Resilience capacity of South countries with respect to the global economic crisis: an empirical comparative analysis of Sub-Saharan African and Latin American countries

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Abstract

This paper deals with the problem of vulnerability of developing countries and their resilience capacity with respect to external shocks. The analysis particularly considers the countries of Latin America and Sub-Saharan Africa. Although the transmission risks of the 2007 financial crisis were initially underestimated for Southern countries, it ended up reaching all continents. Aiming at understanding the crisis propagation the paper carries out a comparative analysis between these two groups of countries. The objective is to test the resilience of Latin America and Sub-Saharan Africa countries with respect to the effects of the economic crisis. It accounts for the differences between countries' behavior with respect to external shocks. Using dynamic panel techniques the paper estimates the growth dynamics for these countries. The estimates results are shown to be relevant and indicate that some groups of countries are more resistant to crisis effects than others.

Key word: Economic and financial crisis, economic growth, resilience, developed countries, developing countries.

JEL: F, G, O

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1. **Introduction**

The financial crisis of 2007-2009 has proved its capacity of propagation throughout the world. The real and financial markets interconnections have contributed to the propagation of the crisis. At the outset of the crisis the capacities of propagation from developed to developing countries were underestimated (Pisani-Ferry and Santos, 2009). The propagation of the crisis to the Southern countries was underestimated because of the low level of development of their financial system. However, recent developments have shown that this crisis has had a highly significant impact on developing countries even more serious than on developed countries (Te Velde et al., 2010; Ocampo, 2011; ECLAC, 2011). According to IMF (2009), the crisis effects in terms of economic deceleration were more important for developing countries than for developed countries. The GDP growth in developing countries declined from 6.1% in 2008 to 2.4% in 2009 (IMF, 2010). Regarding Africa, the crisis has reduced the prospects for achieving the United Nations Millennium Development Goals in several countries. The number of African countries with GDP growth above 5 per cent felt from 29 in 2007 to only 7 in 2009. In addition, the number of countries with negative GDP growth increased from 2 to 8 over the same period (Osakwe, 2010). Contrary to what happened in the past, the African governments were able to react promptly to this economic and financial crisis by implementing countercyclical monetary and fiscal policies (UNCTAD, 2010). In the past, the International Monetary Fund imposed the implementation of pro-cyclical spending cuts as a condition for granting the loans (Green et al., 2010). Recently, the International Monetary Fund (IMF) has allowed greater budget flexibility for African countries to preserve social sector spendings. Therefore, African countries with IMF programs have been more successful in protecting social spendings than others (Green et al., 2010). Concerning the Latin American countries, the positive evolution of the terms of trade that accounted for the faster growth in the period 2003-2008 (Quenan and Torija-Zane, 2011) has allowed the implementation of counter-cyclical monetary and fiscal policies.

The African economies have registered a fast growth in 2000s, but the crisis interrupted it abruptly in 2009 (ADB, 2010). Although the crisis is of financial origin, its transmission channels involve other channels than the international finance traditional channels. The existence of other transmission channels may account for its propagation to developing countries. Any economic relationship between countries may give rise to a transmission vector. Several studies tried to understand the transmission mechanisms of external shocks. The two main vectors that are usually identified are international trade and international finance. For each crisis the features of origin and destination countries, as well as the economic links between them, will determine the importance of various vectors. For example, Hugon and Salama (2010) believe that the transmission to Southern countries may be more important when industrial activity of these countries is less developed. Reinhart et al. (2001) have shown that transmission of crises between economies passes less and less through international trade and terms of trade shocks. For these authors other factors, in particular financial factors, constitute currently the main transmission channels. However, for Least Developed Countries (LDCs), foreign trade features as the strong geographic and product concentration, dynamics of FDI, risk exposure features as the intensity of links with

the North, financial independence and credit exposure features as the tightening of access to international credits are the most convincing vectors of transmission. For example, a study of the United Nations (UNCTAD, 2010) on FDI indicates that African FDI inflows decreased by 36 % in 2009.

The aim of this paper is to provide an empirical comparative analysis between Latin American and Sub-Saharan African countries. These two groups of countries have similar characteristics in terms of economic structure, terms of trade and trade specialization, but different economic and monetary policies. This paper aims at assessing the differences in terms of response to external shocks and the sustainability of macroeconomic policies carried out by these countries. The main objective is to determine the extent to which some countries groups are more resistant than others to imported crisis. Few empirical studies have been carried out on the capacities of resilience of developing countries and on their vulnerability to crisis contagion. Furthermore, among existing studies, like Massa et al (2012) or Green et al (2010), many focus on the theoretical aspects of the transmission. This paper contributes to the literature by investigating and comparing on an empirical basis the capacities of resilience of Latin American and Sub-Saharan African countries.

The paper is organised as follows. Section 2 presents the theoretical background of the transmission mechanisms of the crisis effects focusing on the transmission channels from developed to developing countries. Section 3 proceeds to the econometric test of the transmission mechanism of the crisis using a dynamic panel model methodology. We distinguish two groups of Sub-Saharan countries and one group of Latin American countries with the aim at evaluating the capacities of each country group to resist to the economic crisis. Finally, we present conclusions and remarks.

2. Transmission mechanisms to developing countries

The theoretical view

The analysis carried out on the 2007-2009 financial crisis effects (Hugon and Salama, 2010; Te Velde and al., 2010; Toporowski, 2009, etc.) prove the existence of several factors able to promote its transmission from developed to developing countries. There is, first of all, the traditional channel of international trade by which, with the growing interdependence of countries, all demand fluctuations occurring in developed countries systematically affect the Southern countries. The reason is that most Southern countries are highly specialized in the supply of primary products and have a strong geographical concentration of their export partners. As shown in Table 1, exports of African countries are mainly to the European market, whereas for Latin American countries, North America is the main destination. The main reasons accounting for these trade orientations are geographic, linguistic or cultural proximities and historical or monetary links between the regions. These observations are in line with gravity model estimations (Feenstra, 2003; Anderson and vanWincoop, 2004).

Thus, it is highly likely that any decrease of demand resulting from shocks in Northern countries, will affect Southern countries' exports. The economic and financial crisis in developed countries has caused a sharp decrease of their demand for goods and services, and especially raw materials from Southern countries.

**Table 1: International trade matrix (flows in 2011)**

Origine	Destination							World
	NA	SCA	Europe	CEI	Africa	Middle East	Asia	
Share of regional trade in global merchandise export for each area (%)								Value
World	**16,9**	**4,0**	**39,4**	**2,7**	**3,0**	**3,8**	**28,4**	**14851**
NA	48,7	8,4	16,8	0,6	1,7	2,7	21,0	1965
SCA	23,9	25,6	18,7	1,3	2,6	2,6	23,2	577
Europe	7,4	1,7	71,0	3,2	3,1	3,0	9,3	5632
CEI	5,6	1,1	52,4	18,6	1,5	3,3	14,9	588
Africa	16,8	2,7	36,2	0,4	12,3	3,7	24,1	508
Middle East	8,8	0,8	12,1	0,5	3,2	10,0	52,6	895
Asia	17,1	3,2	17,2	1,8	2,7	4,2	52,6	4686

Sources : WTO, 2011

Notes: SCA = Southern and central America; NA = North America, CEI = Community of independent States

Therefore, this decrease in demand accompanied by falling product prices has caused a decrease in developing countries' export earnings (UNCTAD, 2009). For example, in the first semester of 2009, the poorest developing countries have seen their export earnings decreasing by almost 44% compared to 2008. This decrease of exports earnings also affects public revenues in countries where tax revenues nearly represent half of their budget (IMF, 2009a). Thus, countries with low export diversification will see their terms of trade degraded. The terms of trade of the five groups of countries which are the focus of this paper have evolved differently. Furthermore, over some periods changes can be correlated with changes in the price index (see Figure A1, in appendix) and in the exchange rate policy regimes (Figure A2, in appendix).

Figure 1*: Terms of trade (Oil exporting countries)*
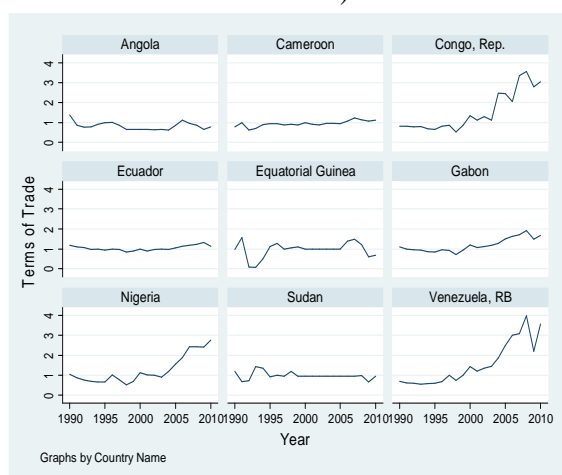
Figure 2: *Terms of trade (Metals exporting countries)*
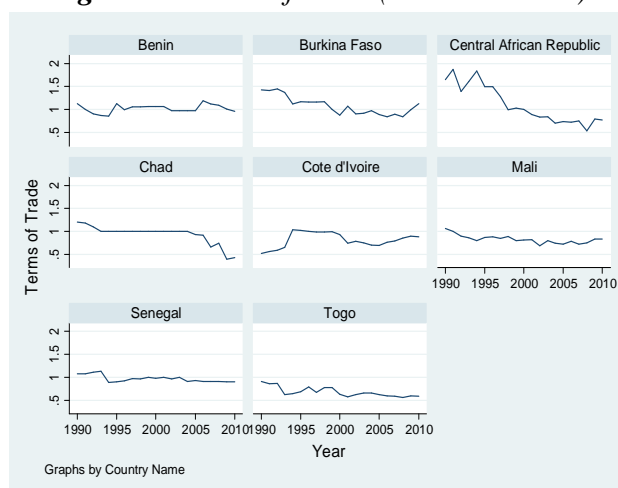
Sources: Authors calculations, IMF data
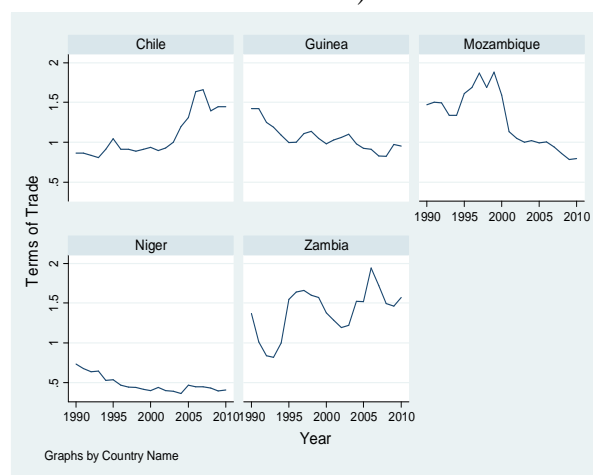
Sources: Authors calculations, IMF data

For oil producing countries (Figure 1), the terms of trade follow a general upward trend since the early 2000s. Moreover, for all countries that did not register an increase of terms of trade, trends remain balanced and sustained. Specialization in oil production seems helping them to take the lead in trade. However, it should be stressed that in the case of Ecuador the historical evolution of terms of trade was not only related to the evolution of oil exports but also to commodities such as bananas, coffee, cacao, accounting for the stable evolution of terms of trade depicted in Figure 1.
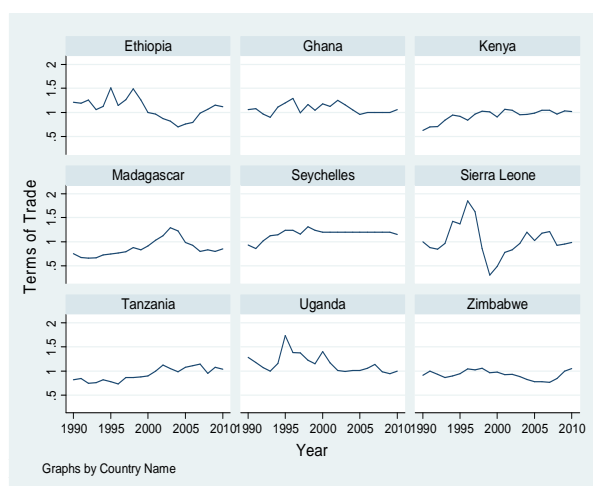
For the group of metal exporting countries depicted in Figure 2, the evolutions of terms of trade are less favorable showing a trend of degradation with big fluctuations. Specialization in metals exports obviously increases the vulnerability of these countries. The only country that registers an improvement in its terms of trade since 2005 is Chile. This specialization may be correlated with the rise of metals prices after 2000 (Figure A1). However, it seems surprising that other countries did not benefit from this trend. The countries of the CFA zone (Figure 3), less specialized in metals or oil, present a rather stable evolution of terms of trade. Nonetheless, the devaluation of the CFA franc in 1994 (Figure A2) has contributed to the degradation of terms of trade except in the case of Ivory Coast. This devaluation did not enhance their competitiveness. The relative stability observed for this group of countries contrasts with the other groups presenting relative high fluctuations, especially in certain Latin American countries (Figure 4 and 5).
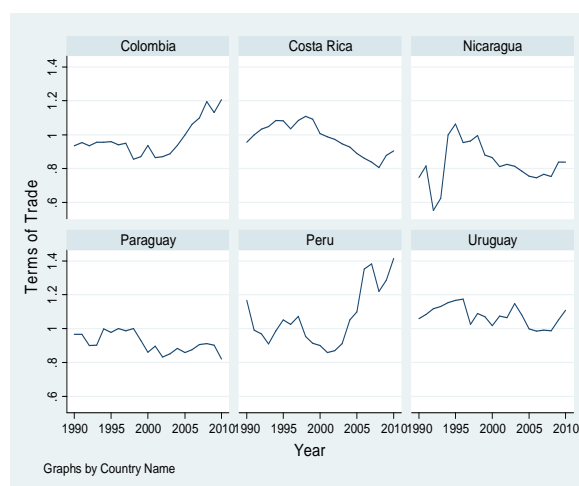
Figure 3: *Terms of trade (CFA countries)*

Sources: Authors calculations, IMF data

Figure 4: *Terms of trade (other non CFA countries)*   **Figure 5:** *Terms of trade (other Latin American countries)*

Sources: Authors calculations, IMF data   Sources: Authors calculations, IMF data

In addition to trade channels, the crisis in Northern countries affects the other economies through financial channels. For financial aspects, the Southern countries that will be most exposed are those that have financial and economic systems highly connected to world finance. The LDCs thus seem preserved from financial shocks. The traditional financial channel of crises transmission is that of bank loans. In this case, interest rates fluctuations are the first threat during the period of crisis. Furthermore, the FDI flows can be negatively affected by external shocks through likely lower profitability of investment projects (Gurtner, 2010). FDI inflows to Africa decreased by 19% from 72 billion US dollars in 2008 to 59 billion in 2009 (UNCTAD, 2010). Worldwide credit access difficulties have also contributed to this decrease of FDI inflows from the Western countries.

The factors known as "financial stress factors" intensify the financial transmission. Global factors and specific factors can be distinguished. This financial stress depends on the financial relationship between developed countries and developing countries (IMF, 2009c). Global factors correspond to global elements affecting banks' predispositions to lend funds to national or international investors (the common-lender effect). In crisis periods, the increase of risks increases interest rates and risk premiums for the risk averse investors. These two effects jointly imply a reduction of loans and an increase of their cost.

Specific factors limit the ability of developing countries to react to imported crises. First, there is the intensity of their economic, commercial and financial relations with the countries of origin of the crisis. In this case, the most vulnerable countries will be those strongly connected to the North. For example, the links between Africa and Europe, in addition to trade channels, take the following forms:

- monetary relation : the fixed exchange rate parity between CFA franc and Euro can be the source of loss of competitiveness for the countries of the CFA zone when the Euro appreciates with respect to other currencies and especially to the US dollar.

- Development aids: the affected Northern countries will be less and less willing to finance the development projects in Southern countries.

- Migration: the decrease of migrant remittances due to economic recession in Northern countries may affect development projects in developing countries LDCs (Barajas and al. 2010).

Second, there is macroeconomic vulnerability of developing countries to financial shocks. Most vulnerable countries will be those with high external deficits and highly dependent to foreign funding. This exposure can be measured via the current account balance, the level of public debt, the size of public deficit, the volume of foreign debt and foreign reserves (Hugon and Salam, 2010).

3. Empirical estimation of the transmission effects

The purpose of this analysis is to assess the relevance of the transmission mechanisms in different countries samples (Table A1 in appendix), during a study period of 21 years from 1990 to 2010. The general idea is to use a dynamic panel econometric model to investigate the relationship between GDP growth and the factors identified previously in three groups of countries. The final goal is to identify the adjustments taking place during crisis (the pro or countercyclical nature of variables), and the differences between country groups.

The selection criteria to distinguish the countries are of two kinds. On the one hand, the degree of concentration of their export structure is taken into account. Thus, we distinguish countries highly specialized in oil, countries highly specialized in metals and others (with relatively more diversified exports). On the other hand, we distinguish countries according to monetary regimes: CFA countries of Africa (13 countries), non-CFA African countries (15

countries), and Latin American countries (9 countries). The Latin American countries have almost all their own national currency. In this last group the exchange regimes are not fixed, but rather oriented to inflation targeting, allowing them to control inflation fluctuations.

Dynamic panel estimation techniques

In order to study dynamic economic growth in our sample countries, we use dynamic panel estimation techniques. This allows us to relate economic growth at a given time to that observed at an earlier time [AR (1) model]. The dynamic model that we estimate is as follows:

$$\dot{GDP}_{i,t} = \alpha \dot{GDP}_{i,t-1} + \beta X_{i,t} + \eta_i + \varepsilon_{i,t} \quad . \tag{1}$$

where $\dot{GDP}_{i,t}$ is the rate of growth in country (i) at time (t), and $X_{i,t}$ is the matrix of the explanatory variables at time (t). It includes according to data availability: public aids in percentage of GDP, external debt, external reserves, domestic savings, net inflows of foreign direct investments, remittances and the current account balance (CAB), two dummy variables (to distinguish Fuel exporting and Metal exporting countries) and the number of countries in recession (to appreciate contagion risks). The η_i stands for the country-specific effects that might explain the differences in growth between countries. These effects are assumed to be fixed and independent of errors ($\varepsilon_{i,t}$).

For dynamic models, OLS is quite inefficient particularly because of the endogeneity of the lagged variable relative to the fixed effects. It creates an upward bias in the estimation of the coefficient associated with the lagged endogenous variable. One way that has been suggested to correct this bias is to transform the estimation model so as to eliminate the fixed effects. The first change involves using the Within-Estimator, which subtracts the individual mean at every observation. Since the specific effects are constant over time each observation equals the mean. Nevertheless, Nickell (1981), Judson and Owen (1999), and Bond (2002) have shown that the Within-Estimator is itself not efficient, especially for panels with few time periods. In fact, they showed that in these short-t panels, the transformation results in a substantial negative correlation between the transformed lagged dependent variable and the transformed error term. In this way, according to Bond (2002), any significantly better estimator should find a coefficient for (α) somewhere between that of the Within-Estimator and that of the non-transformed OLS estimator.

Anderson and Hsaio (1981) have suggested a different transformation to correct the endogeneity bias between the lagged variable and the fixed effects. This involves estimating a first-difference model, which by design also eliminates individual effects:

$$\Delta \dot{GDP}_{i,t} = \alpha \Delta \dot{GDP}_{i,t-1} + \beta \Delta X_{i,t} + \Delta \varepsilon_{i,t}. \tag{2}$$

However, this transformation does not make it possible to remove the endogeneity of the transformed lagged dependent variable ($\Delta \dot{GDP}_{i,t-1}$) in relation to the transformed error term ($\Delta \varepsilon_{i,t}$), since $\dot{GDP}_{i,t-1}$ in $\Delta \dot{GDP}_{i,t-1}$ is correlated with $\varepsilon_{i,t-1}$ in $\Delta \varepsilon_{i,t}$. Anderson & Hsaio (1981)

therefore suggest using the instrumental variables method to overcome this hurdle. According to them, for every first-difference observation (beginning in the 2nd period) there are two potential instrumental variables, both already present in the model, namely the level and the first-difference variables of the previous time period. For example, for $\Delta G\dot{D}P_{i,t-1}$ both $G\dot{D}P_{i,t-2}$ and $\Delta G\dot{D}P_{i,t-2}$ are appropriate instruments since they are highly correlated with $\Delta G\dot{D}P_{i,t-1}$ but not correlated with $\Delta\varepsilon_{i,t}$, assuming that the errors are time independent and that the initial conditions are predetermined (Bond, 2002). Anderson and Hsiao, on the other hand, prefer levels as instruments for differences, since especially in the case of short-t panels, level instruments offer a better way to use more observations, which is a welcome efficiency gain. However, their method does not allow for the possibility of using potential lags as instruments.

This possibility was introduced later by Holtz-Eakin et al (1988) and Arellano and Bond (1991). Their methodology is based on the Generalized Method of Moments (GMM) with additional orthogonality assumptions to ensure the non-endogeneity of the instruments. Arellano and Bond (1991) propose a GMM estimator that is based on the orthogonality of the level variables instruments to the differences of residuals: the condition on the moments is as follows:

$$\begin{cases} E\left[G\dot{D}P_{i,t-j}\cdot\Delta\varepsilon_{i,t}\right]=0 \\ E\left[X_{i,t-j}\cdot\Delta\varepsilon_{i,t}\right]=0 \end{cases} \text{ for } j\geq 2 \text{ and } t=3,4,\ldots\ldots,T \qquad (3)$$

where $G\dot{D}P_{i,t-j}$ and $X_{i,t-j}$ stand for the collection of instruments for the first-difference variables.

Blundell and Bond (1998), however, show that for very long time series, level variables are very weak instruments for first-difference variables. For efficiency gains, they suggest additional moment conditions that can take into account a wider range of instruments (system GMM). Their suggested transformation is an extension of Arellano and Boyer's (1995) forward orthogonal deviations to make the instruments exogenous relative to the fixed effects.

The conditions on the additional moments are as follows:

$$\begin{cases} E\left[\Delta G\dot{D}P_{i,t-1}\cdot(\eta_i+\varepsilon_{i,t})\right]=0 \\ E\left[\Delta X_{i,t-1}\cdot(\eta_i+\varepsilon_{i,t})\right]=0 \end{cases}, t=3,4,\ldots\ldots,T \qquad (4)$$

where $\Delta G\dot{D}P_{i,t-j}$ and $\Delta X_{i,t-j}$ stand for the collection of instruments for the level variables, with $j\geq 2$.

For the purpose of this paper in order to estimate our dynamic model, we have chosen to use the GMM (Blundell & Bond, 1998) approach. The efficiency of the GMM method in a dynamic panel, however, must be tested. The two prerequisites are a good identification of instruments (Sargan test) and the absence of autocorrelation among the residuals (Arellano & Bond test). The Sargan test states as a null hypothesis the absence of correlation between

instruments and residuals. If this hypothesis is rejected, then the estimations are not efficient. The Arellano & Bond test, on the other hand, states as a null hypothesis the absence of autocorrelation among residuals. Since the test involves a first-difference transformation, there will necessarily be a first-order autocorrelation. On the other hand, the absence of autocorrelation among (level) residuals is guaranteed if there is no second-order autocorrelation among the first-difference residuals. For an efficiency gain, we corrected the standard deviations of the heteroscedacity bias, following Windmeijer's (2000) guidelines.

Estimation results

In order to know the adjustments that take place in the different country groups, in recession period, we relate GDP growth within the set of variables identified through the theoretical view. The nature of the links between variables allows evaluating the adjustments in expansion and recession periods. In each country the expansion and recession periods are defined. Thus, crisis periods correspond to years when several countries are simultaneously in recession. Figure A3 in appendix gives an illustration of the succession of crises periods.

In order to focus on monetary links with the North three series of estimation, based on the two criteria, the exchange regime and geographical location, may be performed. The first estimations relate to SSA countries in CFA zone. The second estimation considers SSA countries outside the CFA zone to appreciate the effects of monetary links with the euro area. The last estimation considers Latin American countries strongly linked to North America. Table 2 presents the econometric results of these estimations.

Table 2: Regression results: explaining crisis transmission

Number of observations		239	245	174
Chi2		113.533	469.864	69.816
Phase	Sample	CFA zone (12)	Non CFA zone (13)	Latin America (9)
Recession	Ln (FDI)	0.102*	0.065	-0.056***
	Ln (Public Aids)	0.730	1.402*	0.338
	Domestic Savings	0.015	0.242**	0.305***
	Current account balance	-0.043	-0.092	-0.202***
	Ln (External Debt)	0.308	-1.628***	-0.120
	Ln (External Reserves)	0.094	0.472	-0.734
	Ln (Remittances)	-0.002	-0.020	0.054
	Fuel exporting	-1.357	-1.148	-1.514**
	Metal exporting	-1.396	-2.895	2.659
Expansion	Ln (FDI)	0.048	-0.339***	-0.190**
	Ln (Public Aids)	-0.244	1.456*	-0.066
	Domestic Savings	-0.073	0.035	0.082
	Current account balance	-0.089	-0.026	-0.178**

	Ln (External Debt)	1.119	0.616	-1.077
	Ln (External Reserves)	0.487***	-1.199**	1.157
	Ln (Remittances)	-0.009	-0.135	0.045
	Fuel exporting	-1.924	0.159	0.728
	Metal exporting	1.115	-6.523	2.055
Lagged GDP growth		0.338***	0.498***	0.612***
Number of countries into recession		-0.065*	-0.020	-0.161***
Constant		-23.061**	-5.913	9.050
Sargan test (p-value)		0.3760	0.4843	0.4359
Arellano-Bond test (p-value)	**AR (1)**	0.0415	0.0121	0.0478
	AR (2)	0.1279	0.7356	0.4918

Significance levels: *** (p<1%), ** (p<5%), * (p<10%).

The permanent significance of lagged GDP growth and the results of Sargan and Arellano-Bond tests indicate the relevance of dynamic panel estimations. Indeed, the test of Arellano-Bond shows that there is first-order autocorrelation and there is no second-order autocorrelation among the first-difference residuals. Regarding the Sargan test, the higher the p-value the better the result. As shown in the theoretical section, several factors justify the vulnerability of developing countries to the crisis effects. This vulnerability is not experienced in a similar way in all Southern economies. It depends in particular on their openness, their degree of diversification and their macroeconomic situation.

African countries in the CFA zone

CFA African countries are those belonging to WAEMU and CEMAC zones. Over the entire study period CFA countries are the only group with a fixed exchange rate regime. Their currency is pegged to the Euro – and before the Euro, to the French franc – and any fluctuation of the euro affects the economic situation of these countries. The significant recent facts concerning this currency area can be seen in Figure A2. After having guaranteed to CFA countries a high growth period and good integration to international trade, the CFA franc started to show its first signs of weakness at the end of the 80s[1] (Van de Walle, 1990). In 1994, the CFA franc was devaluated by 100% in order to enhance the exports competitiveness of this area and solve their macroeconomic problems. After this sudden devaluation several years of depreciation with respect to the US dollar followed. This depreciation came to an end with the euro in the 2000s. Then, CFA countries suffered from the appreciation of the euro until 2009 and new discussions about the need for a new devaluation have emerged.

The results of the estimations carried out for the CFA zone show that the link between FDI and GDP growth is significantly positive in recession periods. This indicates that FDI is a pro-cyclical variable during recession so that declines of FDI in recession periods intensify the crisis effects. External debt and external reserves are shown to be pro-cyclical that is to be positively related to GDP growth. In expansion period external reserves are significantly and

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[1] See Van de Wall (1990) for the complete presentation of the history of CFA and the reasons behind its devaluation of 1994.

positively related with GDP growth. This means that the increase of external reserves contributes to the increase of GDP growth. The combination of external reserves and external debt results indicates that the CFA countries are not able to use their external assets and debt to adjust macroeconomic fluctuations. Public aids, domestic savings seem negatively correlated to GDP growth in periods of recession but not significantly. The current account balance seems to be countercyclical even if the link is not significant. The variable measuring the number of country into recession is negatively and significantly linked to GDP growth meaning that this country group is vulnerable to the transmission effects.

Sub-Saharan African countries out of the CFA zone

The econometric results show that this group is the only one for which the link between public development aid and GDP growth seems established. However, we notice that the link is positive during recession and expansion periods. This indicates that, for African countries out of the CFA zone, the public development aid is a significant pro-cyclical transmission vector. Non-CFA zone Sub-Saharan African countries are also the only ones where we find a significant negative link between GDP growth and the external debt. This countercyclical link appears only in recession period. This connection contrasts with the countercyclical property of external reserves found out in this same region during expansion periods. These combined results indicate that these countries have the capacity to use their external assets and debts to adjust their macroeconomic situation. Comparing these results with the variable "number of countries into recession" measuring the intensity of crises, we notice that this zone is less vulnerable to the transmission effects than the two remaining zones.

The domestic savings, however, reveals pro-cyclical dynamics in this zone, contrary to what occurs in the CFA zone. Domestic savings decrease indeed in recession periods and can reinforce the recession. The availability of domestic funds then constitutes a vulnerability factor for this region, as well as for Latin America where we find the same result.

Latin American Countries

The econometric results show that three variables are significantly related to the fluctuations of GDP: the foreign direct investments, the domestic savings and the current account balance. The FDI and the CAB present opposite behaviors with respect to GDP. During expansion periods FDI and CAB fall, and increase during recession periods. Two explanations can be put forward. Firstly, when GDP growth decreases, the authorities will try to relax their FDI legislation in order to rebalance the economic situation. Thus, openness with respect to FDI would be an ideal policy. However, once stabilization is reached during expansion periods, the need for foreign investments decreases in favor of domestic investments. This relation points out the evolutions of FDI and GDP of Asian countries during the Asian financial crisis of 1997. Between 1997 and 1999 the area went into recession and GDP decreased from 2.121 billion dollars in 1997 to 1.891 billion dollars in 1999. During the same period the level of FDI increased from 65,000 million dollars to 87,000 million dollars. After 1999, the GDP reversed its tendency and FDI inflows decreased progressively. Secondly, the positive trend of the CAB in periods of recession corresponds to the efforts made by authorities to stimulate the economy using competitive devaluations. Furthermore, the dummy variable capturing

differences between oil exporting and other countries of Latin America is significant during periods of recession. This indicates that being a fuel exporting country significantly slows down the recession.

In addition, the domestic savings decrease when economic growth slows down (Table 2 above). One can suppose, according to Keynesian models that a reduction in GDP growth often involves a reduction in consumption and demand, which results in a low level of investment and thus of domestic savings. Lastly, the countries of Latin America present the highest level of propagation in this analysis, which contrasts with the capacities of adjustment of this region. This vulnerability to external shocks may come from its relations with North America.

3. Conclusion

The transmission of the crisis from developed to developing countries operated through two main channels: the traditional channel of international trade and the international finance (Hugon and Salama, 2010). Theoretically, many factors may justify the vulnerability of economies of Sub-Saharan Africa and Latin America. All these economies did not experience the effects of external shocks in the same way. Aiming at assessing the resilience capacities of these Southern countries with regard to the crisis this paper has performed an econometric investigation using a dynamic panel model methodology. Furthermore, three sample countries have been considered to carry out an empirical comparative analysis. Two samples of Sub-Saharan African countries have been differentiated by the membership to the CFA zone, and one sample of South American countries. The three groups of studied countries share common features of economic structure and terms of trade.

Concerning the Sub-Saharan African countries, it has been shown that for the CFA countries the transmission factors listed in the theoretical part are not linked significantly to GDP growth. The only factor of vulnerability for these countries has been shown to be the FDI inflows. In recession periods, we showed that FDI decrease aggravate the crisis. Resilience capacities have not been detected for this group. The Sub-Saharan African countries out of the CFA zone present different results. For them, the results show a significant link between public development aid and GDP growth. This link is significant and positive in recession and expansion periods. This indicates that public development aid constitutes a significant pro-cyclical transmission vector. Domestic savings have been shown to be a pro-cyclical variable too. Indeed, its decline in recession period may worsen the deterioration of the economic situation. The external debt has been shown to be a counter-cyclical variable in recession period. This may contrast with the counter-cyclical property of external reserves shown in expansion periods. These countries have the capacity to use their external assets and debts to adjust their macroeconomic situation. The clear difference of results between CFA zone and non-CFA Sub-Saharan African countries could motivate further research about the role of the strict peg to the euro.

In the case of Latin American countries three variables have been shown to be significantly related to the fluctuations of GDP growth. These factors are foreign direct investments (FDI), domestic savings and the current account balance (CAB). FDI and CAB present opposite behaviours relative to GDP. During expansion periods, FDI and CAB fall and increase during recession periods. Indeed, when the growth of the GDP decreases, authorities try to relax their FDI legislation in order to rebalance the economic situation. In addition, they implement competitive devaluation policies affecting the CAB. Countries of Latin America present also the highest risk of propagation in our analysis.

Taking into account that the three groups of studied countries share common features of economic structure and terms of trade, we could expect that the resilience capacities would be similar. However, this paper has shown that resilience capacities of the three investigated country groups (African CFA zone, Sub-Saharan African non-CFA zone and Latin America) are not the same. Considering the Sub-Saharan African countries the econometric results show that countries of the non-CFA group better perform in terms of resilience to external shocks. This area has shown to be less vulnerable to the transmission of the crisis effects compared to the two other groups. The econometric regression results reveal also a determining factor of vulnerability common to the Non-CFA zone and Latin America which is domestic savings. This paper highlights interesting factors and mechanisms relative to the capacity of resilience of certain developing countries with respect to external shocks, in particular those of the Latin America and Sub-Saharan Africa. Further research may be carried out to investigate other variables likely to explain the resistance of Southern countries to the crisis effects and their causalities. Data availability will remain the principal limitation.

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Appendices :

Table A1 : Sample countries

Countries	Economic areas	Currency unit	Exchange regimes
Chile	Latin America	Peso Chi	Floating
Colombia	Latin America	Peso Col	Floating

Costa Rica	Latin America	Colon	Floating
Ecuador	Latin America	Dollar US	Fixed/USD
Nicaragua	Latin America	Cordoba	Floating
Paraguay	Latin America	Guarani	Floating
Peru	Latin America	Nuevo Sol	Floating
Uruguay	Latin America	Peso Uru	Floating
Venezuela, RB	Latin America	Bolivar	Fixed/USD
Benin	WAEMU	CFA	Fixed/Euro
Burkina Faso	WAEMU	CFA	Fixed/Euro
Cote d'Ivoire	WAEMU	CFA	Fixed/Euro
Mali	WAEMU	CFA	Fixed/Euro
Niger	WAEMU	CFA	Fixed/Euro
Senegal	WAEMU	CFA	Fixed/Euro
Togo	WAEMU	CFA	Fixed/Euro
Cameroon	CEMAC	CFA	Fixed/Euro
Central African Rep	CEMAC	CFA	Fixed/Euro
Chad	CEMAC	CFA	Fixed/Euro
Congo, Rep.	CEMAC	CFA	Fixed/Euro
Equatorial Guinea	CEMAC	CFA	Fixed/Euro
Gabon	CEMAC	CFA	Fixed/Euro
Angola	Non-CFA	Kwanza	Floating
Ethiopia	Non-CFA	Birr	Floating
Ghana	Non-CFA	Cedi	Floating
Guinea	Non-CFA	Franc Gui	Floating
Kenya	Non-CFA	Shilling Ken	Floating
Madagascar	Non-CFA	Ariary	Floating
Mozambique	Non-CFA	Metical	Floating
Nigeria	Non-CFA	Naira	Floating
Seychelles	Non-CFA	Roupie Sey	Floating
Sierra Leone	Non-CFA	Leone	Floating
Sudan	Non-CFA	Livre S	Floating
Tanzania	Non-CFA	Shilling Tan	Floating
Uganda	Non-CFA	Shilling Uga	Floating
Zambia	Non-CFA	Kwacha	Floating
Zimbabwe	Non-CFA	Dollar Zim	Floating

Definition of variables (World Bank definitions)

Current account balance (Percent of GDP): Current account is all transactions other than those in financial and capital items. The major classifications are goods and services, income and current transfers. The focus of the BOP is on transactions (between an economy and the rest of the world) in goods, services, and income.

Gross national savings (Percent of GDP): Expressed as a ratio of gross national savings in current local currency and GDP in current local currency. Gross national saving is gross disposable income less final consumption expenditure after taking account of an adjustment for pension funds.

Total reserves (includes gold, current US$): Total reserves comprise holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities. The gold component of these reserves is valued at year-end (December 31) London prices. Data are in current U.S. dollars.

External debt stocks, total (current US$): Total external debt is debt owed to non-residents repayable in foreign currency, goods, or services. Total external debt is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, use of IMF credit, and short-term debt. Short-term debt includes all debt having an original maturity of one year or less and interest in arrears on long-term debt. Data are in current U.S. dollars.

Remittances: data on remittances are interaction variables (from the UNCTAD: fact book, 2011) between:

- Bilateral Estimates of Migrant Stocks in 2010, which we use to identify favorite migrant destination of developing countries (we distinguish to destination: South-South and South- North). In this context, the north refers to Europe and North American.

- Migrant remittance Inflows (US$ million) by year (1995-2009)

Net official development assistance and official aid received (current US$):

- <u>Net official development assistance</u> (ODA) consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC), by multilateral institutions, and by non-DAC countries to promote economic development and welfare in countries and territories in the DAC list of ODA recipients.

- <u>Net official aid</u> refers to aid flows (net of repayments) from official donors to countries and territories in part II of the DAC list of recipients: more advanced countries of Central and Eastern Europe, the countries of the former Soviet Union, and certain advanced developing countries and territories. Official aid is provided under terms and conditions similar to those for ODA.

Foreign direct investment, net inflows (BoP, current US$): FDI are the net inflows of investment to acquire a lasting management interest (10 percent or more of voting stock) in an enterprise operating in an economy other than that of the investor.

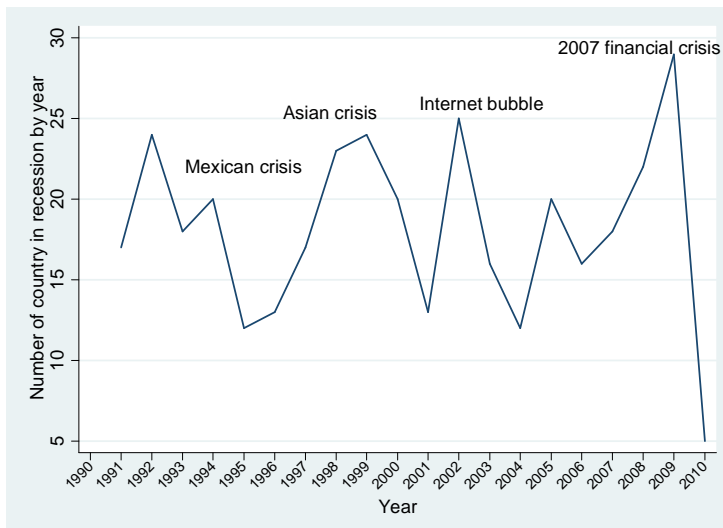**Figure A1**: Evolution of Price indices (Oil, Metals, Energy)
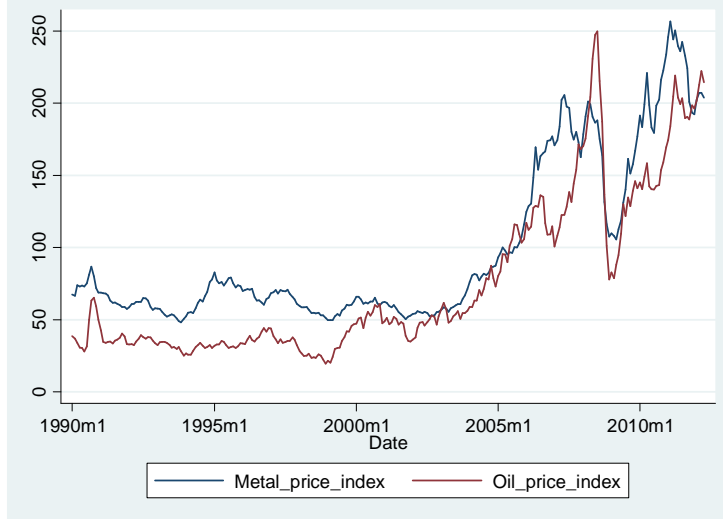
Sources : Authors calculations, IMF Data

Figure A2: Evolution of the official exchange rate (CFA/USD)
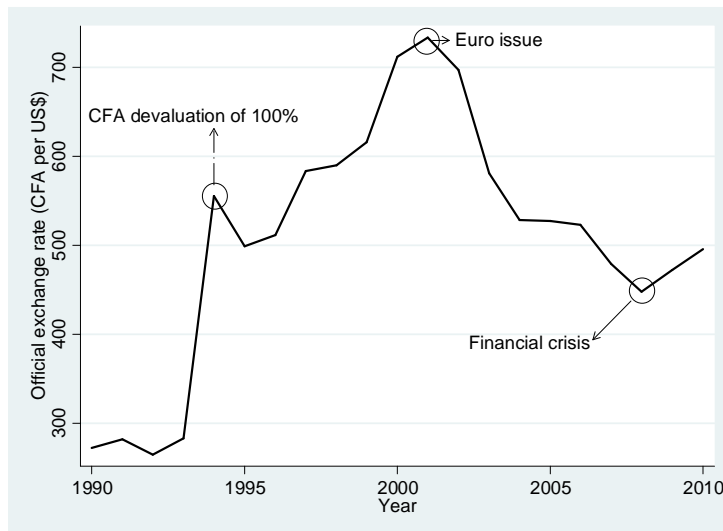
Sources: Authors calculations, IMF data

Figure A3: Number of countries into recession between 1990- 2010

Sources : Authors calculations, IMF Data