Transmission channels and impact of global financial crisis on Sub-Saharan Africa economies

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Abstract

Since the onset of financial crisis, different thoughts have been investigated to address the issues of crisis on African economies. This study reviews transmission channels through which the effects of crisis has spread over Sub-Saharan Africa economies. In this respect, descriptive and empirical analyses have been done to derive some outcomes and necessary policies to overcome the effects of crisis in short-run and long-run. As results, real and financial sectors have been hit by crisis with consequences such as a slump in sales, cancellation and postponements of orders and projects, and dismissal threatens which are worsen living conditions of households. Moreover, empirical analysis found real channels such as trade and foreign aid more sensitive into transmission effects of crisis in SSA economies. However, role of financial channels such as foreign direct investment into transmission effects of crisis is not negligible. Given global recession in western and emerging economies, foreign aid and FDI would shrink which might further delay growth process of the region. In light of empirical results, a drop by 10 percentage points of foreign aid, and FDI will lead to a decrease by 6 and 1.8 percentage points of growth respectively using Dynamic OLS. These results remain stable and consistent with Pooled mean group (PMG) and dynamic fixed effect (DFE) estimators. By contrast, results of the effects of remittances on growth are controversial which might create doubt on a drop of remittances owing to crisis. Policy response to tackle financial crisis should focus on development and reinforcement of African regional organizations and more financial assistance of international organization.

Keywords: financial crisis, economic growth, Sub-Saharan Africa, transmission channels.

JEL Classification: C33, F43, G01

1. Introduction

The ongoing financial crisis that hits world economy since 2008 in advanced economies as well as in developing economies raises up the debate on the economic prosperity and poverty state in Sub-Saharan Africa countries. Although some observers expected that Sub-Saharan region would not be affected by the global financial crisis, economic indicators like GDP growth rate do not confirm that fact. According

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to the IMF, the growth rate of Sub-Saharan Africa is expected to slow down from 6.8% in 2007 to 5.5% in 2008 and 5.1% in 2009. To highlight the effects of link between financial crisis and global economy in Sub-Saharan African economies, it seems important to address the origins and outcome of financial crisis which is transformed into global economy crisis. According to IMF again, global activity is projected to contract by 1.3% in 2009, while growth is projected to reemerge in 2010 by 1.9%.

The root of recent financial crisis comes from the huge transaction of financial assets which is characterized by numerous countries and great amount involved in actual financial transaction. As stressed by Palma and Blankenburg (2009), 11 countries had financial assets of more than 350% of gross domestic product in 2000 while 25 countries had deepened their financial markets to the same extent by 2007.

The weakness of financial system in Sub-Saharan African countries and marginal implication in financial assets, particularly with the use of complex financial instruments to finance mortgage loans, does not ensure that the region is safe to recent financial turmoil. The channel through which economic crisis affects Sub-Saharan economies, although that has been discussed by some authors will be analyzed in this paper with a particularity of empirical analysis of different channels on economic growth in the region. Some macroeconomic and financial indicators concerning Sub-Sahara African economies certainly has been affected by the recent economic and financial crisis, but the magnitude of that effect will be the great concern. This paper will also analyze such indicators in light of theoretical background of the crisis.

As stressed by IMF (Regional Economic Outlook, April 2009), trade finance in Sub-Saharan Africa region has become more expensive which severely affects global demand. Some countries like Nigeria and Ghana have seen their importers face cash shortage to finance their transactions. In Nigeria for example, importers are increasingly being asked by banks to pays in foreign exchange at the time when letters of credit are being opened, which pushes them to rely on more expensive funding in local currency. In Ghana, the situation is different. Importers prefer the use of pre-paid letters to finance their importations as foreign exchange shortages in the domestic market intensify. Such examples are the proof that the region could not be spared to the effects of crisis. More development on some descriptive statistics and eventual empirical analysis will give clear idea on the effects of crisis in the region.

The aim of this study is to address the issues of crisis in SSA economies in light of previous studies and some statistics. Precisely, the study seeks to investigate the transmission channels through which crisis spread over the African economies. The paper is organized as follow: section 2 reviews the background of crisis while section 3 examines different transmission channels of crisis in the region. Section 4 reviews empirical analysis of the role of selected channels on economic growth in the region and section 6 conclude.

2. Theoretical Background of Financial Crisis

Financial crises are recurring and very old phenomenon. These accidents will multiply at the rhythm of the evolution of industrial production. In other words the current financial crisis is not the first and will not be the last notwithstanding the combined efforts of regulators. Economists agree to recognize today that effective financial system is an essential factor that can foster economic growth. However, in the history of successive racings of finance, the shock wave born during summer 2007 signs the first crisis of the process of securitization.

Subprime assets, henceforth celebrates risky real estate were transformed into complex financial instruments such as CDS (Credit Default Swaps) and ABS (Assets Back Securitization) or MBS (Mortgage Back Securitization) by their initial underwriter, American banks, anxious to transfer their risk to the market and to save their own capital stocks. These assets recycled near other agents such as investment funds, banks, and brokers among others, dispersed between investors over the world. When

the non-payments multiplied on subprime market, the whole assets leaned on these mortgages loan were devalued and the crisis has spread out to the world financial system.

Not learning any lesson from real estate crisis of the years 1990 in United States, the banks, made "the heresy " to grant mortgage loans with fluctuating rates to households with even limited dubious resources, as noted by Catherine Lubochinsky (2008). However, the signs of reversal in real estate market already appeared since 2005, as noted by Robert Raymond (2008). Taking into account the fact that it is the ratio of own capital stocks which is imposed to them like a rule of good management, leading the banks to vote by plebiscite the model of securitization, explained Domenica Hoenn (2008).

The phenomenon of securitization always does not present the negative aspects it has advantage of better setting out again the risks by dispersing them.

We are not surprised that on September 15, 2008 in the United States and on October 09 in Europe, starts a great banking crisis which will end up by affecting the real activity. It will be propagated into world economy without forgetting African countries with fragile economies.

According to Kindelberger (2000) "the repetition of financial crisis is not surprising if it is considered that they are generally associated to the peaks of business cycles ". Financial crisis and economic crisis appear closely dependent.

Simple economic slowdown is often accompanied by a crisis of banking and financial system. Draining of credit (Crunch credit), slump in prices of financial assets, bankruptcies and restructuring of banking system move on and worsen the economic crisis. According to monetarists, only the crises followed by banking panics deserve this denomination.

Aglietta (2008) thinks that the concept of financial crisis is broader since it gathers all the financial accidents likely to extend to the global financial system and whole economy.

Theories of financial crises comprise heterodox aspects, closer to the Keynesian thought than that of the walrasians. Dealing with financial crises analysis supposes, indeed, not to regard them as epiphenomena or as negligible symptoms of business cycles.

According to Irving Fisher approach and his heirs, with orthodox contributions, the crisis testifies to the dysfunction of financial system and can contribute to cyclic fluctuations of the activity. The genesis of the financial crises follows a cumulative process, which can be stopped only by the intervention of the monetary authorities and organizations of banking and financial regulations. If it is easy to recognize the financial crises, but it is scarcely easy to define them and economic literature does not help much by multiplying the approaches. The definition proposed by Eichengreen and Portes (1987, p.10) is one of most precise: " financial crisis is a disturbance of the financial markets characterizes by the fall in prices of credits and by the insolvency of debtors and intermediaries which is diffused by ramification in the financial system, destroying the capacity of market to effectively affect the capital in the economy. Let us note that in an international financial crisis, perturbations cross the national borders, dislocating the capacity of international allowance of capital by market. This definition is supplemented by a vast research program which offers only partial contributions to date.

The crossing point of financial crises is the failures of banks or other financial intermediaries. In that case for many economists, financial crises are reduced only to banking crises. If this sight is narrow, it is however useful to try to establish a standard –scenario of the crises.

3. **Transmission channels of financial crisis on African economies**

The great challenge in Sub-Saharan Africa countries that has been growth sustainability and poverty reduction will be certainly affected in the actual context of financial crisis that has changed into global economy crisis. As the rest of world, African countries incur the effects of financial crisis. But, the channels through which these effects translate into global economy in Africa seem to be different to those of developed countries. The particularity of Sub-Saharan region which is the poorest in the world proves the difference of transmission channels of financial crisis between countries of the region and the rest of the world. Therefore, real channels and financial channels can be considered as the main channels through which global financial turmoil affects African economies.

3.1. Real channels

The important bailout in developed countries to sustain financial sector which is the support of real economy hasn't reduce the effects of crisis on African economies as expected. Real channels through which Sub-Saharan Africa economies are affected concern primary industry, secondary production, service industry, external sector (exports and imports) and foreign aid. In spite of marginal contribution of SSA countries financial system in international finance, any shock on this latter can affect global economy as well as African economy through some real channel. Thus, the effects of financial crisis on real economy are indirect.

3.1.1. Primary industry

Manifestly, Sub-Saharan Africa economies are affected by the crisis through declining of commodity prices that are the main exports products of the region. Recession in car industry and falling of rubber price has affected the exports of some African countries like Cameroon. Concerning the falling of cotton, cocoa, coffee, and wheat prices, situation is similar to that of rubber where the industry in developed countries specialized in the products including those commodities as inputs facing the effects of financial crisis have reduced their production which affects export revenues in African countries exporters of those commodities. As illustration, it has been noted by IMF that weak demand of diamond has heavy affected growth in Botswana. Likewise, the falling of copper price has reduced economic growth in Zambia. Moreover, fall in price have been severe for wheat and rubber. Wheat price has fallen by 36% in the first semester 2009 compared to the same period in 2008. Drop in rubber price has been more pronounced in the same period (46%). By contrast, fall in cocoa and coffee prices follows the same trend but with slight magnitude.

Given the fact that some of Sub-Saharan Africa countries are oil exporters, falling of oil price has effects on export revenues which affect tax yields and policy investment of government. Global recession in developed economies that has affected industrial production through the weak demand of oil has negatively affects oil price and the exports of oil exporters. Oil price has dropped by 40% in the first semester 2009 with respect to the second semester 2008 and much more compared to the first semester 2008 in average (52%).

Figure 1: Selected Commodity Price Indices (March 1, 2000=100)
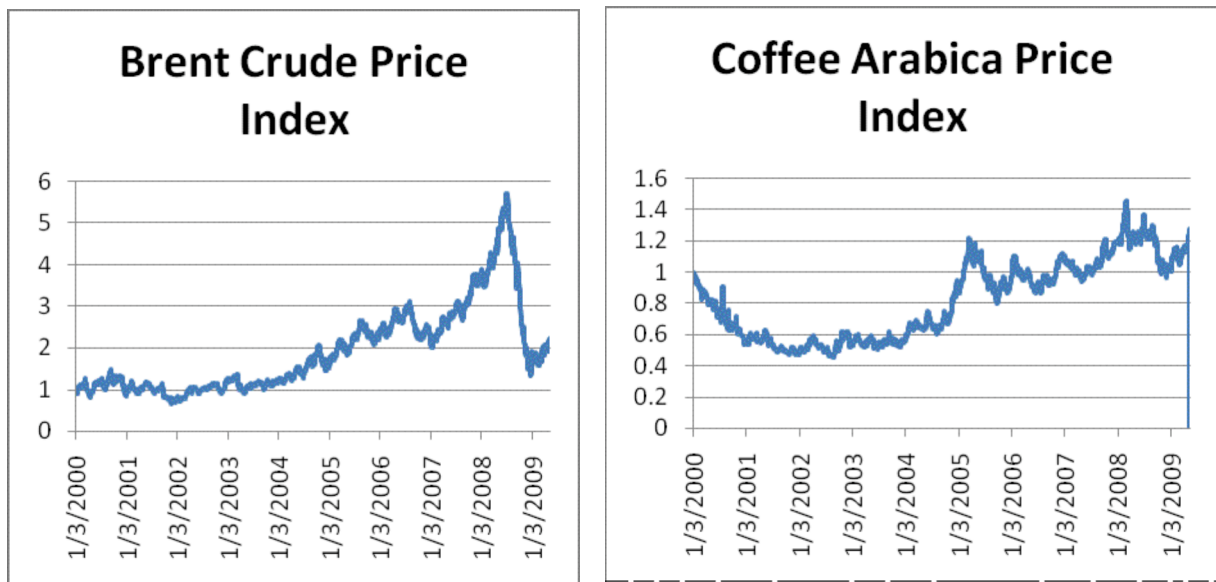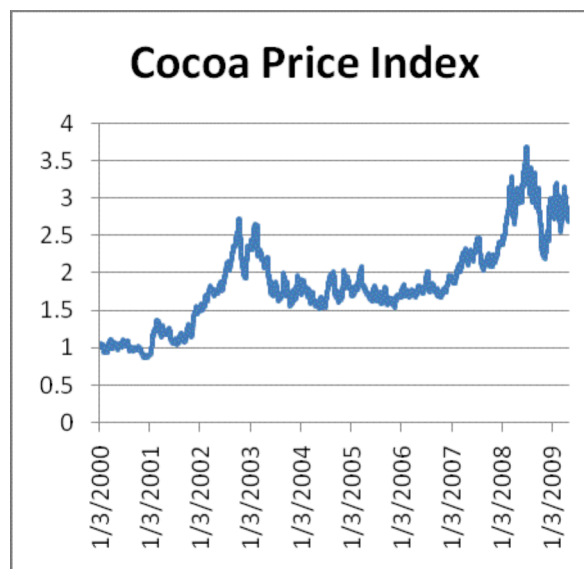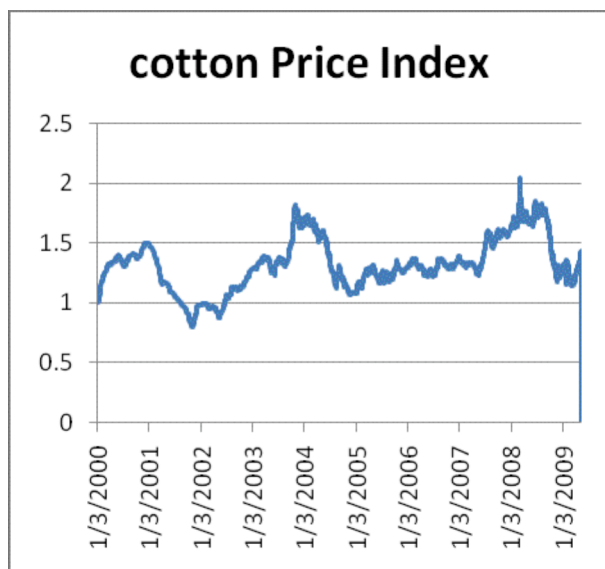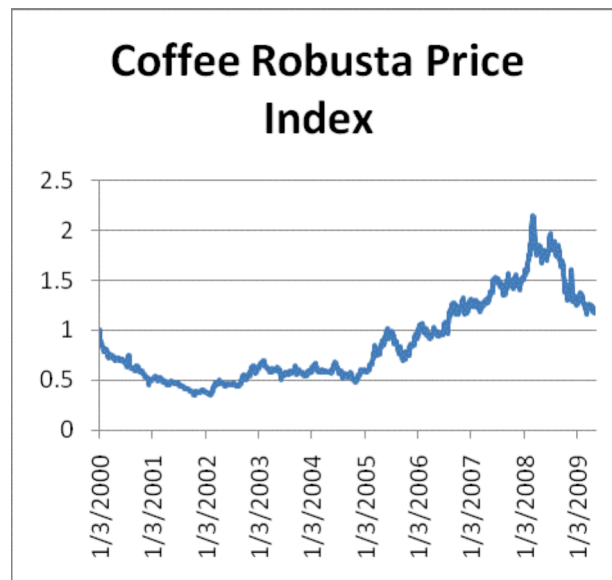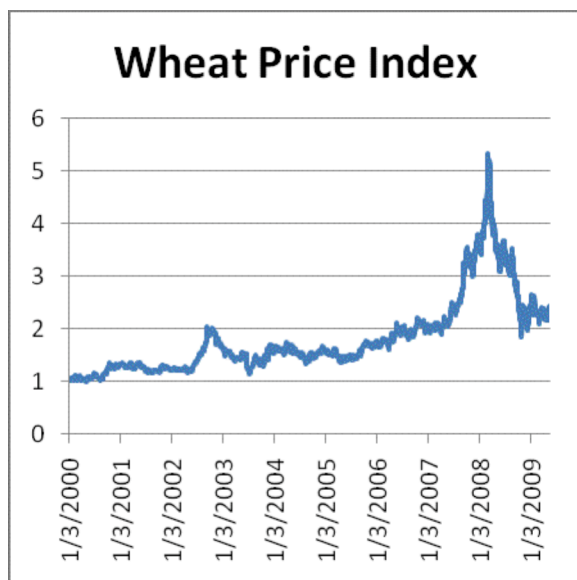
Source: Global Economic Monitor

3.1.2. Secondary production

Although manufacturing sector in Sub-Saharan Africa is weakly integrated to the international economy, the effects of financial crisis seem perceptible. As noticed by Sekkat and Vadourakis (2000), exchange rate management affects seriously export performance. While the weakness of Euro has contributed to the real depreciation of franc CFA, appreciation of US dollar has severely affected oil exporters' countries. One would expect an increasing of competiveness in CEMAC and WAEMU, but that was not the case because of poor capacity of production. At national level, global financial crisis has affected final consumption of household which is translated into manufacturing products by the decline of sales and production.

3.1.3. Service industry

Tourism is the most affected by global financial crisis in this sector. The global recession in western has contributed to reduce the spending of tourism which is expected to be important determinants of the

global slowdown of the economy, given the fact that tourism sectors account for the largest share of GDP in most African countries (Kenya, Tanzania, and Rwanda). It has been noticed by IMF that since 2008, tourism arrivals and revenues were down by 30% over the first 9 months compared to 2007. The situation will be deeper over the first semester of 2009.

According to AFDB/OECD African Economic Outlook, the tourism sector has grown steadily during the past years and has become the second source of export earnings just behind coffee and in front of tea in Rwanda. Thus, as the crisis spreads in the western countries, the tourism sector might start feeling the consequences of less people willing to spend their holidays abroad which affect the revenue of hotels and other tourism enterprises in some Africa countries with high touristic potential. As result of the crisis, Kenya has reported a 25-30% decline in tourist arrivals and Kenya Airways has reported a 62.7% drop in profit.

As global economic and financial turmoil spreads in developed world, people are less willing to spend holidays abroad which reduce revenue in tourism and transportation sectors as well as in all sectors related to tourism (hotels and restaurants). This situation is characterized by dismissal threats, and difficulties to realize investment schedule which will increase their need for financing.

3.1.4. Exports and imports

Before the global economic and financial turmoil, SSA countries benefited from increases in commodity prices albeit the fact that some suffered from it. Oil exporters' countries are the most to benefit from increases of oil demand by China and India which contributed to improve the term of trade of those countries as showed in graph below. However, the global financial crisis and lower global growth started to dampen demand for SSA's exports with consequents of slump in prices. According to the IMF's Regional Economic Outlook on Sub-Sahara Africa (April, 2009), SSA exports are projected to slow by 21% in 2009 and slightly growth by 3% in 2010, against a value of 5% in 2008. The effect will be more pronounced in oil exporters countries with a decrease of 31% in 2009. Accordingly, the term of trade is expected to slow sharply in 2009 mostly for oil exporters as showed in graph below. Concerning the imports of the region, there is none particularity about sharp decrease or increase. The imports of the region seem to be stable since 2003.
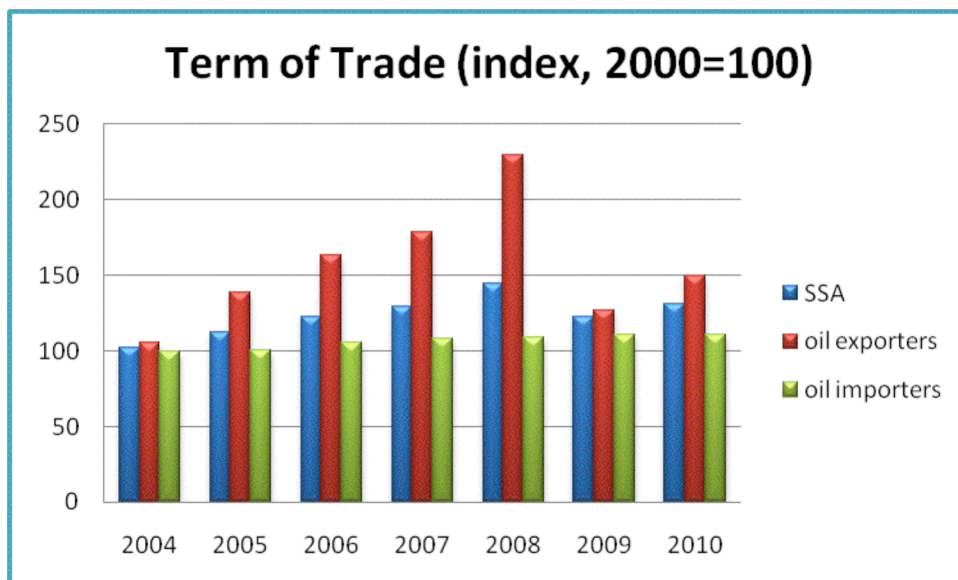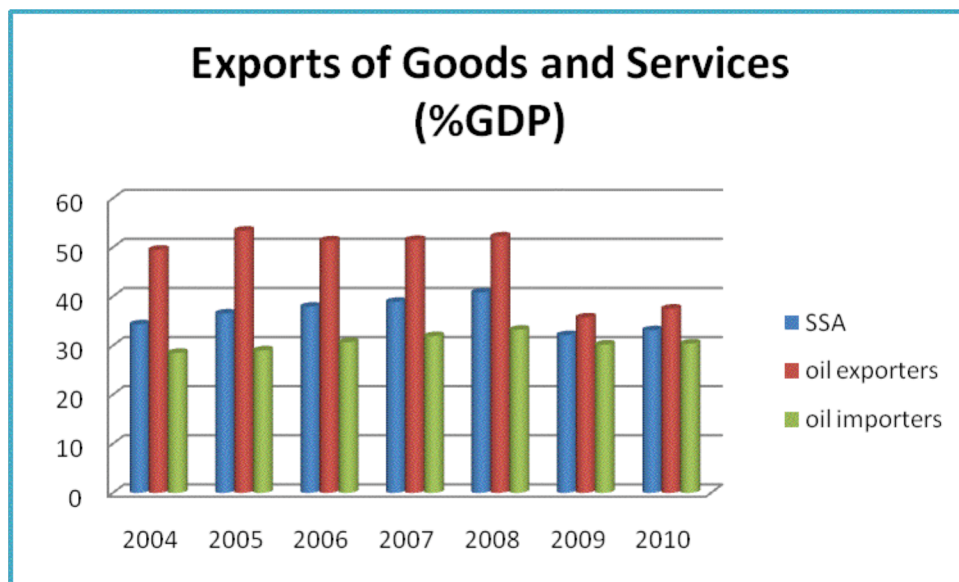
Source: IMF's Regional Economic Outlook on Sub-Saharan Africa, April 2009

3.1.5. Foreign Aid

Official aid alone cannot be sufficient for funding efforts to stimulate economic growth and alleviate poverty and other Millennium Development Goals (MDGs) in SSA countries (Ratha et al. 2009). Such conclusion is likely true in light to recent financial turmoil which will affect ability of donors to realize their promise. Official development assistance (ODA) to the region, excluding South Africa, increased from $ 11.7 billion in 2000 to $37.5 billion in 2006. For specific case of official aid, the amount to Sub-Saharan Africa rose from $12.2 billion in 2000 to $38.2 billion (or 37 percent of ODA to developing countries) in 2006. New donors and investors have increased (for example China and India) their presence in the region. In the context of global recession that hit potential donors and investors, one can expect a downward trend of foreign aid in the region.

Some of the countries that rely on aid will be seriously affected (for example Tanzania and Rwanda). Indeed, foreign aid made up 30% of Tanzania's budget and more than 50% of the Rwanda's national budget. Although it is very difficult to predict the effects of the financial crisis on aid, it is likely that the fall into recession of donor countries will lead to a reduction in aid flows to Sub-Saharan Africa and to the impossibility to honor the G8 commitment to double aid to Africa by 2010.

3.1.6. Public Finance

Public finances of SSA countries have been seriously affected since financial crisis has spread over the global economy. Indeed, western countries have adjusted fiscal policy by large stimulus package to sustain economy and the spread of crisis. This sustainability of global economy in the case of SSA countries seems somewhat different. Oil importers encounter less difficulty than oil exporters given that the latter has benefited from high oil price last year which lead them to increase their foreign reserves which is the support of stimulus package. After a positive fiscal balance since 2004, SSA countries will

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[4] 2009 and 2010 are expected and forecast value respectively.

face a deepest fiscal deficit in 2009 as projected by IMF. Indeed, the region has released a fiscal surplus of 1% and 2.1% of GDP respectively in 2007 and 2008. Fiscal balance has projected to shrink by 4.8% and 3.1% of GDP in 2009 and 2010 respectively. Oil exporters' countries will face a large fiscal deficit in 2009 (i.e. fiscal deficit over 7% of GDP) which will affect their ability to sustain global recession.
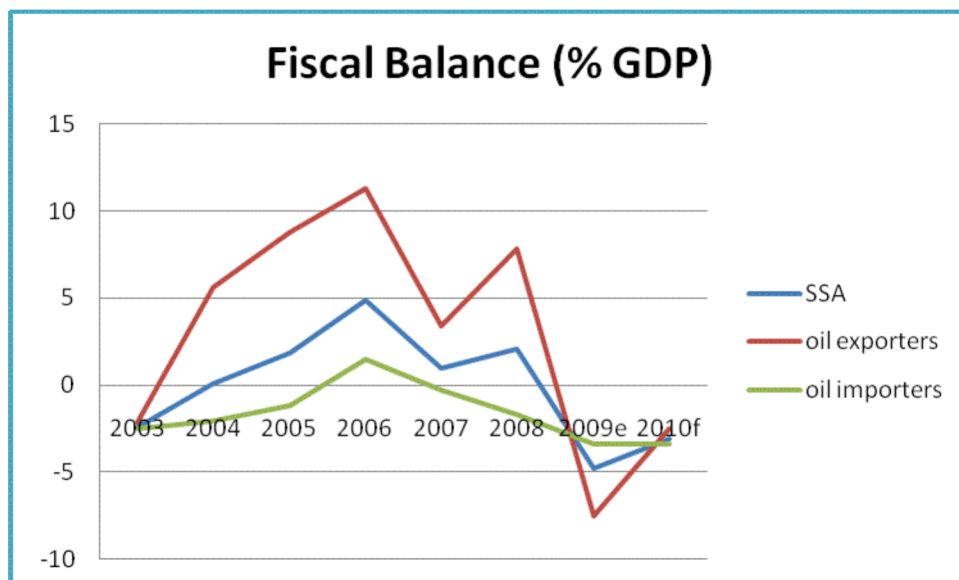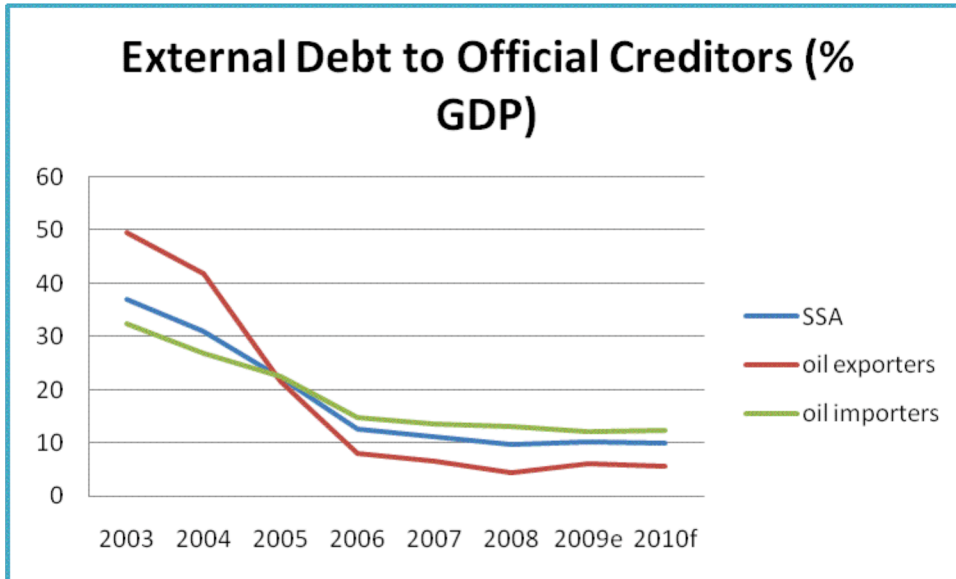

Source: IMF's Regional Economic Outlook on Sub-Saharan Africa, April 2009. Note: the amounts include grants, e=expected and f=forecast.

In 2008, the average price received by barrel of oil by exporting countries was of 90 US dollars which correspond to a rise of 80% comparatively to 2007. Oil exporters countries have had doubled their budget surplus (Republic of Congo and Chad). By contrast, the high level of food prices and fuels has seriously affected net oil importers countries which have reacted by various measures such as tax rate reduction, temporary tax exemptions and increases of subsidies and transfers. The costs of such measures have increased budget deficits of oil importers countries by 1.5% of GDP in 2008 which rise by 1.7%. According to IMF's forecast, the budget deficit of those countries will be large in 2009 less than that of oil exporters' countries as shown by graph () (3.4% of GDP comparatively to 4.8% for oil exporters' countries).

The progress about debt relief in SSA countries has considerably reduced external dependence of those economies and government spending related to debt services. Effects of financial crisis on fiscal budget can be sustained by the reserves obtained from debt relief. This sustainability of fiscal budget seems to be necessary in such context where western donors face great recession which will reduce their ability to honor their commitments vis-à-vis poverty alleviation in the region. Indeed, external debt to official creditors of the region is in upward trend as projected by IMF for 2009 and 2010, 10.1% and 10.0% of GDP respectively, comparatively to 2008. This situation stresses the hard measure to expand fiscal policy which will help to foster growth performance of the region, mostly for oil exporters' countries which will see their external debt dropped by 1.7 point of percent in 2009.

Sustainability of large fiscal deficit projected in the region will be more difficult than expected as regional external current account shows a deepest deficit in 2009. As projected by IMF, the regional external current account will drop by 7.5% of GDP in 2009 compared to 1.3% of GDP in 2008. Oil exporters' countries will be more affected with 8.4% deficit as a share of GDP compared to 8.0% surplus in 2008. These figures expose overall countries in the region, mostly oil exporters' countries, to enter global

recession without necessary reserves to correct their critical external exposure and foster economic growth.

External Debt to Official Creditors (% GDP)

Source: IMF's Regional Economic Outlook on Sub-Saharan Africa, April 2009. Note: e=expected and f=forecast.
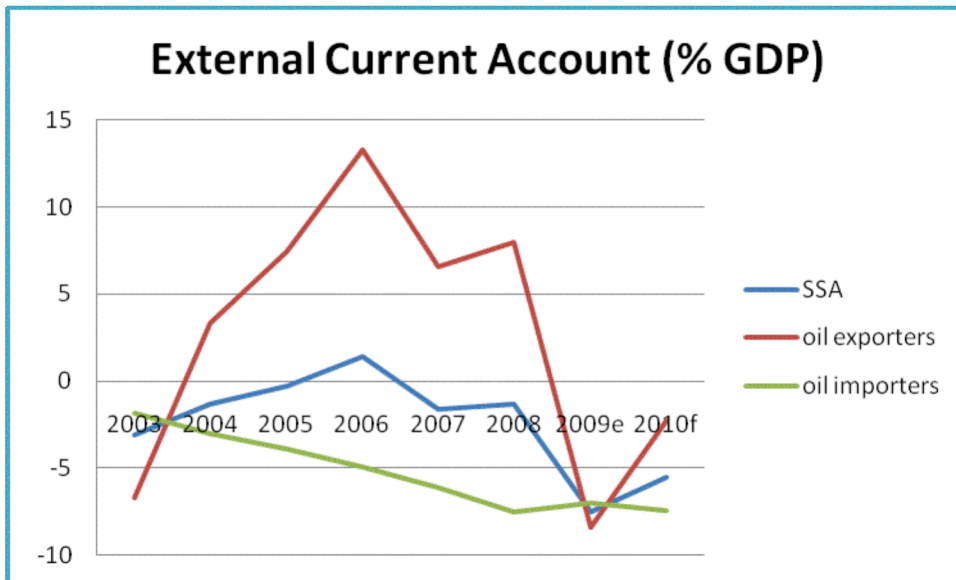
External Current Account (% GDP)

Source: IMF's Regional Economic Outlook on Sub-Saharan Africa, April 2009. Note: the amounts include grants, e=expected and f=forecast.

As detailed previously, global financial crisis has affected public finance despite uneven distribution across countries or between oil exporters and oil importers countries. It's clear that fiscal imbalance in the region will be difficult to correct and some resources needed by government to sustain fiscal deficit such as aid and capital inflows seem to be hard to collect due to the effects of global slowdown in western economies. However, oil exporters' countries will face a largest fiscal deficit in 2009 as forecasted by IMF which will considerably affect fiscal revenue. For example, some countries that had prepared

budgets based on prices averaging USD 70 or 68 such as Cameroon will be forced to scale down their investment plans if the downward price pressures persist, which will slump their economic growth outlook for the future.

Not only real sectors has been sacked by recent financial crisis but also financial sector which is a great contributor to the global financial slowdown in developed countries has been hit by global recession. The next section will deal with financial transmissions channels through which crisis have spread over global economy in Sub-Saharan Africa.

3.2. Financial channels

At the beginning of crisis, financial system of Sub-Saharan Africa countries seemed to be safe. This stability stem largely from several factors: weak integration to the global financial system, weak exposure to the complex financial instruments, high banking liquidity, weak dependency to the external financing and low getting into debt of financial institutions. As the crisis spreads into global economy, the effects on Sub-Saharan Africa financial system become more exposed through the contraction of credit, higher cost of credit due to difficult access of financing by financial institutions in the region, natural linkage between financial assets of banks and their parents overseas which could lead to increase risk of investors if parents are going to be bankrupt. In this section, we present different financial channels through which the ongoing financial crisis has spread over the global economy and financial system in Sub-Saharan Africa countries.

3.2.1. Stock markets

After more than two year of clearing during which financial markets of Sub-Saharan Africa experienced high return, they have been seriously hit by the collapse of financial institutions like Lehman Brothers. As noted by IMF in Regional Economic Outlook of April 2009, stock indices of South Africa, Botswana, Kenya, Namibia, Uganda and Zambia have dropped last year and only three markets (Ghana, Malawi, and Tanzania) have ended 2008 by positive return. Although it's clear that financial markets in SSA countries have been affected by the global financial crisis, the channels through which these effects spread over local financial markets of the region remain weak because of less exposure to foreign exchange markets, bond markets, securities markets and mortgage-loans institutions.

The impacts of financial crisis on SSA stock markets can be direct or indirect. The stock indices slump in western countries has spread over regional markets by increasing risk aversion of investors which lead to the drop of stock indices of the region and reduce its capital inflows. Indeed, as stock markets in the region have different speeds of development, most developed market such as South Africa is more affected than other.

3.2.2. Banking sector

Another channels or main channels through which global financial crisis have been spread into real economy might be come from banking sector. The bleak picture on credit markets with the loss of confidence of investors due to worse effects of mortgage assets which translate into banking sector by high credit risk is seeing in SSA banking sector. Given the weak structure of financial system in the region, one could expect the effects of financial crisis on SSA banking sector lesser which is not the case with the glance of portfolio distribution of banking system. The majority of banking assets are held by foreign banks as shown in the graph below. The headquarters of these foreign banks are mainly located in Europe, where banking system suffered from tremendous deterioration of sub-prime assets and profit during the crisis.

Share of Banking Assets Held by Foreign Banks (%)
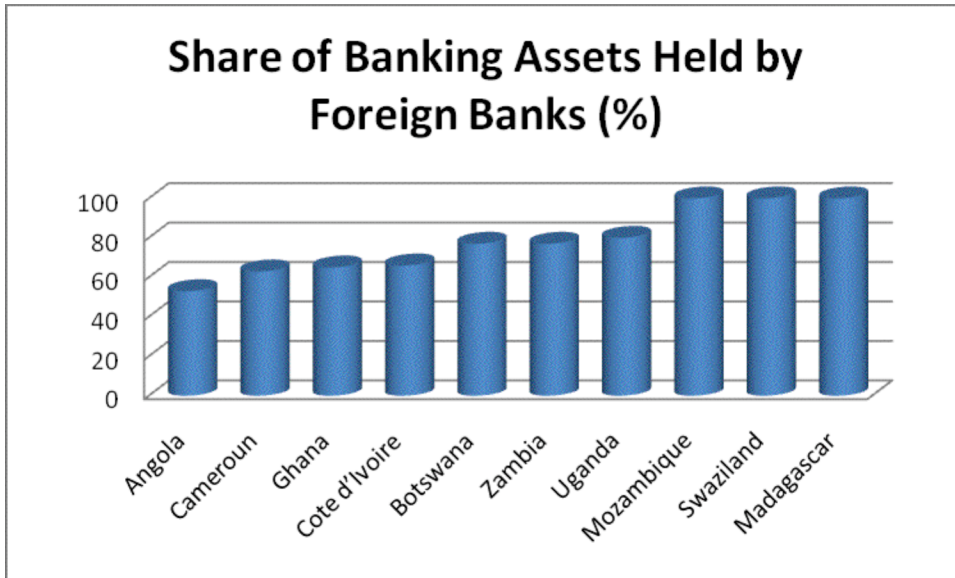
Source: Global Development Finance, World Bank 2008

As the global recession continue to spread over the whole economy in western economies, parent banks of SSA banking system could withdraw funds from subsidiaries and local banks which would considerably affect credit conditions and economic activity in the region.

Despite the weak link between financial system in SSA region and global financial system, evolution of external loans and deposits of the region follows that of world economy which is once again displays a sign of worse effects of global financial turmoil on banking system in the region. In this regard, economy of the region has been hit by financial crisis through the structure of banking system ownership which is held in majority by foreign banks.
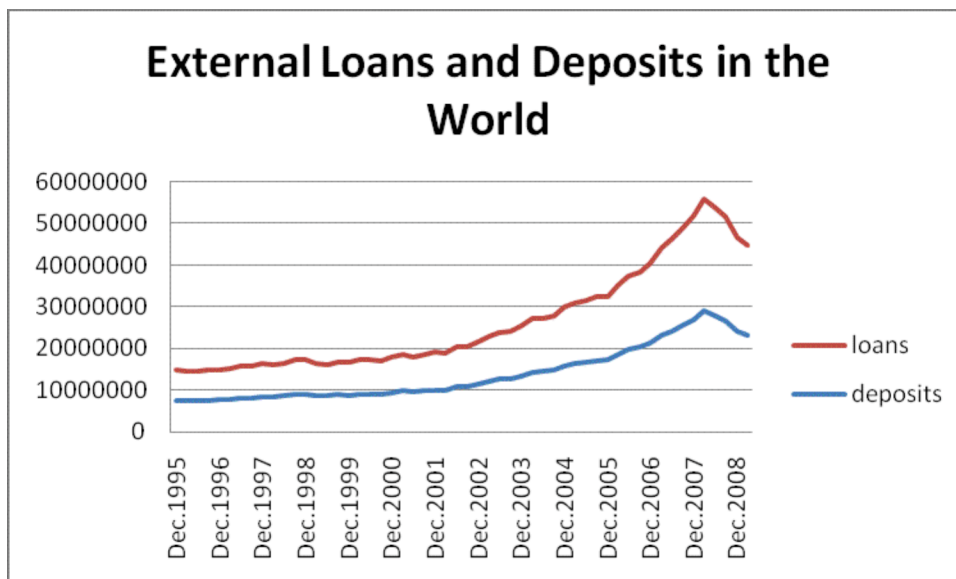
External Loans and Deposits in the World

Source: Bank of International Settlement (BIS)

External Loans and Deposits in Sub-Saharan Africa
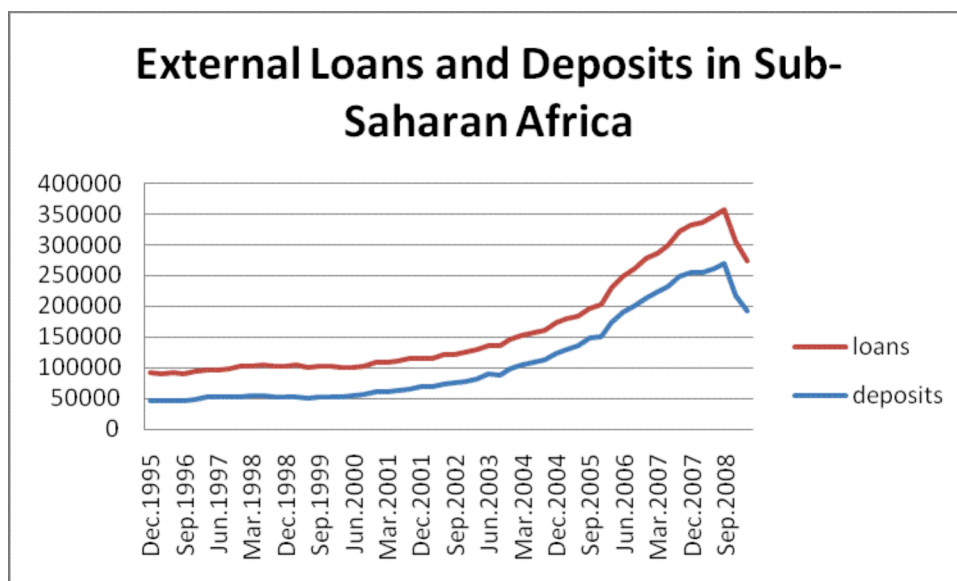
Source: Bank of International Settlement (BIS)

Furthermore, dark effects of financial crisis have been spread into global financial system of SSA region through three channels: slump in fund to feed banking activity, repatriation of capital, and inability to increase capital in order to meet regulation requirements. Indeed, parent banks could be less willing to inject liquidity in their subsidiaries which will enhance credit tightening. However, global slowdown in banking activity of western economies could lead parent banks to reduce their assistance to their subsidiaries which will considerably affect capital requirement as global balance sheet of banking system shrink.

3.2.3. Foreign direct investment

Foreign direct investment to SSA countries reached an estimated $ 17.1 billion in 2006, becoming the second largest source of external financing for the region. Although the amount received by SSA is tiny compared with the total FDI flows to developing countries, it is equivalent to 2.4 percent as a share of GDP, comparable to the share of foreign direct investment in the GDP of other developing regions (Ratha et al. 2009). In such case, ongoing recession of western donors or new donors like China and India will probably shrink FDI inflows in SSA countries.

3.2.4. Remittances

Workers' remittances grew these last years and amounted to $ 19 billion in 2007 in the region. Although its amount only represents 2.5 percent as a share of regional's GDP, workers' remittances slump will affect economic growth of the region as its importance nowadays in the region is comparable at foreign aid inflow. Given the fact that most of those funds are coming from western economies, recession in those economies will likely shrink amount of remittances which retract outlook growth of the region. Furthermore, it has been projected a drop by 4.4% of remittances in 2009 by World Bank which is consistent with empirical research on growth-remittances nexus. Using a panel of 36 Sub-Saharan countries, it has been found that a fall of a point of economic growth in the host countries would result in a fall of sending funds of 4% (IMF Regional Economic Outlook, April 2009).

According to IMF, some SSA countries could be more affected by reduction in funds sending than others. Indeed, in Comores and Lesotho, workers' remittances represent more than 20 percent of their GDP while it represent a little more of 5 percent in some countries in 2008. It's clear that global financial crisis which is characterized by global recession in western and emerging economies with its consequences on workers' revenue will affect workers' remittances in Sub-Saharan Africa countries.

4. Real channels, financial channels and economic growth in Sub-Saharan Africa

4.1. Data and methodology

We are now interested to evaluate which channels affect considerably economic growth in the region. To do this, we study the long-run relationship between some real channels (foreign aid, trade openness and government spending) and financial channels (foreign direct investment and workers' remittances) and economic growth using panel cointegration regression on pooled data from 36 selected economies across the SSA region over the period 1980-2007[5]. Before checking the robustness of estimation by using Pooled Mean Group (PMG) estimator and Dynamic Fixed Effects (DFE) proposed by Pesaran et al. (1999), the main model used in this study is Dynamic Ordinary Least Square (DOLS) suggested by Kao and Chiang (2000). In that case, the model estimated is the following:

$$GDP_{it} = \alpha_0 + \alpha_1 AID_{it} + \alpha_2 FDI_{it} + \alpha_3 OPEN_{it} + \alpha_4 REMIT_{it} + \alpha_5 GOV_{it} + \sum_{s=-p}^{p} \beta_s \Delta AID_{it-s}$$

$$+ \sum_{s=-p}^{p} \delta_s \Delta FDI_{it-s} + \sum_{s=-p}^{p} \gamma_s \Delta OPEN_{it-s} + \sum_{s=-p}^{p} \varphi_s \Delta REMIT_{it-s} + \sum_{s=-p}^{p} \mu_s \Delta GOV_{it-s}$$

$$+ \varepsilon_{it}$$

Where GDP_{it} represents GDP growth; AID is foreign aid; FDI is foreign direct investment; OPEN is trade openness measured as the sum between exports and imports, REMIT is workers' remittances, and government consumption (GOV). All variables are in percent of GDP and ε_{it} is error term. Equation above is extended version of DOLS with eventual lags and leads obtained by using information criterion.

As standard in time series analysis, cointegration tests are required to examine the long-run relationship between economic growth and five independent variables related to different channels which could serve as bridge to effects of financial crisis on SSA economies. Before cointegration tests, unit root tests will be computed to give an idea about stationary behavior of each variable into the model. A variety of unit root tests have been developed in econometric literature. In our case, we only used three unit root tests: Im et al. (2003), Hadri (2000), and Breitung (2000). It has been pointed out by Breitung (2000) that IPS test suffers from a dramatic loss of power if individual-specific trends are included in the model. To solve that problem, he suggests a test statistic that does not suffers from such problem. However, the two former tests (IPS and Breitung) are a generalization of ADF test from time series to panel data, while the latter is a generalization of KPSS test from times series to panel data (Baltagi, 2005). The results of different tests are given in the table 1.

Table1: panel unit root tests

	Hadri	IPS	Breitung

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[5] The countries in the sample are: Benin, Botswana, Burkina Faso, Burundi, Cameroon, Chad, Central African Republic, Comoros, Republic Democratic of Congo, Cote d'Ivoire, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Rwanda, Senegal, Sierra Leone, Sudan, Swaziland, Togo, Uganda, Zambia, and Zimbabwe.

	level	difference	level	difference	level	Difference
AID	8.05235	-0.89335*	-4.17327*	-29.8845*	-1.44351	-18.902*
FDI	10.8693	0.58791*	-6.19053*	-29.2837*	-3.53816*	-21.1973*
GDP	4.85584	0.09529*	-18.0449*	-34.9784*	-9.73546*	-12.0367*
OPEN	13.3364	-1.87791*	-4.0979*	-27.6267*	-4.65485*	-17.2837*
REMIT	14.9697	-2.18988*	2.74489	-27.1132*	-3.04241*	-19.368*
GOV	14.9556	0.38197*	-6.76521*	-25.0308*	-3.96491*	-13.0553*

*indicates significance level at 1%

IPS and Breitung tests have as null hypothesis a common unit root while Hadri's test considers no unit root as null hypothesis. As results, we found that IPS and Breitung tests reject the null hypothesis of a common unit root while Hadri's test rejects the null hypothesis of no unit root in level. Univariate tests do not confirm the results of IPS and Breitung tests in level which need more caution by interpreting panel unit root test results. Therefore, we can conclude that all variables are integrated in order one with univariate tests and Hadri's panel unit root test which lead us to check for long-run cointegration between the variables.

In common practice, we use Johansen's procedure to test for cointegration. However, the recent studies in the field of panel cointegration found that Johansen test in multivariate systems with small sample sizes can be severely distorted. It's more efficient to combine information from cross-section as well as from times series. There are a variety of panel cointegration tests which include Kao (1999), McCoskey and Kao (1998), Pedroni (1999) and Larsson et al. (2001), among others.

Given the presence of heterogeneity, we use cointegration test proposed by Pedroni (1999) which considers as the null hypothesis that of no cointegration. The good features of Pedroni's test are the fact that it allows for multiple regression, for the cointegration vector to vary across different sections of panel, and also for heterogeneity in the error across cross-sectional units (Asteriou and Hall, 2007). The results are given in the table 2 below.

Table2: panel cointegration tests

panel v-stat	-1.45437
panel rho-stat	-2.35442*
panel pp-stat	-14.5464*
panel adf-stat	-12.4347*
group rho-stat	-0.5622
group pp-stat	-17.5898*
group adf-stat	-13.6026*

Notes: Nsecs=36, Tperiods=28, no. regressors=5

With the exception of panel v-statistic, and group ρ-statistic, the other statistics reject the null hypothesis of no cointegration at 1% significance level. Although some of panel cointegration test indicate the presence of cointegration relationship and their number, Pedroni's cointegration test only indicate the presence of cointegration but not their number. In our case, we assumed only one cointegrating vector among the variables.

4.2. Results

Table 3 summarizes the results of DOLS as well as PMG and DFE, having showed that there exists a long-run relationship between economic growth and different channels such as foreign aid, foreign direct investment, remittances, government consumption and trade openness. For robustness purposes, we combined the results of PMG and DFE estimation suggested by Pesaran et al. (1999) which constraints the long-run coefficients to be identical, but allows the short-run and adjustment coefficients as the error variance to differ across the cross-sectional dimension (Baltagi, 2005). Furthermore, Kao and Chiang (2000) pointed out that DOLS estimator may be more promising than OLS or Fully Modified (FM) estimators in estimating the cointegrated panel regressions.

Table 3: results of long-run relationship

	AID	FDI	REMIT	GOV	OPEN
DOLS	0.593243**	0.188524**	4739.356	-0.9052*	-8.03222**
	(2.399537)	(2.36077)		(-2.83891)	(-.044747)
PMG	0.08042*	0.150133*	-0.10806	-0.14092*	2.959178*
	(3.51)	(3.92)	(-1.03)	(-3.92)	(2.59)
DFE	0.114959*	0.12277***	0.053404	-0.15798**	3.724923**
	(4.36)	(1.69)	(0.35)	(-2.13)	(2.32)

(*),(**),(***) indicate significance at the 1%, 5% and 10% level; T-statistics in parentheses.

All regressions include a constant not reported and DOLS was estimated using only one

lag and lead.

Results obtained with DOLS estimation show that all variables are statistically significant save remittances. As expected, Foreign aid is statistically significant and positive which means that Sub-Saharan Africa growth could be severely affected with a drop of foreign aid owing to ongoing financial crisis. This result confirms that of previous studies (Asteriou, 2009; Burnside and Dollar, 1997; Karras, 2006). Good use of foreign aid appears to be a necessary but not the sufficient to foster growth in the region. Indeed, foreign aid act as a supplement of capital which is scarce in the region, allow creativity in private enterprise through technological transfers which improve managerial skills of workers and creates easy access to modern technology and new production process. In the context of financial crisis, one could expect a drop by 6 percentage points of growth if foreign aid shrinks by 10 percentage points. The effects are somewhat little for PMG and DFE. A decrease by 10 percentage points of foreign aid will lead to a drop by 0.8 and 1.14 percentage points of economic growth in the region using PMG and DFE respectively.

As similar to foreign aid, foreign direct investment remains statistically significant in the regression. In other words, foreign direct investment positively affects growth in the region. This result confirm that of previous studies (Khawar, 2005; Roy and Berg, 2006; Bhandari et al., 2007). Foreign direct investment plays an important role to economic performance of recipient countries. As foreign aid, foreign direct investment is conditional to a set of adequate policies such good governance in host countries. Indeed, FDI provides additional resources that can be used to build additional physical capital and create more employment; it increases the size of capital stock and encourages more efficient use of existing resources (Massa and Macias, 2009). In the actual context of financial crisis, a drop by 10 percentage points of FDI could lead to shrink economic growth by 1.8 percentage point using DOLS estimator, 1.5 and 1.2 percentage point using PMG and DFE respectively.

In contrast with positive effects of FDI and foreign aid on economic growth in SSA region, the effects of remittances are mixed and not statistically significant using a set of 36 countries in our sample. Restraining our sample to 18 countries, we found that remittances are statistically significant with negative sign which means that it cannot foster growth in the region. This result seems hard to understand but easy to explain. Indeed, most of remittances are not directed to productive sector but rather for consumption purposes which concern essentially imported goods. In that case, one could not be worried a lot about the drop of remittances owing to financial crisis. However, the negative impact of remittances on growth has been obtained with PMG estimator but the results are not reported. For example, a drop by 10 percentage points of remittances will lead to a decrease by 3 percentage points of growth in the region narrowed to 18 countries that effectively receive remittances[6].

Using stimulus package in SSA countries is harmful than in western economies not only given the stock of capital but also the poor quality of government expenditure in the region. This conclusion has been derived from table 3. Indeed, government consumption has negative impact on economic growth in the region. Increase government consumption in the region by 10 percentage points lead to a decrease by 9 percentage points of growth using DOLS and 1.4 percentage points for PMG and DFE. Theoretically, it has been noted that an increase of government expenditure should lead to contract private investment which is known as "eviction effect". In the context of financial crisis, a drop of government consumption will not hamper growth as expected.

Moreover, another traditional growth variable such as trade openness is statistically significant with positive sign. In other words, SSA countries could not be spared from external shocks such as ongoing financial crisis. As stressed previously, weak demand in western and emerging economies should lead to shrink SSA's trade.

Given the fact that the aim of this study was to detect which channels seem plausible to translate the effects of financial crisis on SSA economies, we seek now to evaluate the impacts of each channel on economic growth. Having split the channels in two categories, we can now assert that shocks on real channels affect considerably growth in the region. However, a drop of aid could delay economic development process of the region through investment slowdown in short-run and decrease in technological transfers in long-run. Furthermore, a weak external demand owing to global recession could affect trade openness of the region which is leaning on raw material with highly volatile prices.

Concerning financial channels which are foreign direct investment and remittances, results derived from panel regression show that their effects on growth are not negligible, even though their magnitude is less than that of real channels. In sum, a drop of FDI could shrink economic development process through scarcity of capital necessary for long-run investment. In return, a drop of remittances could not seriously affect growth process of the region. Indeed, most of remittances inflow to the region is usually affected to household final consumption which is directed to imported goods. In that sense, one should not be worried about a drop of remittance due to global recession in the context of financial crisis.

5. **Conclusion**

Sub-Saharan Africa countries are now involved in a crisis of which they have not been at the origin. As expected by numerous observers that African countries could not be affected since the outbreak of financial crisis due to weak participation of their financial system into complex financial instruments, it seems important to mention that such expectation would not be sustained in comparison with many studies and conferences on the impacts of financial crisis in the region. Results derived from these reflections state clearly how Sub-Saharan Africa economies have been affected by the crisis. In light of

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[6] These countries are Benin, Burkina Faso, Cameroon, Chad, Comoros, Ghana, Gabon, Guinea, Guinea-Bissau, Madagascar, Mali, Mauritania, Namibia, Niger, Rwanda, Senegal, Sudan, and Togo.

previous studies and specific research on the effects of different channels found on economic growth of the region, this study seeks to analyze the channels through which crisis have been spread over the region.

Globally, financial crisis has spread over the region through real and financial channels. Concerning real channels, trade is the most affected with its consequences on external balance and employment not only for oil exporters' countries but also for oil importers' countries. However, global imbalance will be critical for oil exporters' countries which face slump in oil price and others raw materials prices. As projected by IMF, Sub-Saharan African exports will slow by 21% in 2009 and will slightly growth by 3% in 2010. External debt payment and others investment plans will be delayed as the main source of financing shrink. Fiscal imbalance will continue to grow as export revenues show a downward trend. Alternative financing source which is foreign aid is expected to fall as potential donors face a great recession.

Coming from financial system, the ongoing crisis has spread over SSA economies through financial channels. One would expect SSA's banking system and financial markets spared from this turmoil which is not the case in light of some statistics. Although the link between financial system of the region and international financial system is weak, the effects of crisis on banking sector or financial markets in the region cannot be direct but indirect. Given the weak involvement of SSA's banking system on unsound assets of mortgage loans which are released the crisis, banking system of the region should not be affected directly but indirectly because most of the western banks involved in unsound assets are parent banks of several banks in the region. The way how bankruptcy of parent banks could affect its subsidiary is quite simple. Facing liquidity shortness, parent banks could withdraw funds or squeeze financing of its subsidiaries which will contract credit undermining ongoing projects and others investment plans. Concerning capital inflows in the region, foreign direct investment and remittances will be seriously affected by the crisis. Empirical analysis has been done to quantify the effects of selected channels on growth in the region and the results will be summarized in the next paragraph.

Combined effects of financial crisis through real and financial channels on African economies would affect economic growth process gained over the past decade. The most important aspects could be Millennium Development Goals and poverty. Proportion of people living in extreme poverty will rise due to crisis in 2009 and unemployment will continue to rise as well. Social impacts of crisis seems more severe in the region than elsewhere as aid inflows shrink owing to global recession facing by potential donors. Fall in remittances will lead to a certain extent reduce household revenue and worse living conditions of people rely on such funds.

Empirical example on the link between selected channels and economic growth in the region shows that real channels conduct mainly the effects of financial crisis on Sub-Saharan Africa countries compared to financial channels. Fall by 10 percentage points of foreign aid lead to a drop by 6 percentage points of growth in the region using DOLS. These results remain consistent with PMG and DFE methods. Moreover, traditional growth determinants such as trade openness and government consumption are statistically significant. Furthermore, financial channels such as FDI and remittances affect growth positively and negatively respectively. Consistent policies should be established in light of results derived from empirical example.

Policy response of financial crisis concerns African governments, regional and international organization as well. African governments should develop local transformation of their products such as timber, cocoa and rubber. In other words, manufacturing sector should be at the top of priority by dialogue between private sector and governments in order to harmonize and define development policy of sector. These policies should be held in long-run to response eventual shocks in the future. In the short-run, government should control any social action such as dismissal threatens and slump in sales. In that case subvention policy should be coordinated in order to avoid funds inadvertence to sustain enterprises during the crisis. Moreover, foreign aid and foreign direct investment should be directed to sustainable investments for

manufacturing sector in long term. Concerning banks in distress due to crisis, central banks should intervene with support of governments. Given resource endowments and size of different countries, policy responses to crisis should be fruitful at regional level.

Particularity of Sub-Saharan Africa countries in term of natural resources endowment call for great integration of the region. Coordinated trade at regional level would lead countries to face future financial outbreak.   Indeed, promote trade between countries will save region to eventual external shocks. Furthermore, trade between oil importers and oil exporters in the region will help both parts to solve specific problem they face such as slump or rise in oil price, dependency on one product which would create "Dutch disease". Creation of regional organization like World Trade Organization (WTO) which would define trade policy in the region could be a solution. Creation project of three financial organizations such African Central Bank, African Investment Bank and African Monetary Fund in Africa which will come to supplement considerable assistance of African development Bank could help region to tackle future challenge.

Without being unaware of the role of international organization such as World Bank and International Monetary Fund, policy should be to continue to increase financial assistance in the region. Given all these policies, African governments at regional level are the main actors to meet the challenge of ongoing financial crisis and any future shock on their economies.

6. References

African Development Bank (2009). "Africa and the Global Economic Crisis: Strategies for Preserving the Foundations of Long-term Growth". The 2009 Annual Meetings of the African Development Bank, Dakar, Senegal.

Africa Partnership Forum (2009). "The crisis and Africa: Monitoring the Global Policy Response". *12th Meeting of the Africa Partnership Forum*, Rome, Italy.

Aglietta, M. (2008). "Macroéconomie financière". Pp. 133-165

Arieff, A., Weiss, M., A., and Jones, V., C. (2009). "The Global Economic Crisis: Impact on Sub-Saharan Africa and Global Policy Responses". Congressional Research Service.

Asteriou, D., (2009). "Foreign aid and economic growth: new evidence from a panel data approach for five South Asian countries". *Journal of policy modeling*, vol. 31, pp. 155-161.

Asteriou, D. and Hall, S. (2007). "Applied Econometrics: a modern approach". Palgrave Macmillan, New York.

Balchin N. (2009). "The Impact of the Global Financial crisis in Africa". Africa Growth Agenda*, University of Cape Town*, South Africa.

Baltagi, B.H. (2005). "Econometric analysis of panel data". John Wiley and sons, New York.

Bhandari, R., Dhakal D., Pradhan G., Upadhyaya K. (2007). "Foreign aid, FDI and economic growth in East European countries". *Economics Bulletin*, vol. 6, no 13 pp. 1-9.

Burnside, C., &Dollar, D. (1997). "Aid, policies, and growth". *Policy research Working Paper 1777*. Washington, DC: World Bank.

Crotty J. (2009). "Structural causes of the global financial crisis: a critical assessment of the new financial architecture". *Cambridge Journal of Economics*, vol. 33, 563-580.

 Economic Commission for Africa and Africa Union (2009). "The global financial crisis: impact, responses and way forward". The Committee of Experts, Cairo, Egypt.

Eichengreen, B. and Portes, R. (1987). "The anatomy of financial crises". Working Paper Nº 2126, NBER.

Frenkel, R. and Rapetti, M. (2009). "A developing country view of the current global crisis: what should not be forgotten and what should be done". *Cambridge Journal of Economics*, vol. 33, 685-702.

Gore, C. (2009). "The impact of the Global Financial Crisis on Africa and LDCs". *UNCTAD*, Geneva.

Hoenn, D., Lubochinsky, C. and Raymond, R. (2008). "Conférence organisé par la maison de l'Europe". Mars 2008.

Holmqvist, G. (2009). "Impact of the financial crisis on Africa, the unpredictable flows: remittances and aid", Nordic Africa Institute.

IMF (2009). "Impact of the Global Financial crisis on Sub-Saharan Africa". *African Department*, Washington.

IMF (2009a). "Crisis and Recovery". World Economic Outlook, Washington.

IMF (2009b), "World Economic Outlook". Washington.

IMF (2009). "Global Financial Stability Report: Responding to the Financial Crisis and Measuring Systemic Risks". *World Economic and Financial Surveys*, Washington.

IMF (2009). " Regional Economic Outlook: Sub-Saharan Africa". Washington D.C.

Kao, C. (1999). " Spurious regression and residual-based tests for cointegration in panel data, *Journal of Econometric*, vol. 90, 1-44

Kao, C. and Chiang, M.H. (2000). "On the estimation and inference of a cointegrated regression in panel data, *Advances in Econometrics*, 15, 179-222

Karras, G. (2006). "Foreign aid and long-run economic growth: empirical evidence for a panel of developing countries". *Journal of International Development*, vol. 18, pp. 15-28.

Kasekende, L., Ndikumana, L., Rajhi, T. (2009). "Impact of the Global Financial and Economic Crisis on Africa". Working Papers Series Nº 96, *African Development Bank*, Tunis, Tunisia. 36 pp.

Khawar, M. (2005). Foreign direct investment and economic growth: a cross-country analysis. *Global Economy Journal*, 5(1): 1-13

Ketkar, S. and Ratha, D (2009). "Innovative Financing for Development". *World Bank*, Washington D.C.

Kregel, J. (2009). "Why don't the bailouts work? Design of a new financial system versus a return to normalcy". *Cambridge Journal of Economics*, vol. 33, 653-663.

Larsson, R., Lyhagen, J. and Lothgren, M. (2001). "Likelihood-based cointegration tests in heterogeneous panels, Econometrics Journal, vol. 4, 109-142.

Lawson, T. (2009). "The current economic crisis: its nature and the course of academic economics". *Cambridge Journal of Economics*, vol.33, 759-777.

Macias, B., J., and Massa, I. (2009). "The global financial crisis and Sub-Saharan Africa: the effects of slowing private capital inflows on growth". Working Paper 304, *Overseas Development Institute (ODI)*, London.

Massa, I., and Velde, W., D. (2009). "The global financial crisis: will successful African countries be affected?". Background note, *Overseas International Development (ODI)*, London.

McCarthy, C. (2009)."The global financial and economic crisis and its impact on Sub-Saharan economies". *tralac* Trade Brief 1.

McCoskey, S. and Kao, C. (1998). " A residual-based test of the null of cointegration in panel data, *Econometric reviews*, vol. 17, 57-84.

Othieno T. (2009). "The Global financial crisis: risks for fragile states in Africa". Opinion, *Overseas Development Institute (ODI)*, London.

Palma, G., J., and Blankenburg, S. (2009). "Introduction: the global financial crisis". *Cambridge Journal of Economics*, vol. 33, 531-538.

Pedroni, P. (1999). "critical values for cointegration tests in heterogeneous panels with multiple regressors, Oxford *Bulletin of Economics and Statistics*, vol. 61, 653-678.

Pesaran, M.H., Shin, Y., & Smith, R.P. (1999). "Pooled mean group estimation of dynamic heterogeneous panels". *Journal of American Statistical Association*, vol. 94, pp. 621-634.

Revenga, A. (2009). "Financial Crisis and the Developing countries". *World Bank*, Washington.

Roy, G.A., Berg, H.V. (2006). "Foreign direct investment and economic growth: a time-series approach". *Global Economy Journal*, 6(1): 1-19.

Sanford, J., and Weiss, M., A. (2009). "The Global Financial Crisis: Increasing IMF Resources and the Role of Congress". Congressional Research Service.

Townsend, I. (2009). "Global economic crisis and developing countries". Economic Policy and Statistics Section.