

HIV PREVALENCE AND SOCIO-ECONOMIC STATUS IN SUB-SAHARAN AFRICA

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ABSTRACT

Dalam perkembangannya, HIV/AIDS bukan hanya menjadi masalah kesehatan, tetapi juga menjadi masalah sosial dan ekonomi. Kenyataannya, lebih dari 90 persen kasus HIV/AIDS ditemukan di Negara Sedang Berkembang (NSB), utamanya di Negara-negara Sub-Sahara Afrika. Hal ini menimbulkan pemikiran umum bahwa ada hubungan yang sangat erat antara HIV/AIDS dengan masalah-masalah sosial ekonomi seperti kemiskinan dan tingkat pendidikan. Dalam beberapa literatur dikemukakan bahwa pada banyak kasus di Afrika, terdapat hubungan positif antara HIV/AIDS dan tingkat pendapatan dan tingkat pendidikan. Ini berarti bahwa, semakin tinggi taraf hidup masyarakat Afrika, semakin rentan pula mereka terhadap infeksi HIV/AIDS. Hal ini tentu bertentangan dengan pandangan yang umum di terima. Hal sebaliknya terjadi pada kasus Negara-negara Asia. Argumen yang masuk akal adalah, HIV/AIDS terjadi di Afrika ketika banyak orang belum mengetahui penyebab dan cara penyebarannya, padahal HIV/AIDS sangat berhubungan dengan gaya hidup dan mobilitas masyarakat. Masyarakat kelas menengah di Afrika adalah masyarakat yang lebih "mobile" dari kelompok lainnya, mereka umumnya tinggal di perkotaan atau di daerah perbatasan dengan Negara lain (sebagian besar Negara Afrika tidak memiliki perbatasan laut/ landlock), sehingga resiko untuk terinfeksi menjadi lebih tinggi. Tidak seperti beberapa literatur yang membahas masalah HIV/AIDS di Afrika dengan kasus Negara per Negara, artikel ini mencoba mendekati permasalahan dengan analisis yang lebih makro, mencakup semua Negara Sub-Sahara, semua kelompok umur, dan lintas gender. Hasilnya adalah tidak adanya hubungan yang jelas antara banyaknya kasus HIV dan pendapatan per kapita. Sedangkan, pada kasus tingkat pendidikan, terdapat hubungan yang positif tetapi hubungan tersebut tidak linier.

Kata kunci: HIV/AIDS, kemiskinan, negara sedang berkembang, pendapatan perkapita, pendidikan, sub-sahara africa.

HIV/AIDS is stated on the goal number 6 of the United Nations millennium development goals, the point is "combat HIV/AIDS, malaria, and other infection diseases". The target of this goal is to stop the spread of the diseases by 2015 (UN, 2007, pp 19). The actions suggest by the UN are expanding the access of treatment, promoting the prevention to HIV, and caring orphans caused by AIDS (UN, 2007, pp 19-20).

AIDS was almost an unknown disease 20 years ago, both the dangers and the means of transmission. Today, HIV/AIDS becomes a prominent problem, mostly in developing countries. According to UNAIDS and the World Bank (2003, pp.1), 95 % of the people living with HIV live in developing countries, the home for more than 80 % of world's population. Not surprisingly, HIV/AIDS is not only known as a health problem, but also a socio-economic problem.

What are HIV and AIDS? AIDS or *Acquired Immune Deficiency Syndrome* is a disease caused by *Human Immunodeficiency Virus* (HIV), a virus which attacks human immune system. HIV and AIDS can be transmitted by four transmission systems; (1) unsafe sexual intercourse, (2) unsafe injecting practise, (3) mother-to-child infection, and (4) contaminated blood transfusion.

According to UNAIDS and WHO (2006), almost 40 million people are now living with HIV. The estimate numbers of the infection in 2006 can be seen in the map below. The numbers in brackets indicate the low and high estimations, while the bold numbers indicate the mean of estimations. The interesting figure is that more than 60 percent of people living with HIV are found in Sub-Saharan Africa, the region known as the poorest region in the world.

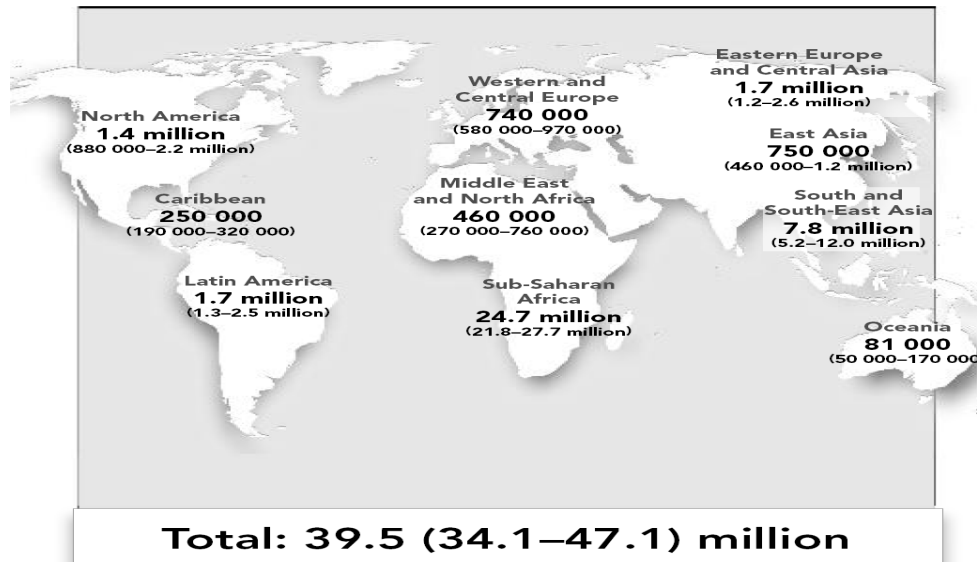


Figure 1. Adults and children estimated to be living with HIV in 2006
Source: UNAIDS and WHO (2006, pp. 65)

Why HIV/AIDS is typically found in poor regions? Not only HIV/AIDS, but also other infectious diseases, such as malaria, tuberculosis, and other diseases are very common in developing worlds. The patterns of health problems are different in rich and poor countries (Fortson, 2007, pp.1). Poor countries seem to have higher cases on infection diseases, while rich countries seem to have more common cases on chronic diseases (Fortson, 2007, pp.1), such as heart attack, high blood pressure, cancer, or kidney failure. The reasons are infectious diseases are commonly caused by bad sanitation, malnutrition, unsafe sexual behaviour, and lack access to health facilities which are closely related to the lack access to education and poor socio-economic degree. In contrast, chronic diseases, which more often to be found in developed countries, are caused by unbalanced nutrition intakes which are negatively correlated with poverty.

For African countries, especially Sub-Saharan, HIV/AIDS is the biggest obstacle for their development. While they try hard to escape from poverty, this epidemic seems to make this condition even worse. Lachaud (2007, pp. 484) asks the questions, is HIV/AIDS simply a medical or behaviour problem, or is it a sign of underdevelopment? In fact, both are linked together. HIV/AIDS is not only a serious health problem but also a serious socio-economic problem. It is a serious health problem because until now, there is no cure. Since it has been known, it has infected more that 60 million people worldwide, killed approximately 3 million people every year, and infected 14,000 more people every day (UNAIDS & the World Bank, 2003). The main socio-economic problems caused by

HIV/AIDS are declining life expectancy, declining workforce, increasing poverty and inequality, creating large number of orphans, and giving more pressure on health and social services.

Back to the fact that most of the HIV/AIDS cases are found in developing countries, so the hypotheses that commonly accepted is that there is a strong correlation between HIV/AIDS prevalence and the lack of socio-economic status. The purpose of this paper is to estimate relationship between HIV and the degree of socio-economic status, namely, income per capita and educational level. The focus of this article is Sub-Saharan African countries.

HIV/AIDS is strongly related to the socio-economic condition. From the micro level, individual who infected with HIV will unable to work properly or unable to work at all, he/she also needs high cost of health services, so these lead to the opportunity losses to earn more income. Losing income leads the other members of the family to even have higher risk, for example, to feed her family, a young girl works as a commercial sex worker.

In macro level, HIV/AIDS can devastate the demographic pattern. High rate of death among adults can increase the dependency ratio. High rate on mother-to-child infection can increase child mortality rate. According to Loewenson and Whiteside (2001) AIDS is responsible for 25 percent of all death of Sub-Saharan population, they predict by the end of 2010, Sub-Saharan will have 71 million fewer people than now (pp. 7).

Figure 2 and 3 show how HIV/AIDS affects life expectancy and child mortality. In countries as shown above, high level of AIDS infections significantly reduce life expectancy and increase child mortality. This situation can affect the demographic pattern and cut the size of population.

Demographic pattern changing also affects the aggregate economic condition. High dependency ratio lowers the economic productivity and at the end reduces the economic growth. This condition makes poverty reduction strategies are more difficult to apply.

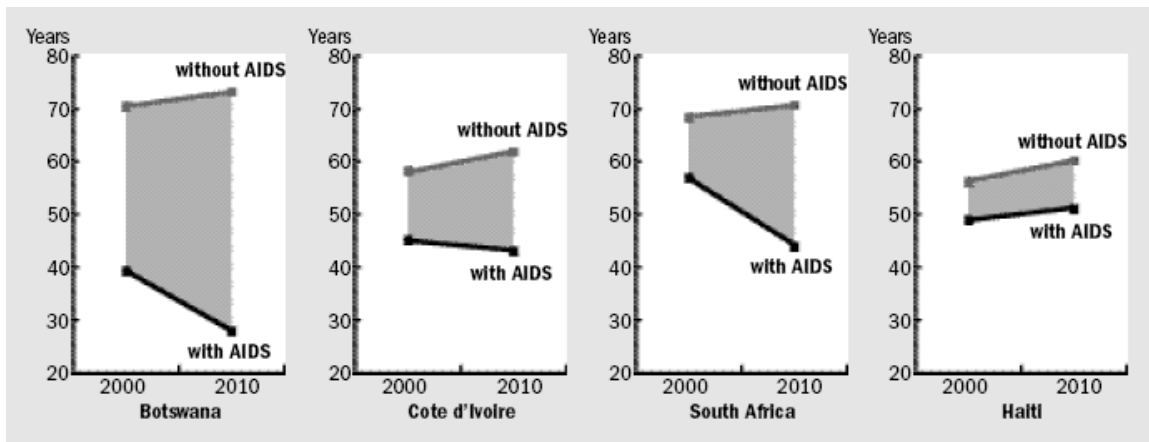


Figure 2. Life expectancy 2000 and 2010 (selected countries)

Source: US Bureau of Census, 2000 (cited in Loewenson and Whiteside, 2001, pp.8)

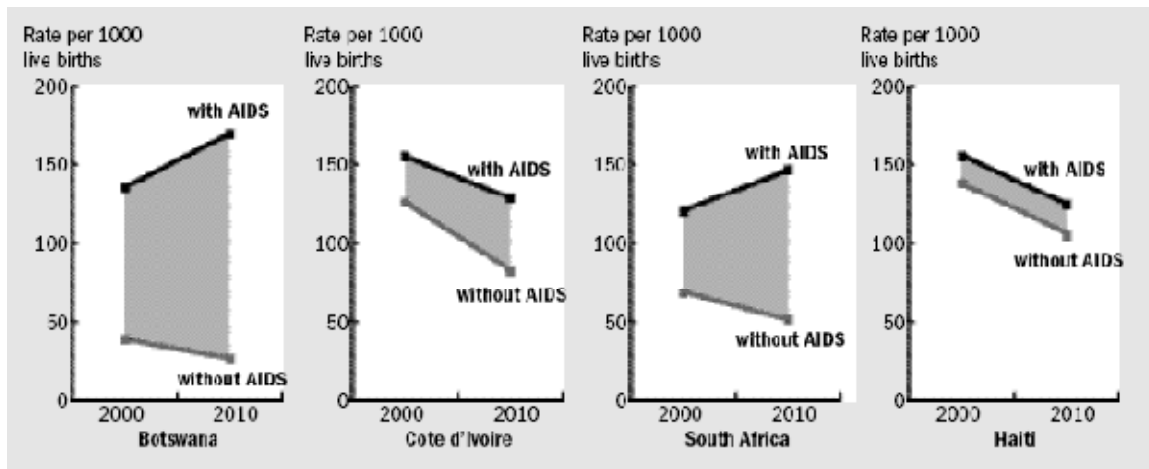


Figure 3. Under five child mortality 2000 and 2010 (selected countries)
 Source: US Bureau of Census, 2000 (cited in Loewenson and Whiteside, 2001, pp.8)

From the social aspect view point, the increasing number of HIV infection among adults leaves many social problems, such as the increasing number of orphans. An increasing number of orphans increase the cost of caring them; increase the number of children on work, because they need to feed themselves and their existing family; decrease the school rate, because they spend their time for working or taking care their sick families, or the school teacher who also infected to HIV cannot go teaching.

Another example of social problem is the failure of health system to tackle this problem. This is because the cost of HIV treatment is very expensive and almost impossible to be achieved by poor countries. According to UNAIDS and the World Bank (2003), for some poor counties, the cost of basic care for an AIDS patient, excluding antiretroviral drugs (ARV) is 2-3 times their per capita income.

Those examples, lead us to a general view that there is a strong relation between HIV and socio-economic problems, especially poverty. Adeyi, Hecht, Njobvu, & Saucet (2001, pp.8) summarise the relationship between HIV/AIDS and poverty as follows.

Adeyi et al. (2001, pp. 8) simplify the relationship between HIV/AIDS and poverty by two issues. The first one is AIDS worsens the poverty and the other one is the combination between poverty and inequality.

According to Adeyi et al. (2001, pp. 43), in the early stage of HIV infection, socio-economic status, in most case, have a significant and positive correlation with HIV/AIDS. It means that HIV/AIDS tends to infect more people with higher socio-economic degree. This argument is supported by several researches, for example Ainsworth and Semali (1998, cited in Adeyi et al., 2001, pp. 43) find HIV infection relates positively with education, income, and occupation. Adeyi et al. (2001, pp. 8) simplify the relationship between HIV/AIDS and poverty by two issues. The first one is AIDS worsens the poverty and the other one is the combination between poverty and inequality.

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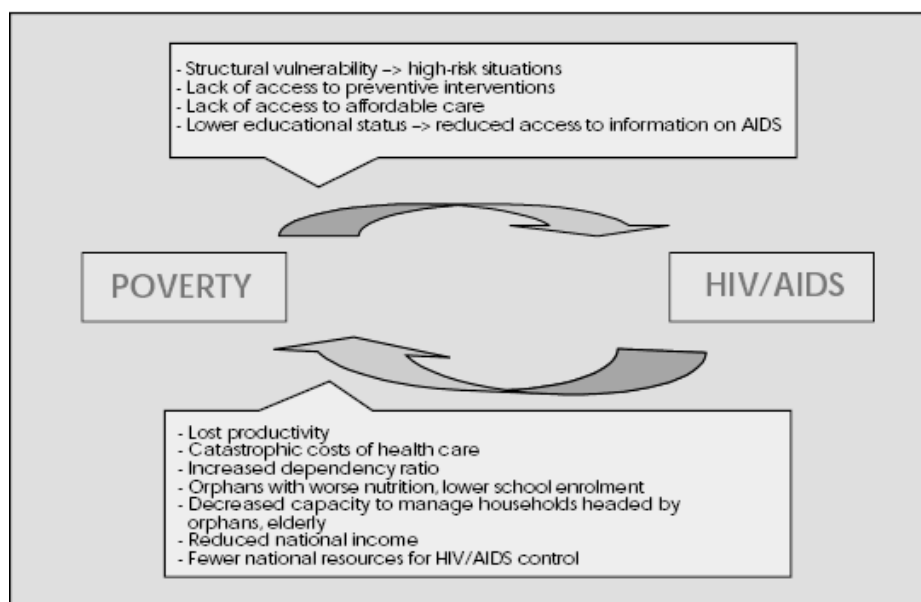


Figure 4. The relation between HIV/AIDS and poverty: A simplified view
Source: Adeyi et al. (2001, pp. 8)

The recent study by Lachaud (2007) also suggests a positive correlation between HIV prevalence and living standard, both in micro level (individual) and macro level (provincial of households). He examines the factors of HIV prevalence in Burkina Faso. What he found are, *first*, it is a dangerous assumption to say that the spread of HIV is a consequence of underdevelopment, because micro-econometric estimates positive relationship between HIV among adult men and women and individual living standards. *Second*, he says that the association between HIV and poverty is in question. The study suggests that there is a positive (negative) association between HIV and households living standards (poverty) (Lachaud, 2007).

Fortson (2007) examines the relationship between HIV prevalence and socioeconomic status in Burkina Faso, Cameroon, Ghana, Kenya, and Tanzania. She suggests that there is a positive correlation between HIV prevalence and educational level (year of schooling), except for Burkina Faso (not significant), this is because very few of Burkinabe have formal educations. However, the correlation between HIV prevalence and wealth (measured by ownership of radio, refrigerator, television, bicycle, motorcycle, car, telephone, electricity, and flush toilet) is not clear (the correlation is not linear; only positive and significant in Ghana and Tanzania). She says it is because the data on wealth is very sensitive to the measurement of wealth (Fortson, 2007, pp. 14). She, thus, concludes that education can be used as a better reflection of socio-economic status.

Why many cases find that the infections are related positively with high socio-economic status? Filmer (1998) and Deheneffe et al. (1998) (cited in Adeyi et al., 2001, pp. 43) state that the probability of doing non-regular sex relationships, for example with commercial sexual workers, rises as income or level of education increases. This, therefore, increases the probability to be infected to sexual transmitted diseases (STD's), including AIDS (Adeyi et al., 2001, pp. 43). Fortson (2007) also

suggests that respondents with higher educational level are more likely to have pre-marital sexual relationships than respondents with lower year of schooling (pp.13). Lachaud (2007, pp. 494) also suggests that, for Burkina Faso, the process of development, especially at the western border area that is close to Cote d'Ivoire, may contribute to the increase of standard of living, and, unfortunately, at the same time, increase the number of HIV infections.

In contrast, there are some studies indicate that HIV linked positively with poverty. Lacey et al. (1997, cited in Adeyi et al., 2001, pp. 43) find that cases of STD's are higher among the poor and less educated. Results from developed countries also support this argument, especially in HIV cases (Cowan et al., 1994, Krueger et al., 1990, McCoy et al., 1996; cited in Adeyi et al., 2001, pp. 43). Bloom, River Path Associates, & Sevilla (2002) who focus their research in Asian countries, suggest that the characteristic of Asian epidemic is different from Africa. In Asia, the poor tend to have higher risk to HIV/AIDS. This is because AIDS has hit Asia after Africa, so that the wealthier people in Asia are more aware to the epidemic than the poor (Bloom et al., 2001). AIDS has hit Africa before people know the dangers and the means of transmissions, this is why the correlation between HIV and poverty more often to be negative in Africa (Bloom et al., 2001).

Others suggest that the pattern of infection is changing now. In later stage, the pattern moves from the higher socio-economic status to the lower one. UNAIDS (2000; cited in Adeyi et al., 2001, pp. 43) find that the tendency of the infection shifts from higher to lower educated groups. In Brazil, the number of more educated people that newly infected by HIV decreases over time (Parker, 1998; cited in Adeyi et al., 2001, pp. 43). The possible explanations are people with higher education become more aware and have more access to information about the infection.

This article will elaborate two issues about socio-economic status, namely, income per capita and education index. The model is as follows:

$$HIV_i = a + bY_i + cEduc_i + \varepsilon$$

Where, HIV_i is the percentage of HIV infection among adults and children in country i , Y_i is income per capita in country i , $Educ_i$ is the education index in country i . Those variables are chosen because they can represent social (education) and economic (income per capita) status.

The data of HIV prevalence are taken from "Annex 2: HIV and AIDS estimates and data, 2005 and 2003" which is available on UNAIDS website. The data of the education index can be found on "Human Development Report (HDR)" which is available on UNDP website. And finally, the data of income per capita are taken from IMF "World Economic Outlook Database (WEOD)" which can be found on IMF website. The income per capita data is based on purchasing power parity (PPP) in international dollar.

This article observes the sample of Sub-Saharan countries, where more than 60 percent of HIV cases are found. The cross-section regression used year 2005 as the time sample for HIV and income per capita, and 2004 data were used for the education index because at the time this paper was written that was the latest version of the index (the index was published once in two years).

Table 1 show that the percentages of HIV prevalence in Sub-Saharan countries are varied between 0.08 percent in Comoros to 19.5 percent in Zimbabwe. There are some countries which have low rate of HIV infection (below 1 percent) such as Comoros, Equatorial Guinea, Guinea, Madagascar, Mauritania, Mauritius, Niger, and Senegal. In contrast, other countries like Botswana, Lesotho, Namibia, South Africa, and Zimbabwe have HIV cases of more than 10 percent of their populations.

Table 1. HIV Prevalence, Purchasing Power Parity, and Education Index in Sub-Saharan Countries

Country	HIV (% of Population)	PPP	Educ. index	Country	HIV (% of Population)	PPP	Educ. index
Angola	2.076	2974	0.53	Lesotho	11.421	2132	0.77
Benin	1.176	1347	0.4	Madagascar	0.274	943	0.66
Botswana	17.045	15004	0.78	Malawi	7.308	645	0.64
Burkina Faso	1.144	1314	0.23	Mali	1.042	1229	0.24
Burundi	2.002	635	0.52	Mauritania	0.425	2225	0.49
Cameroon	2.858	2107	0.66	Mauritius	0.331	12225	0.81
Central African Rep.	6.091	1150	0.42	Mozambique	9.188	1381	0.47
Chad	1.992	1761	0.29	Namibia	11.324	7898	0.79
Comoros	0.082	1997	0.53	Niger	0.629	919	0.26
Congo	3.582	1355	0.72	Nigeria	1.983	1148	0.63
Cote d'Ivoire	4.121	1643	0.46	Rwanda	2.102	1349	0.61
Dem. Rep. Of Congo	1.738	798	0.54	Senegal	0.523	1919	0.39
Djibouti	2.060	2403	0.52	Sierra Leone	0.881	824	0.45
Equatorial Guinea	0.782	20525	0.77	South Africa	11.730	12062	0.8
Eritrea	1.273	976	0.5	Swaziland	19.538	5120	0.72
Gabon	4.292	7215	0.71	Togo	1.789	1520	0.54
Gambia	1.318	2038	0.42	Uganda	3.470	1550	0.67
Ghana	1.532	2605	0.54	United Rep. Of Tanzania	3.733	748	0.62
Guinea	0.916	2356	0.34	Zambia	9.487	1016	0.63
Guinea-Bissau	2.018	740	0.39	Zimbabwe	14.490	2494	0.77
Kenya	3.887	1257	0.69				

Source: IMF (2007), UNPD (2006), UNAIDS (2006)

The data of income per capita are based on purchasing power parity (PPP). PPP among Sub-Saharanans give mixed results. The highest is Equatorial Guinea that has 20.525 PPP (in international dollar) and the lowest is Malawi with 645 PPP.

The education index data are also varied, but in general, compare to other regions, Sub-Saharan countries have the lowest human development index, including the education index. For examples countries like Burkina Faso, Mali, and Niger only have around 0.2 index of education. The highest indexes are found in Mauritius and South Africa which have index which are greater than 0.8.

There are some countries which not only have high percentage of people living with HIV, but also high purchasing power and high education index, such as, Botswana and South Africa. On the other hand, other countries like Burkina Faso, Mali, and Niger have low cases on HIV, low PPP and low educational level.

This paper is not focusing on specific group of people, for example groups of age, gender, or how they get the infection. The data for HIV prevalence is based on the percentage of the total number of adults and children infected by the virus over the whole population.

Empirical Evidence

The cross section estimates the relationship between percentage in HIV prevalence and income per capita and the educational index in Sub Saharan countries.

Table 2. The Relationship Between HIV Prevalence and Income per Capita and the Education Index

Dependent Variable: HIV				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
a	9.124503	7.017947	1.300167	0.2016
Educ	-41.68215	28.01872	-1.487654	0.1453
PPP	-0.000215	0.000207	-1.036478	0.3067
Educ ²	56.33877	27.17024	2.073547	0.0451
R-squared	0.360157			

The regression indicates that there is no evidence to support that HIV is correlated with higher living standard, because the t-statistic is less than 2.021. However, the correlation between HIV prevalence and educational is not clear, the relation is not linear. It is indicated by the t-statistic of education is less than 2.021, but the t-statistic of education² is greater than 2.021. It means that the relationship is not linear.

To test that the classical assumptions hold, we did the test of heteroscedasticity, autocorrelation and functional form test (Ramsey's Reset test). The heteroscedasticity test can not reject the null hypothesis that there is a homocedasticity, because the probability of chi-square (Obs*R-squared) statistic is 0.056, which is higher than 0.05, it means we can reject that there is a heteroscedasticity.

The second test is autocorrelation test (Breusch-Godfrey Serial Correlation LM Test). The probability of LM statistic is 0.067, which is higher than 0.05, so we cannot reject the null hypothesis that there is no autocorrelation. The Durbin-Watson statistic, which is 2.02, also suggests that there is no autocorrelation problem in the model.

The last test is the functional form test (Ramsey's reset test). The null hypothesis suggests that the model is in a correct functional form. The probability of Log-likelihood ratio statistic is 0.26, which is greater than 0.05, so we do not reject the Ho. It means that the model is in a correct functional form.

Why income is not related to HIV prevalence? And why education seems to have an ambiguous relation? Fortson (2007, pp. 14) says that this could be because the value of the wealth is very sensitive to the method of the data collecting. She also suggests that the value of individual income can change overtime, however the degree of education is fixed (Fortson, 2007, pp. 15). Other possible explanation might be the case observed in this paper is too broad. We do not focus on the specific case, for example on HIV prevalence among adults or among children separately. It is obvious because little children do not go to school and they do not earn money. And finally, this can be because African countries now move to the later stage of the infection, like the case of Asian countries. As mention previously, the positive relationship between HIV prevalence and socio-economic status seems to be found in the early stage of the epidemic.

CONCLUSION

Several researches find that the relationship between HIV prevalence and socio-economic status (poverty) are positive (negative) in some African countries, although, the general view is that HIV relates positively with poverty. This is because most of the HIV cases are found in poor countries, especially in Sub-Saharan countries. However, the cases in Asian countries give different results.

This paper tries to find the relationship between HIV infections and socio-economic status by using income per capita (PPP) and the education index in Sub-Saharan countries. The results are, *first*, income does not relate to HIV, and *second*, education has a non linear relation to HIV. The explanation could be because; *first*, the data, especially PPP, cannot be a good representative of socio-economic status; *second*, the research is too broad, because it does not focus on the specific case; and *at last*, it could be because African countries now move to the later stage of the AIDS infection.

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