracy on FDI will be very conservative, the Bayesian Information Criterion (a statistical criterion for model selection) indicates that the dynamics in model (1) are generally appropriate.

⁶ <http://www.unctad.org/Templates/Page.asp?intItemID=1923?>1

⁷ There are no zero values in our sample.

⁸ In dynamic panel data models, the lagged dependent variable needs to be instrumented since it is correlated with the time-invariant country-specific effect. In this paper, worries about a potential endogeneity of the lagged negative FDI dummy may arise if it is assumed that country fixed effects are determinants of both negative and positive FDI. However a probit regression indicates that the probability of negative FDI values is totally unexplained by country fixed effects.

more FDI,⁹ but rather restrictive since it implies that the elasticity of FDI to GDP (coefficient β_2) is equal to unity. By not imposing any constraint on β_2 , the model adopted in this paper is much more flexible. Data on GDP, expressed in constant 2000 USD, come from the 2005 World Development Indicators (WDI) (World Bank, 2005).

Good public governance is expected to be a key determinant of FDI. Such a multi-faceted concept requires the use of numerous variables to assess the quality of the different dimensions of public governance.

2.1 Degree of democracy

The democratic nature of the political regime is captured through six dummies.¹⁰

Electoral democracy: Two dummies measure the extent to which political participation is fully competitive and executives are elected. They are based on the Polity variable, which is computed by subtracting an autocracy score from a democracy score (Marshall and Jaggers, 2002). Both these scores are a sum of four components: competitiveness of executive recruitment, openness of executive recruitment, constraint on the chief executive and competitiveness/regulation of political participation. After having subtracted, the points given for the constraints on chief executive, the variable is rescaled from 1 to 7 (worst to best). The medium (*full*) electoral democracy dummy takes the value of 1 if the transformed Polity variable is equal to 3, 4 or 5 (6, 7) and 0 otherwise.

Civil rights: Two dummies indicate how much civil freedom is enjoyed by the citizens. They are derived from the Freedom House indicator, which assesses four aspects of civil liberties on a 1 to 7 global scale (best to worst): freedom of expression and belief, associational and organisational rights, rule of law, personal autonomy and individual rights (Freedom House, 2005). The medium (*full*) civil freedom dummy takes the value 1 if the Freedom House civil rights indicator is equal to 3, 4 or 5 (1, 2).

⁹ As Chakrabarti's (2001) literature review makes clear, GDP is the only determinant of FDI which is always significant, whichever the sample, time period and model used.

¹⁰ Dummies are used in preference to continuous variables for three reasons. First, their use reduces multicollinearity among democratic proxies. Second, they allow the possibility of a non-linear effect of democracy on FDI. Finally, they facilitate the computation of the impact of different political regimes on FDI.

Political constraints: Two dummies measure the extent of constraints on policy change, thanks to an index devised by Henisz (2000). The POLCONIII index estimates the feasibility of policy change by taking into account the number of independent political institutions with veto power (executive, upper house of legislature, lower house of legislature) and the alignment and heterogeneity of the political actors who inhabit those institutions. The variable is rescaled from 1 to 7 (worst to best). The medium (*full*) political constraints dummy takes the value of one if the POLCONIII index is equal to 3, 4 or 5 (6, 7).

2.2 Provision of public goods

Health: Following Alsan *et al.* (2006), the health of the population is proxied by life expectancy at birth, defined as the number of years a new-born infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life. As a measure of mortality, life expectancy is an imperfect measure of population health since it does not directly take into account morbidity, i.e. years lived in less than full health. However, based on World Health Organization's (2002) data, a cross-country correlation between life expectancy and its health-adjusted variant for the year 2001 reveals that these two measures are almost perfectly correlated (0.99). Hence, life expectancy at birth appears to be a suitable proxy of a country's population health. Data come from the World Bank (WDI 2005).

Education: Education of the population corresponds to the average years of schooling in the total population over age 15. Values are the average of those in the Barro-Lee (Barro and Lee, 2000) and Cohen-Soto (Cohen and Soto, 2007) data sets. Their spatio-temporal coverage differs slightly, expanding the information available on educational attainment across the world, and when both series are available, taking the average may reduce the measurement error (Ndulu and OConnell, 2003). Since data on life expectancy and educational attainment are not available for consecutive years, missing values have been filled by linear interpolation.

Physical infrastructure: As in Easterly & Levine (1997) and Collier & Gunning (1999), the availability of physical infrastructure is assumed to be positively correlated with the per-capita stock of fixed telephone mainlines. Data come from Canning (1998) and the World Bank (2005).

2.3 Macroeconomic policies

Inflation: As noted by Fischer (1993), the level of inflation is a good indicator of the government's ability to manage the economy. Data on changes in price levels come from the IMF World Economic Outlook Database.¹¹

Foreign debt: On the external side, a high foreign debt to GNP ratio is another sign of macroeconomic mismanagement (Collier and Gunning, 1999). Data on external debt stock can be found in Milesi-Ferretti & Lane's (2006) database, and GNP data come from World Bank (2005).

Open trade policies: On the basis of Wei's (2000) methodology, a trade policy indicator is constructed. It is the residual of the log-log regression of the standard trade openness ratio ($\frac{X+M}{GDP}$) on a time trend and structural determinants of a country's *natural* openness: population, landlockedness and remoteness from world markets. Once these factors have been taken into account, it is assumed that any deviation from predicted values is the consequence of trade policies, which influence the degree of *artificial* openness. The indicator ranges between 1 and 10 (worst to best), according to the distribution decile in which the original residual value lies. Data on population size and landlocked status come from the World Bank. The remoteness variable measures how geographically distant a given country is from world demand; it is calculated according to Wagner *et al.*'s (2002) formula:

$$\text{Rem}_i = \frac{1}{\sum_f [(GDP_f / GDP_w) / \text{Distance}_{if}]}$$

and when $i = f$, the country's internal distance corresponds to $(\text{Area}_i / \pi)^{0.5}$.

2.4 Security of property rights and contracts

Property rights: The strength of the rule of law is assessed through the ICRG Law and Order index. It measures, on a 1–6 scale, both the strength and impartiality of the judicial system and popular observance of the law. Data are accessible on the *Political Risk Services'* website.¹²

Territorial conflicts: The security of property rights and contracts may be threatened by territorial armed conflicts. Based on the

¹¹ <http://www.imf.org/external/pubs/ft/weo/2006/01/data/index.htm>

¹² www.icrgonline.com

armed conflicts data set developed by Uppsala University (Eriksson & Wallensteen, 2004), three dummies are created, according to the intensity and length of the conflict: (1) minor armed conflict, i.e. at least 25 battle-related deaths per year and fewer than 1000 battle-related deaths during the course of the conflict; (2) intermediate armed conflict, i.e. at least 25 battle-related deaths per year and at least 1000 battle-related deaths during the course of the conflict; (3) war, i.e. at least 1000 battle-related deaths per year.

$T - 1$ time dummies and $n - 1$ country dummies are also included.

Fixed effects: Time dummies control for unobserved time-specific factors common to all countries. Country dummies control for country-specific factors that do not vary much over the period observed and that cannot easily be proxied. For instance, a large proportion of FDI in SSA countries is attracted by fixed natural endowments, e.g. hydrocarbons and minerals.¹³ For various reasons, resource-abundant countries tend to have high risks of violent conflict and poor governance (Bannon and Collier, 2003). Not taking into account the availability of natural resources, or using the imperfect proxy commonly found in the literature, i.e. the share of primary exports in total exports or gross national product, could result in an omitted-variable bias, which is likely to generate an under-estimation of the impact of public governance indicators. In this paper, the effect of the availability of natural resources on FDI is thus captured by the inclusion of country-specific fixed effects.¹⁴ In addition, a particularly attractive feature of a fixed effects panel model, in comparison to a random effects panel model, is that it eliminates inter-country (between) variation. Assuming that natural endowments are fixed implies that this major source of heterogeneity between SSA and other developing countries is removed since it cannot influence the time-varying changes in FDI flows received. In this way, FDI attracted by natural resources is disentangled, to a certain extent, from manufacturing or services FDI, the latter, almost by definition, being much more likely to be sensitive to changes in public governance quality

¹³ It is estimated that the overall share of the primary sector in the total SSA stock of FDI in 1997 was 50%, although it varies considerably at a disaggregated origin country level (UNCTAD, 1999).

¹⁴ For reasons given previously, treating the country-specific effect as a random variable would not be appropriate since natural resource availability, included in the error term, is likely to be correlated with other explanatory variables.

(Asiedu, 2002).¹⁵ Overall, by focusing on short-run FDI dynamics, as the estimates solely indicate how FDI responds to changes within a country over time, model (1) tests which public governance reforms are likely to exert the strongest impact on the level of FDI received by a typical developing country, regardless of its history and geography. Finally, a fixed-effects panel model also controls for country-specific idiosyncrasies in FDI reporting, some countries omitting, for instance, to include reinvested earnings in their FDI figures.

Data are available for 70 developing countries over the 1985–2004 period and include 28 SSA countries, 22 LAC countries, 6 SEA countries and 14 other countries (Tables 1 and 2). The country sample appears to be representative at the regional level since mean comparison tests show that the means of most variables hardly change when all the observations available for each variable are considered, without being restricted by missing values of other variables.¹⁶

3. Results

Results are given in Table 3.¹⁷ Most of the explanatory variables have the expected sign and are highly significant. Broadly speaking, we find that FDI tends to be attracted by large and well-governed developing countries. More specifically, government accountability, human capital accumulation, the quality of macroeconomic policies and the security of property rights and contracts

¹⁵ Unfortunately, disaggregated FDI data by sector does not exist for most countries.

¹⁶ For example, over the period investigated, the average life expectancy is 49 years for the 28 SSA countries in the sample and 49.5 years for an unrestricted sample of 45 SSA countries.

¹⁷ Several regression diagnostics were carried out. Multicollinearity among the variables does not seem to be an issue. Influential observations, both in terms of leverage and outlieriness, have been removed according to the Cook's *D* influence statistic, which is a scaled measure of the distance between the coefficient estimates when observation *i* is included and when it is not. Observations are conventionally characterised as outliers when values of Cook's distance exceed $4/n$, where *n* is the total number of observations. Using Wooldridge's (1995) methodology for panel data models, there is no evidence of a sample selection problem. Finally, an Arellano & Bond (1991) test and a Breusch-Pagan/Cook-Weisberg test (Breusch and Pagan, 1979) indicate that residuals are, respectively, autocorrelated up to order 3 and are heteroscedastic. On the basis of Newey & West's (1987) methodology, standard errors are corrected in order to be robust to both heteroscedasticity and serial correlation.

Table 1: *Countries in the Sample, by Region*

SSA	LAC	SEA	Other
Angola	Argentina	China	Algeria
Botswana	Bolivia	Indonesia	Bahrain
Burkina Faso	Brazil	Korea. Republic of	Bangladesh
Cameroon	Chile	Malaysia	Egypt
Congo	Colombia	Philippines	India
Congo. Democratic Republic of	Costa Rica	Thailand	Iran. Islamic Republic of
Côte d' Ivoire	Dominican Republic		Jordan
Ethiopia	Ecuador		Morocco
Gabon	El Salvador		Pakistan
Gambia	Guatemala		Papua New Guinea
Ghana	Guyana		Sri Lanka
Guinea	Haiti		Syrian Arab Republic
Kenya	Honduras		Tunisia
Madagascar	Jamaica		Turkey
Malawi	Mexico		
Mali	Nicaragua		
Mozambique	Panama		
Niger	Paraguay		
Nigeria	Peru		
Senegal	Trinidad and Tobago		
Sierra Leone	Uruguay		
South Africa	Venezuela		
Sudan			
Tanzania, United Republic of			
Togo			
Uganda			
Zambia			
Zimbabwe			

Notes: SSA, Sub-Saharan Africa; SEA, South-East Asia; LAC, Latin America and Caribbean.

Table 2: *Summary Table*

Variables	SSA		Non-SSA	
	Mean	SD	Mean	SD
Net FDI inflows ^a	17.64	1.82	19.84	1.92
Negative FDI	0.07	0.25	0.03	0.17
Market size ^a	22.13	1.13	24.12	1.63
Medium political constraints	0.36	0.48	0.61	0.49
High political constraints	0.04	0.19	0.16	0.36
Medium civil rights	0.68	0.47	0.70	0.46
High civil rights	0.06	0.24	0.18	0.39
Medium political rights	0.36	0.48	0.13	0.33
High political rights	0.26	0.44	0.68	0.47
Health ^a	3.89	0.13	4.21	0.09
Education ^a	0.94	0.69	1.72	0.35
Physical infrastructure ^a	1.68	0.97	3.87	1.17
Inflation ^a	0.16	0.22	0.21	0.46
Foreign debt/GNP ^a	4.55	0.60	4.11	0.81
Trade policies ^a	1.64	0.57	1.60	0.64
Property rights ^a	1.34	0.27	1.36	0.34
Low-intensity territorial conflict	0.05	0.21	0.05	0.21
Medium-intensity territorial conflict	0.05	0.21	0.13	0.34
High-intensity territorial conflict	0.10	0.30	0.08	0.28

^aVariable expressed in logarithms.

are key determinants of FDI. However, external debt, physical infrastructure (as measured by per capita stock of fixed telephone lines), low-intensity territorial conflict, medium political constraints and the degree of political rights do not appear to matter. Foreign investors may not necessarily interpret an increase in external indebtedness as a sign of macroeconomic deterioration: on the contrary, it may underline the country's international creditworthiness¹⁸ or may be seen as a necessary prerequisite to the

¹⁸ This hypothesis is supported by an unreported regression in which the debt stock is disaggregated into two components: non-concessional debt and concessional debt. Both are significant but with positive and negative signs, respectively. Hence, foreign investors are likely to see increased financing at market

Table 3: *Determinants of Foreign Direct Investment in Developing Countries and their Relative Contribution to Inter-regional Differences in FDI Volume*

Determinants	Fixed effects estimation Net FDI inflows (1)	Relative contribution of each determinant to inter-regional differences in FDI volume (%)		
		SSA versus ALL (2)	SSA versus SEA (3)	SSA versus LAC (4)
Negative FDI	-0.463 ^a (0.129)	2	2	2
Market size	0.699 ^b (0.306)	65	63	62
Degree of democracy		4	1	5
Medium political constraints	0.103 (0.093)	1	0	2
High political constraints	0.237 ^b (0.119)	1	1	1
Medium civil rights	0.564 ^a (0.117)	2	1	1
High civil rights	0.562 ^a (0.152)	3	1	6
Medium political rights	0.111 (0.121)	-1	-1	-1
High political rights	-0.139 (0.155)	-2	-1	-4
Public goods provision		46	36	52
Health	1.868 ^a (0.716)	24	17	26
Education	0.882 ^b (0.419)	23	20	27
Physical infrastructure	-0.011 (0.109)	-1	-1	-1
Macroeconomic policies		1	16	-11
Inflation	-0.414 ^a (0.081)	0	7	-7
Foreign debt/GNP	0.043 (0.101)	0	-1	0
Open trade policies	0.715 ^a (0.098)	1	10	-4

(continued on next page)

Table 3: *Continued*

Determinants	Fixed effects estimation	Relative contribution of each determinant to inter-regional differences in FDI volume (%)			
		Net FDI inflows (1)	SSA versus ALL (2)	SSA versus SEA (3)	SSA versus LAC (4)
Security of property rights			0	2	1
Property rights	0.358 ^b (0.147)		1	2	0
Low-intensity territorial conflict	0.108 (0.115)		0	0	0
Medium-intensity territorial conflict	−0.295 ^b (0.116)		−1	−1	0
High-intensity territorial conflict	−0.453 ^a (0.159)		0	1	1
Structural factors			−18	−12	−7
Transitory factors			0	−8	−4
Constant	−11.427 (7.472)				
Observations	1109		−	−	−
R ²	0.89		−	−	−

Notes: a, b, c denotes significance at the 1, 5 and 10% level, respectively. Heteroscedasticity-autocorrelation robust standard errors are in parentheses. Unreported country and time dummies are included. Country and time dummies are jointly significant at the 1% level.

ALL, all non-SSA countries.

financing of growth-enhancing productive domestic investment. The stock of physical infrastructure may not vary enough over time to exert an impact on foreign investors. As indicated by the growing magnitude and significance of the territorial conflict dummies, fighting only affects FDI if the conflict exceeds a certain intensity and duration. Finally, the mere existence of political rights does not appear to guarantee the effective accountability of a government; in the absence of civil freedom and strong political constraints on executive discretion, the impact of an 'illiberal/incomplete' democracy is insignificant. On the other hand, a country with highly developed civil rights and high political constraints is found to attract about twice as much FDI as an autocratic one,¹⁹ although foreign investors seem to be indifferent to the degree of civil freedom once a certain threshold has been reached. Overall, these results are in line with Globerman & Shapiro (2002), Alsan *et al.* (2006) and Asiedu (2006), which focus only on FDI in SSA countries. However, the magnitude of these effects must be treated with caution. First, the reliability of data from developing countries is questionable and if there are measurement errors, the estimators will be biased and inconsistent, meaning that the estimated effects of some determinants will be certainly attenuated (Wooldridge, 2002).²⁰ In addition, the coefficients obtained indicate only the direct effects of each determinant on FDI, without taking into account interdependencies between the four public governance dimensions. For instance, various papers, e.g. Tavares & Wacziarg (2001), have shown that democracies tend to provide more public goods, in terms of health and education, but the transition from an authoritarian regime to a competitive political system may increase civil disorder and delay

rates as indicating an improvement in creditworthiness, and increased financing by official lenders at below market rates as signalling the low solvency of a country. Inter-regional differences in the level and type of external debt explain on average, 5% of SSA FDI deficit. Results are available upon request to the authors.

¹⁹ $[(\exp^{0.237} - 1) + (\exp^{0.562} - 1)] \times 100 \simeq 102\%$.

²⁰ Correction of measurement errors using Fuller's (1987) method of moments estimator indicates that equality between the OLS estimates and errors-in-variables estimates cannot be rejected as long as the macroeconomic and social indicators are on average at least 80% reliable, with reliability defined as $(1 - [\text{variance of measurement error}/\text{total variance}]) \times 100$.

the implementation of unpopular macroeconomic policy reform (Fosu *et al.* 2006). Likewise, territorial conflicts destroy physical infrastructure, including roads, schools and health facilities, and civil wars contribute to the long-term deterioration of public governance. Hence, as in all FDI studies, the total and true effects of some determinants of FDI are likely to be underestimated in Table 3.

The size and significance of the coefficients $\hat{\beta}$ are suggestive of the policies that a developing country needs to undertake to attract more FDI. However, they do not indicate which public governance dimension contributes the most to differences in FDI attractiveness across developing regions. Thus, in order to understand why SSA tends to attract relatively less FDI than other regions, it is necessary to decompose the sources of SSA's FDI gap with other developing regions.

Following Fernandez-Arias and Montiel (2001) inter-regional differences in FDI volume can be expressed as:

$$\begin{aligned}
 \underbrace{\text{Ln}(\bar{\text{FDI}}_j) - \text{Ln}(\bar{\text{FDI}}_{\text{SSA}})}_{\text{Actual difference}} &= \underbrace{\hat{\beta}[\text{Ln}(\bar{X}_j) - \text{Ln}(\bar{X}_{\text{SSA}})]}_{\text{Time - varying difference}} \\
 &+ \underbrace{[(\bar{C}_j) - (\bar{C}_{\text{SSA}})]}_{\text{Structural difference}} \\
 &+ \underbrace{[\epsilon_j - \epsilon_{\text{SSA}}]}_{\text{Unexplained difference}}
 \end{aligned} \tag{2}$$

where $\hat{\beta}$ is the vector of the coefficient estimates (Table 3, column 1), X are the time-varying FDI determinants and C are the country-specific fixed effects. The term on the left-hand side of equation (2) is the average difference in volume of FDI received by region j and the SSA region over the period 1985–2004; the j region corresponds alternately to all non-SSA developing countries, SEA and LAC. On the right-hand side of the equation, the first two terms capture the explained portion of the differences in FDI attractiveness, i.e. they measure the extent to which differences in market size, public governance quality and structural factors explain inter-regional differences in FDI performance. The last term corresponds to differences in aggregate FDI residuals and indicates

whether the performance of the benchmark region has been higher or lower than expected, based on international experience. Note that time-specific fixed effects disappear since they are common to all countries and regions.

The contribution of differences in time-varying, structural, and transitory factors to the FDI gap between two regions can be calculated as follows:

$$\begin{aligned} \frac{\text{Ln}(\bar{\text{FDI}}_j) - \text{Ln}(\bar{\text{FDI}}_{\text{SSA}})}{\text{Ln}(\bar{\text{FDI}}_j) - \text{Ln}(\bar{\text{FDI}}_{\text{SSA}})} &= \frac{\hat{\beta}[\text{Ln}(\bar{X}_j) - \text{Ln}(\bar{X}_{\text{SSA}})]}{\text{Ln}(\bar{\text{FDI}}_j) - \text{Ln}(\bar{\text{FDI}}_{\text{SSA}})} \\ &+ \frac{(\bar{C}_j) - (\bar{C}_{\text{SSA}})}{\text{Ln}(\bar{\text{FDI}}_j) - \text{Ln}(\bar{\text{FDI}}_{\text{SSA}})} \quad (3) \\ &+ \frac{\epsilon_j - \epsilon_{\text{SSA}}}{\text{Ln}(\bar{\text{FDI}}_j) - \text{Ln}(\bar{\text{FDI}}_{\text{SSA}})} \end{aligned}$$

The decomposition is based on simple average values of variables and shows the relative contribution of each determinant to inter-regional differences in the FDI attractiveness of a typical (average) country.²¹ The results of this decomposition are given in columns (2)–(4) of Table 3.

Two-thirds of the inter-regional FDI gaps can be accounted for by differences in market size. Such a result not only emphasises the importance of local demand as a key determinant of FDI but also highlights that countries in SSA are characterised by small and slow growing markets in comparison with other developing regions. However, it makes little sense to contrast the FDI performance of different geographical zones without first taking into account that economically larger countries tend ‘naturally’ to attract greater FDI flows, in absolute terms, than smaller countries. In addition, from a per capita income growth perspective, it is the foreign investment rate which matters, not the absolute size of inflows (see, for instance, Borensztein *et al.*, 1998). Hence, most FDI studies use the ratio of FDI to GDP to compare the performance of

²¹ Decomposition using GDP-weighted average values of variables, indicating the relative importance of each determinant in explaining inter-regional aggregate FDI gaps, gives similar results: low human capital accumulation (health and education) in SSA explains 80–110% of inter-regional ‘normalised’ FDI gaps. Results are available upon request to the authors.

FDI across countries. This normalisation is valid as long as the elasticity of FDI with respect to GDP equals unity, implying that FDI is not, for instance, income elastic thanks to plant-level scale economies (Markusen, 1998). Although in this paper, the FDI to GDP elasticity is estimated to be lower than one, the restriction that the coefficient $\hat{\beta}_2$ is not significantly different from unity cannot be rejected: normalising FDI flows by total GDP would have been a data admissible model. A corollary implication of this unitary income elasticity is that growth without improvement in public governance, resulting, for instance, from windfall oil revenues, will not lead to a higher FDI to GDP ratio as both the numerator and the denominator will grow at the same rate.²² Only improvements in public governance will raise the FDI to GDP ratio sustainably. The rest of the paper discusses which dimensions of public governance explain the inter-regional differences in normalised FDI performance between SSA and the other developing regions.

Once inter-regional differences in market size are taken into account, columns 2–4 highlight that the underlying commonality in explaining the weaker FDI attractiveness of SSA is its relative poor record in terms of public goods provision. Low human capital accumulation (health and education) in SSA explains 100–140% of inter-regional ‘normalised’ FDI gaps. On the other hand, whereas SEA has the best macroeconomic policies, SSA fares much better than LAC in this policy area. On average, SSA macroeconomic policies are on a par with those of non-SSA countries. Differences in the security of property rights and in the degree of democracy do not significantly contribute to FDI inter-regional gaps. Diverging structural factors, however, play a non-negligible role. Their negative contribution can be interpreted as capturing the positive impact on FDI of the superior natural resources’ endowment of an average SSA country, compared with an average non-SSA country. Unlike Asiedu (2002), our results also show that SSA countries are not structurally less attractive than other countries. In fact, the reverse may be true as their subsoil wealth is a constant factor of attractiveness; unsurprisingly, the three countries with the highest fixed effects values all possess

²² From another perspective, a temporary slowdown of the economy should not affect the FDI to GDP ratio *ceteris paribus*; this ‘ratchet effect’ may explain why FDI flows, normalised by GDP, have been found to be less volatile than other capital flows (Levchenko and Mauro, 2006).

huge oil reserves: Angola, Sudan and Nigeria. Finally, it appears that the econometric model predicts net FDI inflows in developing countries quite well since the contribution of transitory factors (unexplained differences) to FDI inter-regional gaps is very small.

Overall, the decomposition of the sources of SSA's FDI gap with other developing regions has singled out the low provision of public goods, in terms of health and education, as the public governance dimension contributing the most to SSA's relative low FDI attractiveness, whichever is the benchmark region. Differences in the degree of democracy, quality of macroeconomic policies and security of property rights matter much less. The elasticity of FDI to these determinants is smaller and contrary to conventional wisdom (Goldsmith, 2000), the quality of SSA governance in these areas is not much different from that of other developing regions. Such findings echo the conclusions of Collier & Gunning (1999) on the causes of slow SSA growth. In the next section, the determinants of SSA's relatively poor population health are investigated and, by extension, we consider how diseases like HIV/AIDS and malaria hinder FDI in SSA.

4. Health and FDI

The FDI literature has, until recently, mostly ignored the positive impact of human capital on FDI.²³ In addition, human capital has traditionally been identified with education. For instance, no recent research focusing on the determinants of FDI in SSA, e.g. Asiedu (2006) or Dupasquier & Osakwe (2006), mentions the health component of human capital. In contrast, Table 3 indicates that, after market size, education and health are the factors that contribute most to SSA's FDI deficit, with about an equal weight.²⁴

²³ Noorbakhsh *et al.* (2001) and Alsan *et al.* (2006) are probably the first cross-sectional studies to respectively highlight the positive effects of education and health on FDI in developing countries.

²⁴ In terms of elasticities, raising life expectancy or education by one year substantially increases net FDI inflows by 3% and 16%, respectively. The semi-elasticities are calculated by dividing the coefficient reported in Table 3 by the mean sample value, e.g.

$$\text{semi-elasticity}_{\text{Health}} = \frac{\text{Elasticity}_{\text{Health}}}{\overline{\text{Health}}} = \frac{1.868}{62} \simeq 3\%$$

where $\overline{\text{Health}}$ is the mean sample value of life expectancy.

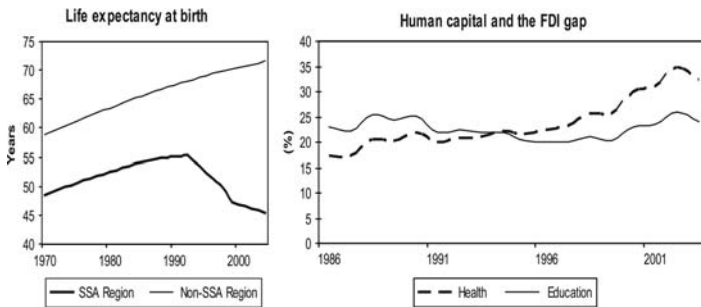


Figure 1: The growing contribution of health to SSA's FDI deficit. Source: WDI and authors. Three years' moving averages.

Furthermore, Figure 1 shows that the contribution of health to the FDI gap between SSA and the non-SSA aggregate zone has increased over time and now exceeds the contribution of education, which has remained more or less constant over the last two decades.²⁵ Given the sparse attention paid by the FDI literature to population health, and the observation that inter-regional differences in the latter increasingly matter when attempting to explain the relatively poor FDI performance of SSA, this section focuses on the links between health and FDI, with special reference to the pivotal role of diseases like HIV/AIDS and malaria in the context of SSA.

There are several explanations for a large effect of health on FDI (Alsan *et al.* 2006). From a factor cost perspective, poor health raises unit labour cost by both lowering workers' productivity and increasing employee compensation. Healthier workers are more productive (Strauss and Thomas, 1998). They are physically more robust and mentally more agile than undernourished and disabled workers. In societies where good health is widespread, healthy workers are less likely to be absent from work, since they fall sick less often and/or need less time to take care of sick relatives. Conversely, repeated illnesses or, worse, deaths of colleagues or family members may trigger a drop in staff morale causing low productivity. Bloom *et al.* (2004) estimate that a 1-year increase in life

²⁵ Since inter-regional differences in FDI have also been fairly stable, their temporal variations cannot explain the higher contribution of health to SSA's FDI deficit.

expectancy increases the overall labour productivity by 4%. Workforce health also exerts a significant impact on labour costs (U.S. Agency for International Development, 2001; Bloom *et al.*, 2003). Coverage of health care costs and payment of death benefits by employers may significantly affect the profitability of firms if total expenditures rise as a consequence of an epidemic. The costs of recruiting and training new workers can be fairly high. This is particularly so if skilled staff, who are in limited supply in developing countries, need to be replaced. In addition, foreign companies may be deterred by the prospect of a shrinking customer base, as a growing share of household incomes are earmarked for health-related expenditures (U.S. Agency for International Development, 2001; Bloom *et al.*, 2006b). Finally, it is probable that foreign investors avoid countries in which their expatriates, or their clients in the case of the tourism industry, are likely to contract an infectious disease (Sachs and Malaney, 2002).²⁶

Figure 1 shows that life expectancy in SSA has historically been lower than in other developing regions and has recently declined, explaining the large and growing contribution of inter-regional differences in health to SSA's FDI gap.²⁷ As Bloom & Sachs (1998) emphasise, poor health conditions cannot be blamed only on bad government policies; region-specific characteristics, and a general lack of domestic financial resources should be taken into account. Unfortunately, for SSA, a combination of favourable climatic and ecological conditions fosters high prevalence of deadly *Falciparum* malaria, which claims about 1.21 million lives each year, with the majority of them being African children (Lopez *et al.* 2006). In addition to this chronic negative effect of malaria on health, the reversal of the secular positive trend in life expectancy in SSA can largely be attributed to the spread of HIV, which for economic, social and cultural reasons is widespread in this region (see World Bank, 1997). On average, in 2000, 9% of the adult population of SSA were infected with HIV, compared with less than 1% in

²⁶ Sachs & Malaney (2002) report the following story about the foreign investment of the London-based mining and metals company Billiton: 'In a US\$1.4 billion joint venture investment to build an aluminium smelter in Mozambique, the largest foreign investment so far in that country, the company was faced with 7000 cases of malaria in two years, and the death of 13 expatriate employees' (p. 684).

²⁷ On the other hand, although no cross-regional convergence has occurred, educational attainment has steadily increased in both regions.

other developing regions (World Health Organization, 2004). By weakening the immune system of infected individuals, HIV not only kills its host but also favours the resurgence in SSA of certain infectious diseases, such as tuberculosis (Jamison *et al.*, 2006). Prevention, treatment and eradication of malaria, HIV and tuberculosis require financial resources far exceeding those of SSA governments.²⁸

Indirectly these viral and bacterial scourges of mankind, which are particularly prevalent in SSA, exert a deeply negative impact on FDI through their direct negative impacts on life expectancy. Business surveys confirm that executives are concerned about the current and future impacts of HIV/AIDS, malaria and tuberculosis on their company (Bloom *et al.* 2003, 2006a, b). For instance, answers to the 2003/2004 GCR Executive Opinion Survey (Bloom *et al.*, 2003) indicate that more than one-third of the firms surveyed in developing countries claim that at least one of these diseases exert, or will exert in the near future, some negative impact on their business. Firms operating in Africa are much more pessimistic, especially about the impact of AIDS/HIV: for 60% of them, this disease poses a serious threat to their activities.

To estimate the indirect impacts of HIV, malaria and tuberculosis on FDI, the direct effects of these three infectious diseases on health are calculated using the estimates of the following model:

$$\begin{aligned}
 \text{Ln(Life expectancy)}_i &= \gamma_0 + \gamma_1 \text{Ln(GDP per capita)}_i \\
 &+ \gamma_2 \text{Undernourishment prevalence}_i \\
 &+ \gamma_3 \text{Safe water access}_i + \gamma_4 \text{Education}_i \\
 &+ \gamma_5 \text{HIV prevalence}_i \\
 &+ \gamma_6 \text{malaria risk}_i + \gamma_7 \text{tuberculosis incidence}_i \\
 &+ \varepsilon_i
 \end{aligned}
 \tag{4}$$

²⁸ The Global Fund (2006) estimates that only one-fifth of the \$25 billion needed in 2007 to reach three internationally agreed health targets (reaching universal coverage for HIV/AIDS treatment by 2010 and significantly increasing coverage of prevention and care activities; halving tuberculosis mortality and prevalence and beginning to reverse the incidence of tuberculosis by 2015; halving malaria morbidity and mortality by 2010) can be funded by developing countries.

where ε_i is the error term. Life expectancy is expected to depend on purchasing power parity (PPP)-adjusted income per capita, education, the prevalence of undernourishment, access to an improved water source, the prevalence of HIV in the adult population, the risk of living in a deadly malaria zone and the incidence of tuberculosis. All these variables have been identified as strong determinants of population health in developing countries (Fogel, 1994; Pritchett and Summers, 1996; Hamoudi and Sachs, 1999; Fuchs, 2004; Cutler *et al.*, 2006). A high income supports the public and private per capita expenditures on goods and services that contribute to better health: public health services, private health care, medicines and shelter.²⁹ PPP-adjusted income is used since the purchasing power of \$1 differs widely across countries. An adequate supply of calories should make an individual less vulnerable to sickness and, in the case of childbearers, it should foster normal foetal development, which reduces the incidence of factors affecting mortality in adulthood. To take into account the nutritional status of the population, the proportion of the population below the minimum level of dietary energy consumption is used. Access to safe drinking water is also included in equation (4) as this plays a significant role in reducing the prevalence of diarrhoeal diseases, which are a major cause of infant deaths in developing countries (World Health Organization, 2005). Data for these three variables come from the World Bank (2005). Better-educated individuals are more likely to adopt behaviours that improve their health and the well-being of their families. As in Section 2, education is measured by the average years of schooling in the total population over age 15. As previously mentioned, the population of developing countries, especially of SSA, is severely affected by HIV/AIDS, tuberculosis and malaria. Data on HIV prevalence in the adult population (the percentage of people aged 15–49 who are infected with HIV), come from the World Bank (2005), while that on tuberculosis incidence (the yearly number of new cases per thousand people), can be found on the WHO site.³⁰ Finally, an index of deadly malaria prevalence has been constructed by Gallup & Sachs (2001). This is calculated using the fraction of the

²⁹ Once GDP per capita is included in equation (4), various measures of public health inputs (e.g. public health expenditures per capita and births attended per skilled health workers per capita), are no longer significant.

³⁰ <http://www.who.int/globalatlas/dataQuery/default.asp>

population in high malaria risk areas multiplied by the fraction of cases of malaria that are *Plasmodium falciparum*. Although the data are currently available only for the year 1994, maps of malaria risk shows that malaria prevalence in tropical countries has been fairly stable during the last 50 years (Gallup & Sachs, 2001).

Data for most of these variables are available only for the period 2000–2004 and for 65 developing countries, including 27 SSA countries.³¹ Hence, their average values over this period are used in the econometric estimation.³² Finally, the possibility of reverse causality between health and income or education is taken into account by instrumenting these two variables by their lagged values, averaged over the 1991–1994 and 1995–1999 periods.³³ Results are presented in Table 4.

Column (5) shows that most explanatory variables are significant at the 1% level and the variance explained is extremely high with an R^2 of 0.96. In column (6), GDP per capita and education are instrumented by their lagged levels. The Sargan–Hansen test suggests that the chosen instruments are valid, in the sense that they are not correlated with the error term. The results obtained through instrumental variables regression are similar to those found previously, indicating that GDP per capita and education are unlikely to be endogenous. A Durbin–Wu–Hausman test confirms the exogeneity of these two variables. At the sample mean, a 1% point rise in HIV prevalence causes a drop in life expectancy of about 1.1 years, and life expectancy is 5.3 years lower in a country fully exposed to *P. falciparum* malaria.³⁴ These estimates are close to those found by Bawah & Binka (2003) and UN DESA–Population Division (2006). On the other hand, no link is found between tuberculosis incidence and life expectancy. An unreported regression

³¹ Unavailability of data and instrumentation of health and income preclude the use of a simultaneous equation framework, in which equations (1) and (4) would be simultaneously estimated.

³² Outliers were removed according to the Cook's distance statistic, which is described in footnote 17.

³³ Recent reviews of microeconomic and macroeconomic studies stress that health is a strong determinant of worker productivity and economic growth (Strauss and Thomas, 199; Bloom *et al.* 2004). Likewise, health influences education. Healthy children are less likely to miss school and benefit from better cognitive development, while a longer life horizon makes investment in education more attractive (Scrimshaw, 1998; Bloom and Canning, 2003).

³⁴ This implies that a developing country with an HIV prevalence rate of 5% experiences the same loss in life expectancy than a country fully exposed to malaria.

Table 4: *The Indirect Impact of HIV and Malaria on FDI*

Determinants	Estimation		Relative contribution of each determinant to inter-regional difference in life expectancy (%) SSA versus ALL	Impact of HIV / AIDS and malaria on FDI (%) $\beta_4^* \gamma_{j=5,6}$
	OLS	IV		
	Life expectancy			
	(5)	(6)	(7)	(8)
PPP-adjusted GDP per capita	0.066 ^a (0.017)	0.066 ^a (0.017)	19	
Education	0.015 ^a (0.004)	0.014 ^a (0.004)	11	
Prevalence of undernourishment	−0.001 (0.001)	−0.001 (0.001)	3	
Prevalence of HIV in adult population (%)	−0.019 ^a (0.002)	−0.019 ^a (0.002)	33	
Rise in HIV prevalence of 1% point				−3.5
Deadly malaria risk	−0.088 ^a (0.022)	−0.088 ^a (0.022)	18	
Rise in pop. at risk of malaria of 1% point				−0.16
Incidence of tuberculosis (per 10 ³)	−0.000 (0.000)	−0.000 (0.000)	2	
Safe water access	0.001 ^c (0.001)	0.001 ^c (0.001)	9	
Transitory factor			5	

(continued on next page)

Table 4: *Continued*

Determinants	Estimation		Relative contribution of each determinant to inter-regional difference in life expectancy (%) SSA versus ALL	Impact of HIV / AIDS and malaria on FDI (%) β_4^* $\gamma_{j=5,6}$
	OLS	IV		
Life expectancy				
	(5)	(6)	(7)	(8)
Constant	3.609 ^a (0.120)	3.608 ^a (0.119)		
Observations	65	65		
R^2	0.96	0.96		
Instruments	gdppc _{<i>t</i>-1} , gdppc _{<i>t</i>-2} , education _{<i>t</i>-1} , education _{<i>t</i>-2}			
Sargan–Hansen overidentification test <i>P</i> -value	–	0.20		
Durbin–Wu–Hausman endogeneity test <i>P</i> -value	–	0.96		

Notes: a, b, c denotes significance at the 1, 5 and 10% level, respectively. Robust standard errors are in parentheses. ALL, all non-SSA countries; OLS, ordinary least squares; IV, instrumental variables regression. The variable HIV prevalence is expressed in %.

shows that the coefficient of this variable diminishes in size and significance once the HIV prevalence rate is included in equation (4). This is not surprising since an immuno-compromised person is very vulnerable to opportunistic infections such as tuberculosis. Hence, as long as the prevalence of HIV is not taken into account, the incidence of tuberculosis is likely to act as a proxy for the spread of the HIV disease in a country. However, once the deaths attributable to HIV are isolated, the consequences of tuberculosis on life expectancy are very limited.

In order to pick out the factors that contribute most to the low life expectancy in SSA, the relative contribution of each determinant to the health gap between SSA and non-SSA is shown in column (7). In a similar fashion to equation (3), the decomposition is based on simple average values of variables and shows the relative contribution of each determinant to inter-regional differences in life expectancy:

$$\begin{aligned} & \frac{\text{Ln}(\overline{\text{Health}}_{\text{non-SSA}}) - \text{Ln}(\overline{\text{Health}}_{\text{SSA}})}{\text{Ln}(\overline{\text{Health}}_{\text{non-SSA}}) - \text{Ln}(\overline{\text{Health}}_{\text{SSA}})} \\ &= \frac{\hat{\gamma}[\text{Ln}(\overline{X}_{\text{non-SSA}}) - \text{Ln}(\overline{X}_{\text{SSA}})]}{\text{Ln}(\overline{\text{Health}}_{\text{non-SSA}}) - (\text{Ln}(\overline{\text{Health}}_{\text{SSA}})} \\ &+ \frac{\varepsilon_{\text{non-SSA}} - \varepsilon_{\text{SSA}}}{\text{Ln}(\overline{\text{Health}}_{\text{non-SSA}}) - \text{Ln}(\overline{\text{Health}}_{\text{SSA}})} \end{aligned} \quad (5)$$

Almost two-thirds of SSA's health deficit can be attributed to malaria and HIV/AIDS while the remaining one-third is explained by differences in wealth and, to a lesser extent, in education and in access to safe water. The direct contribution of HIV to the relatively low life expectancy of the SSA population greatly exceeds that of malaria.³⁵ This result corroborates the findings of Neumayer (2004), which demonstrates that the recent cross-national divergence in life expectancy mainly finds its roots in the rising spread of the HIV disease.³⁶

³⁵ Note that the overall contribution of both diseases is likely to be higher since they have been found to depress economic growth and educational achievement Bonnel, 2000; Sachs and Malaney 2002).

³⁶ After completing this paper, we became aware that UNAIDS had revised downward most of their HIV prevalence estimates in SSA (see Table 5). Using these new data, obtained from UNAIDS senior epidemiologist Karen Stanecki, leaves the results of Table 4 virtually unchanged.

On the basis of columns (1) and (5), the impact of HIV/AIDS and malaria on FDI can be calculated as:

$$\begin{aligned} \% \Delta \text{FDI}(\text{col.8}) &\simeq \\ 100 \times \beta_4 (\text{col.1}) \times \gamma_{j=5,6} (\text{col.5}) \times \text{Disease prevalence} &\quad (6) \end{aligned}$$

where $100 \times (\beta_4 \times \gamma_{j=5,6})$ is the semi-elasticity of FDI with respect to the prevalence of HIV or malaria. Column (8) shows that a 1% point rise in HIV prevalence in the adult population is associated with a decrease in net FDI inflows by 3.5%, whereas a country in which 100% of the population is at risk of contracting deadly malaria receives about 16% less FDI than a similar country located in a malaria-free region.³⁷ Table 5 and Figure 2 illustrate the FDI losses experienced by SSA countries as a consequence of the relatively high levels of malaria and HIV. Using equation (6), they display the percentage increase in yearly FDI that an SSA country would have received during the 2000–2004 period had HIV and malaria not existed. In this hypothetical scenario, yearly net FDI inflows would have been about one-third higher in the median SSA country, with slightly more than one-half of this contribution by malaria.³⁸ Hence, as suggested by Bloom & Sachs (1998) and Sachs & Malaney (2002), the integration of SSA countries into the world economy, and by extension, their economic growth, is greatly hindered by malaria and HIV/AIDS.

5. Conclusion

The relatively poor FDI performance of SSA can largely be explained by insufficient provision of public goods, in terms of health and education. However, it is important to stress the point that deficiencies, especially, in health may be driven as much by geography, societal conditions and limited domestic financial resources as by government policies. For instance, region-specific conditions have fostered the spread of malaria and HIV, two

³⁷ Respectively: $1.868 \times -1.9 \simeq -3.5\%$ and $1.868 \times -8.8 \simeq -16.4\%$.

³⁸ This finding is based on the revised data that generally show less incidence of HIV in African countries than previously estimated (see Table 5). Also note that the median exhibits a consistently smaller prevalence of HIV in Africa than does the mean, especially when the more accurate revised data are used. This finding, then, supports the view that HIV is concentrated in certain countries, typically in Southern Africa (Table 5).

Table 5: *Prevalence of HIV/AIDS and Malaria in Sub-Saharan Africa and FDI Losses*

Country	Prevalence		FDI losses (%) (11)	Share of the impact (%)		
	HIV (%) (9)	Malaria (%) (10)		HIV (12)	Malaria (13)	
Angola	4	<4>	100	30	45	55
Benin	2	<2>	100	23	29	71
Botswana	38	<28>	36	138	96	4
Burkina Faso	3	<2>	100	27	39	61
Burundi	6	<3>	100	38	57	43
Cameroon	6	<6>	100	39	58	42
Chad	5	<3>	99	33	51	49
Central African Republic	13	<11>	100	64	74	26
Congo	5	<6>	100	34	52	48
Congo, Democratic Republic of	4	<3>	100	31	47	53
Cte d'Ivoire	7	<5>	100	40	59	41
Djibouti	3	<3>	100	26	38	62
Eritrea	3	<2>	76	22	43	57
Ethiopia	4	<2>	58	24	61	39
Gabon	8	<8>	100	43	62	38
Gambia	1	<2>	100	21	20	80
Ghana	3	<2>	100	26	36	64
Guinea	3	<2>	100	27	39	61
Kenya	7	<7>	84	40	65	35
Lesotho	29	<24>	0	102	100	0
Liberia	6	<3>	100	36	54	46
Madagascar	2	<0>	100	22	24	76
Malawi	14	<14>	100	66	75	25
Mali	2	<2>	99	23	29	71
Mauritania	1	<1>	85	16	12	88
Mozambique	12	<14>	100	59	72	28
Namibia	21	<17>	62	85	88	12
Niger	1	<1>	98	20	20	80
Nigeria	5	<4>	100	35	54	46
Rwanda	5	<4>	100	34	52	48
Senegal	1	<1>	100	19	15	85

(continued on next page)

Table 5: *Continued*

Country	Prevalence			FDI losses (%) (11)	Share of the impact (%)	
	HIV (%) (9)	Malaria (%) (10)			HIV (12)	Malaria (13)
South Africa	19	<18>	2	68	99	1
Sudan	2	<2>	98	23	31	69
Swaziland	39	<31>	10	136	99	1
Tanzania, United Republic of	8	<7>	100	45	64	36
Togo	4	<3>	100	31	47	53
Uganda	5	<7>	100	33	50	50
Zambia	16	<17>	100	73	78	22
Zimbabwe	25	<23>	62	97	90	10
Mean SSA	9	<8>	86	45 <41>	54 <51>	46 <49>
Median SSA	5	<4>	100	34 <30>	52 <46>	48 <54>
Mean non-SSA	Less than 1	23				
Median non-SSA	Less than 1	4				

Notes: HIV prevalence rates have been averaged over the period, 2000–2004 and the fraction of the population at risk of contracting deadly malaria has been assumed to have remained constant since 1994. <.> Revised UNAIDS estimates for the period 2000–2004 (UNAIDS, 2006). FDI losses are the percentage increase in yearly net FDI flows that a country would have received during the period 2000–2004 if HIV and malaria had not existed. They are calculated according to the following formula: $(\text{HIV prevalence}) \times (\beta_4\gamma_5) + (\text{malaria prevalence}/100) \times (\beta_4\gamma_6)$, with $\beta_4\gamma_5 = 3.5$ and $\beta_4\gamma_6 = 16.4$.

deadly diseases responsible for more than half of the contemporaneous difference in life expectancy between SSA and other developing regions. The public-good nature and negative externalities of these diseases (World Bank, 1997) warrant government intervention but the limited national resources of SSA countries make it unlikely that they will be able to cope without the assistance of the international community. Unfortunately, international resources committed to fighting malaria and HIV/AIDS in the last decade have been inadequate (Attaran and Sachs, 2001; Sachs, 2005), and have ignored the fact that treating these diseases can bring great benefits to developed countries as well (World Bank, 1997).

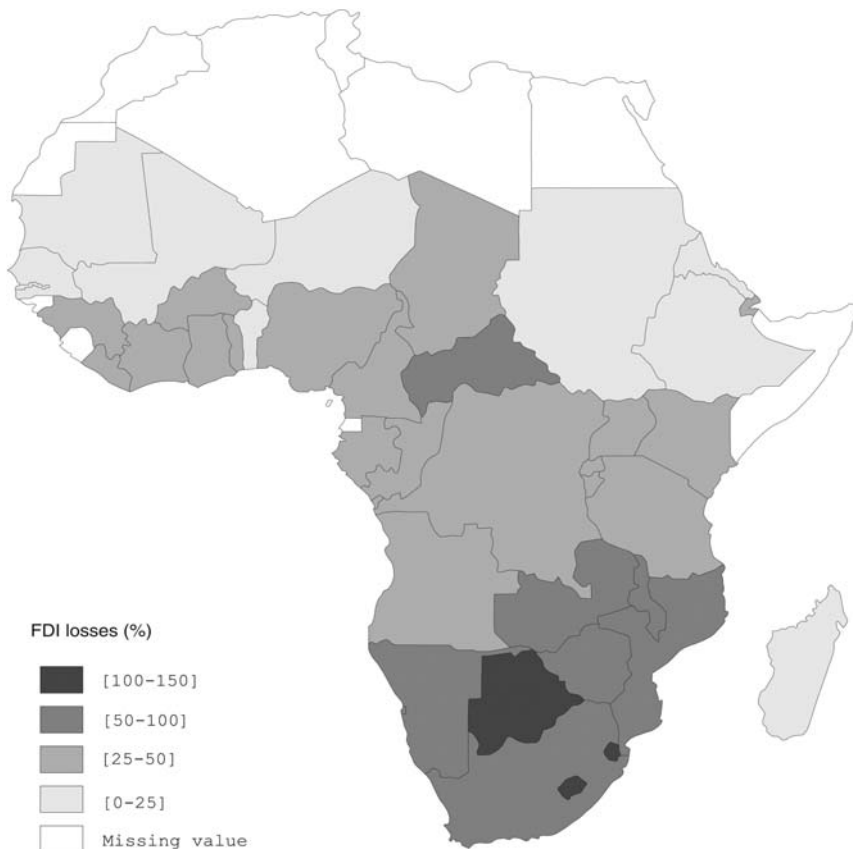


Figure 2: *FDI losses due to HIV/AIDS and malaria in SSA.* Source: Authors.

Adopting concerted public health policies at both the international and national levels could generate large economic and welfare pay-offs, including, as this paper shows, stronger economic integration of SSA into the world economy via FDI.

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References

- Ahn, Y. S., S. S. Adjil and T. D. Willet (1998) 'The Effects of Inflation and Exchange Rate Policies on Direct Investment to Developing Countries', *International Economic Journal*, 12(1): 95–104.
- Aizenman, J. and N. Marion (2004) 'The Merits of Horizontal Versus Vertical FDI in the Presence of Uncertainty', *Journal of International Economics*, 62(1): 125–48.
- Almeida, H. and D. Ferreira (2002) 'Democracy and the Variability of Economic Performance', *Economics and Politics*, 14(3): 225–257.
- Alsan, M., D. E. Bloom and D. Canning (2006) 'The Effect of Population Health on Foreign Direct Investment Inflows to Low- and Middle-Income Countries', *World Development*, 34(4): 613–30.
- Arellano, M. and S. Bond (1991) 'Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations', *Review of Economic Studies*, 58(2): 277–97.
- Asiedu, E. (2002) 'On the Determinants of Foreign Direct Investment to Developing Countries: Is Africa Different?', *World Development*, 30(1): 107–19.
- Asiedu, E. (2006) 'Foreign Direct Investment in Africa. the Role of Natural Resources, Market Size, Government Policy, Institutions and Political Instability', *World Economy*, 29(1): 63–77.
- Attaran, A. and J. Sachs (2001) 'Defining and Refining International Donor Support for Combating the AIDS Pandemic', *The Lancet*, 357: 57–61.
- Bannon, I. and P. Collier (2003) *Natural Resources and Violent Conflict: Options and Actions*. Washington: the World Bank.
- Barro, R. J. and J.-W. Lee (2000) International Data on Educational Attainment: Updates and Implications, CID Working Papers, n. 42.

- Bawah, A. A. and F. N. Binka (2003) How Many Years of Life Could Be Saved If Malaria Were Eliminated from a Hyperendemic Area of Northern Ghana?, Population Council Policy Research Division Working Paper, n. 203.
- Bénassy-Quéré, A., L. Fontagné and A. Lahréche-Révil (2001) 'Exchange-rate Strategies in the Competition for Attracting Foreign Direct Investment', *Journal of the Japanese and International Economies*, 15(2): 178–98.
- Bénassy-Quéré, A., M. Coupet and T. Mayer (2007) 'Institutional Determinants of Foreign Direct Investment', *The World Economy*, 30(5): 764–82.
- Blonigen, B. A. and M. Wang (2005) 'Inappropriate Pooling of Wealthy and Poor Countries in Empirical Fdi Studies', in T. H. Moran, E. M. Graham and M. Blomström (eds), *Does Foreign Direct Investment Promote Development?* Washington: Institute of International Economics.
- Bloom, D. E. and D. Canning (2003) 'The Health and Poverty of Nations: from Theory to Practice', *Journal of Human Development*, 4(1): 47–71.
- Bloom, D. E. and J. D. Sachs (1998) 'Geography, Demography, and Economic Growth in Africa', *Brooking Papers on Economic Activity*, 1998 (2): 207–273.
- Bloom, D. E., L. R. Bloom, D. Steven and M. Weston (2003) *Business and HIV/AIDS: Who Me? A Global Review of the Business Response to HIV/AIDS*. Geneva: World Economic Forum Global Health Initiative.
- Bloom, D. E., D. Canning and J. Sevilla (2004) 'The Effect of Health on Economic Growth: A Production Function Approach', *World Development*, 32(1): 1–13.
- Bloom, D. E., L. R. Bloom, D. Steven and M. Weston (2006a) *Business and HIV/AIDS: A Healthier Partnership?* Geneva: World Economic Forum Global Health Initiative.
- Bloom, D. E., L. R. Bloom, D. Steven and M. Weston (2006b) *Business and Malaria: A Neglected Threat?* Geneva: World Economic Forum Global Health Initiative.
- Bonnel, R. (2000) 'HIV/Aids and Economic Growth: A Global Perspective', *South African Journal of Economics*, 68(5): 820–55.

- Borensztein, E., J. De Gregorio and J.-W. Lee (1998) 'How Does Foreign Direct Investment Affect Economic Growth?', *Journal of International Economics* 45(1): 115–35.
- Breusch, T. S. and A. R. Pagan (1979) 'A Simple Test for Heteroscedasticity and Random Coefficient Variation', *Econometrica*, 47(5): 1287–94.
- Brown, D. K., A. V. Deardoff and R. M. Stern (2003) The Effects of Multinational Production on Wages and Working Conditions in Developing Countries. NBER Working Paper, n. 9669.
- Busse, M. (2004) 'Transnational Corporations and Repression of Political Rights and Civil Liberties: An Empirical Analysis', *Kyklos*, 57(1): 45–65.
- Canning, D. (1998) 'A Database of World Stocks of Infrastructure, 1950–95', *The World Bank Economic Review*, 12(3): 529–47.
- Carr, D. L., J. R. Markusen and K. E. Maskus (2004) 'Competition for Multinational Investment in Developing Countries: Human Capital, Infrastructure and Market Size', in R. E. Baldwin and A. L. Winters (eds), *Challenges to Globalization: Analyzing the Economics*. Chicago: The University of Chicago Press.
- Chakrabarti, A. (2001) 'The Determinants of Foreign Direct Investments: Sensitivity Analyses of Cross-country Regressions', *Kyklos*, 54(1): 89–114.
- Clague, C., S. Keefer, S. Knack and M. Olson (1999) 'Contract-Intensive Money: Contract Enforcement, Property Rights, and Economic Performance', *Journal of Economic Growth* 4(2): 185–211.
- Cohen, D. and M. Soto (2007) 'Growth and Human Capital: Good Data, Good Results', *Journal of Economic Growth*, 12(1): 51–76.
- Collier, P. and J. W. Gunning (1999) 'Explaining African Economic Performance', *Journal of Economic Literature*, 37(1): 64–111.
- Cutler, D., A. Deaton and A. Lleras-Muney (2006) 'The Determinants of Mortality', *Journal of Economic Perspectives*, 20(3): 97–120.
- Dupasquier, C. and P. N. Osakwe (2006) 'Foreign Direct Investment in Africa: Performance, Challenges, and Responsibilities', *Journal of Asian Economics*, 17(2): 241–60.
- Easterly, W. and R. Levine (1997) 'Africa's Growth Tragedy: Policies and Ethnic Divisions', *The Quarterly Journal of Economics*, 112(4): 1203–50.

- Eriksson, M. and P. Wallensteen (2004) 'Armed Conflict, 1989–2003', *Journal of Peace Research*, 41(5): 625–36.
- Fernandez-Arias, E. and P. Montiel (2001) 'Reform and Growth in Latin America: All Pain, No Gain?', *IMF Staff Papers*, 48(3): 522–46.
- Fischer, S. (1993) 'The role of Macroeconomic Factors in Growth', *Journal of Monetary Economics*, 32(3): 485–512.
- Fogel, R. W. (1994) 'Economic Growth, Population Theory, and Physiology: The Bearing of Long-term Processes on the Making of Economic Policy', *American Economic Review*, 84(3): 369–95.
- Fosu, A., R. Bates and A. Hoeffler (2006) 'Institutions, Governance and Economic Development in Africa: An Overview', *Journal of African Economies*, 15 (S1): 1–9.
- Freedom House (2005) *Freedom in the World 2005: The Annual Survey of Political Rights and Civil Liberties*. Lanham: Rowman & Littlefield Publishers, Inc.
- Fuchs, V. R. (2004) 'Reactions on the Socio-economic Correlates of Health', *Journal of Health Economics*, 23(4): 653–61.
- Fuller, W. A. (1987) *Measurement Error Models*. New York: John Wiley & Sons.
- Gallup, J. L. and J. D. Sachs (2001) 'The Economic Burden of Malaria', *American Journal of Tropical Medicine and Hygiene*, 64 (1–2): 85–96.
- Gastanaga, V. M., J. B. Nugent and B. Pashamova (1998) 'Host Country Reforms and FDI Inflows: How Much Difference Do They Make?', *World Development*, 26(7): 1299–314.
- Global Fund (2006) *Funding the Global Fight Against HIV/AIDS, Tuberculosis and Malaria*. The Global Fund: The Global Fund to Fight AIDS, Tuberculosis and Malaria.
- Globerman, S. and D. Shapiro (2002) 'Global Foreign Direct Investment flows: The Role of Governance Infrastructure', *World Development*, 30(11): 1899–919.
- Globerman, S. and D. Shapiro (2003) 'Governance Infrastructure and U.S. Foreign Direct Investment', *Journal of International Business Studies*, 34(1): 19–39.
- Goldsmith, A. A. (2000) 'Sizing up the African State', *The Journal of Modern African Studies*, 38(1): 1–20.

- Hamoudi, A. A. and J. D. Sachs (1999) 'Economic Consequences of Health Status: A Review of the Evidence', Harvard CID Working Paper, n. 30.
- Harms, P. and H. W. Ursprung (2002) 'Do Civil and Political Repression Really Boost Foreign Direct Investments?', *Economic Inquiry*, 40(4): 651–63.
- Henisz, W. J. (2000) The Institutional Environment for Economic Growth, *Economics and Politics*, 12(1): 1–31.
- Jakobsen, J. and I. De Soysa (2006) 'Do Foreign Investors Punish Democracy? Theory and Empirics, 1984–2001', *Kyklos*, 53(3): 383–410.
- Jamison, D. T., G.R. Feachem, M. W. Makgoba, E. R. Bos, F. K. Baingana and K. J. Hofman and K. O. Rogo (2006) *Disease and Mortality in Sub-Saharan Africa*. The World Bank.
- Jensen, N. M. (2003) 'Democratic Governance and Multinational Corporations: Political Regimes and inflows of Foreign Direct Investment', *International Organization*, 57(3): 587–616.
- Kaufmann, D. and A. Kraay (2002) 'Growth without Governance', *Economia*, 3(1): 169–229.
- Kaufmann, D., A. Kraay and P. Zoido-Lobaton (1999) 'Governance Matters', World Bank Working Paper, n. 2196.
- Kinoshita, Y. and A. Mody (2001) 'Private Information for Foreign Investment in Emerging Countries', *The Canadian Journal of Economics*, 34(2): 448–64.
- La Porta, R., F. López-de Silanes, A. Shleifer and R. Vishny (1999) 'The quality of government', *Journal of Law, Economics and Organization*, 15(1): 222–79.
- Lehmann, A. (1999) 'Country Risks and the Investment Activity of U.S. Multinationals in Developing Countries', IMF Working paper, n. 99/133.
- Levchenko, A. A. and P. Mauro (2006) 'Do Some Forms of Financial Flows Help Protect from Sudden Stops?', IMF Working Paper, n. 06/202.
- Li, Q. and A. Resnick (2003) 'Reversal of Fortunes: Democratic Institutions and Foreign Direct Investment Inflows to Developing Countries', *International Organization*, 57(5): 175–211.

- Lopez, A. D., C. D. Mathers, M. Ezzati, D. T. Jamison and C. J. Murray (2006) 'Global and Regional Burden of Disease and Risk Factors, 2001: Systematic Analysis of Population Health Data', *The Lancet*, 367(9524): 1474–757.
- Markusen, J. (1998) 'Multinational Firms, Location and Trade', *The World Economy*, 21(6): 733–56.
- Markusen, J. R. (2002) *Multinational Firms and the Theory of International Trade*. Cambridge: MIT Press.
- Marshall, M. G. and K. Jagers (2002) *Polity IV Project: Political Regime Characteristics and Transitions, 1800–2002, Dataset Users Manual*. University of Maryland.
- Merkel, W. (2004) 'Embedded and Defective Democracies', *Democratization*, 11(5): 33–58.
- Milesi-Ferretti, G. M. and P. R. Lane (2006) 'The External Wealth of Nations Mark II: Revised and Extended Estimates of Foreign Assets and Liabilities, 1970–2004', IMF Working Paper, n. 06/69.
- Ndulu, B. J. and S. A. OConnell (2003) Revised Collins/Bosworth Growth Accounting Decompositions, AERC Explaining African Economic Growth Project.
- Neumayer, E. (2004) 'HIV/Aids and Cross-national Convergence in Life Expectancy', *Population and Development Review*, 30(4): 727–42.
- Newey, W. K. and K. D. West (1987) 'A Simple, Positive Semi-definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix', *Econometrica*, 55(3): 703–8.
- Noorbakhsh, F., A. Paloni and A. Youssef (2001) 'Human Capital and FDI Inflows to Developing Countries: New Empirical Evidence', *World Development*, 29(9): 1593–1610.
- North, D. C. (1990) *Institutions, Institutional Change and Economic Performance*. Cambridge MA: Cambridge University Press.
- Pattillo, C., H. Poirson and L. Ricci (2004) What Are the Channels Through Which External Debt Affects Growth?, IMF Working Paper, n. 04/15.
- Pritchett, L. and L. H. Summers (1996) 'Wealthier is Healthier', *Journal of Human Resources*, 31(4): 841–68.
- Rivera-Batiz, F. A. (2002) 'Democracy, Governance, and Economic Growth: Theory and Evidence', *Review of Development Economics*, 6(2): 225–47.

- Rodrik, D., A. Subramanian and A. Trebbi (2004) 'Institutions Rule: The Primacy of Institutions Over Geography and Integration in Economic Development', *Journal of Economic Growth*, 9(2): 131–65.
- Rogoff, K. S. and C. M. Reinhart (2003) 'FDI to Africa: The Role of Price Stability and Currency Instability', IMF Working Paper, n. 03/10.
- Sachs, J. (2005) 'Achieving the Millennium Development Goals the Case of Malaria', *New England Journal Medical*, 352(2): 115–7.
- Sachs, J. D. and P. Malaney (2002) 'The Economic and Social Burden of Malaria', *Nature*, 415(6872): 680–5.
- Schneider, F. and B. S. Frey (1985) 'Economic and Political Determinants of Foreign Direct Investment', *World Development*, 2(13): 161–75.
- Scrimshaw, N. S. (1998) Malnutrition, Brain Development, Learning, and Behavior. *Nutrition Research*, 18(2): 351–79.
- Strauss, J. and D. Thomas (1998) 'Health, Nutrition, and Economic Development', *Journal of Economic Literature*, 36(2): 766–817.
- Tavares, J. and R. Wacziarg (2001) 'How Democracy Affects Growth', *European Economic Review*, 45(8): 1341–78.
- Thomas, V., M. Dailami, A. Dhareshwar, D. Kaufmann, N. Kishor, R. Lopez and Y. Wang (2000) *Quality of Growth*. New York: Oxford University Press.
- UN DESA-Population Division (2006) *World Population Prospects: The 2004 Revision, Vol. III: Analytical Report*. New York: UN Publication.
- UNAIDS (2006) *2006 Report on the Global AIDS Epidemics*. Joint United Nations Programme on HIV/AIDS.
- UNCTAD (1999) *Foreign Direct Investment in Africa: Performance and Potential*. New York and Geneva: The United Nations.
- U.S. Agency for International Development (2001) HIV/Aids and Businesses in Africa, Population, Health and Nutrition Information Project.
- Wagner, D., K. Head and J. C. Ries (2002) 'Immigration and the Trade of Provinces', *Scottish Journal of Political Economy*, 49(5): 507–25.
- Wei, S.-J. (2000) 'Natural Openness and Good Government', NBER Working Paper, n. 7765.

- Wooldridge, J. M. (1995) 'Selection Corrections for Panel Data Models Under Conditional Mean Independence Assumptions', *Journal of Econometrics*, 68(1): 115–32.
- Wooldridge, J. M. (2002) *Introductory Econometrics: A Modern Approach*. South-Western College Publishing.
- World Bank (1997) *Confronting AIDS: Public Priorities in a Global Epidemic*. New York: Oxford University Press.
- World Bank (2002) *World Development Report 2002: Building Institutions for Markets*. New York: Oxford University Press.
- World Bank (2005) *World Development Indicators*. Online Database.
- World Health Organization (2002) *The World Health Report 2002: Reducing Risks, Promoting Healthy Life*. Geneva: WHO Press.
- World Health Organization (2004) *The World Health Report 2002: Changing History*. Geneva: WHO Press.
- World Health Organization (2005) *The World Health Report 2005: Make Every Mother and Child Count*. Geneva: WHO Press.

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