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The Absorption and Spending Capacity of Aid in the Economic Community of West African States

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Abstract

The study focuses on the absorption and spending capacity of aid inside the member countries of the Economic Community of West African States (ECOWAS). The absorption and spending of aid are analyzed through the impact of aid on, respectively, the non-aid current account balance, and the non-aid government budget. One of the new features of the study is the inclusion of financial and government related variables in the list of control variables. This helps to capture well the estimators, and avoid the bias generated by the exclusion of relevant variables. In addition, the study focuses on more appropriate econometric tools. The analysis focuses on three econometric estimators, namely, a fixed effect model, an instrumental variable and the generalized method of moments. Results show that aid is more absorbed than spent inside the whole union. Countries that have less dependency on aid have better spending capacity than the ones who highly rely on aid. In highly-aid dependent countries, aid is used to reduce budget deficit rather than to finance government expenditures.

Keywords: Aid absorption, Aid spending, Fixed effect, Instrumental variable, Generalized Method of Moments.

1. Introduction

Over the period 2004-2008, the amount of aid to Africa has quadrupled, surging from around 11 billion USD to 44 billion USD (UN statistics 2008). Targeted toward the reduction of poverty, as well as the leverage of the continent's growth, the purpose of the Official Development Assistance (ODA) was to help Africa accelerate its development. The results remain unsatisfactory. For example, Easterly (2007) states that “\$568 billion in today's dollars flowed into Africa over the past 42 years, yet per capita growth of the median African nation has been close to zero.” While some countries have been left heavily indebted and have to follow new conditions and processes to change their status, others are still struggling to solve the internal disruptions attributed to the surge of aid. However, some countries have been showing positive performances in the use of aid. It is the case of Ghana, Zambia, and Senegal. Through meetings and forums (such as Rome, Paris, Accra and Busan), the directives, structures and level of commitment of aid have been changing, and new donors have been emerging (China, Brazil, Russia among others). However, poverty continues to increase in many parts of the continent, which brings more concerns about aid's efficiency.

Development assistance was born after the ruins of World War II (Fan and Yuehua, 2008). The “Marshal Plan” aid program was targeted to reconstruct Europe by focusing on the alleviation of poverty in less advanced countries and the promotion of development (Führer, 1996). As conflicts, starvation and poverty in many regions in the world, especially in Africa, were increasing; the generalization of aid among developed countries and the involvement of bilateral agencies took place. With the spread of poverty, the international community agreed to more commitments and the gradual increase of aid, following meetings and forums, such as the Monterey Consensus in 2002. The most comprehensive attempt to improve the cooperation between donors and developing countries is the *Paris Declaration on Aid Effectiveness* in 2005.

The amount of aid received is not a problem by nature, but rather the policy and conditionality tied to it (Collier, 1997). Apart from the donors' interest, the lack of knowledge of the country realities, culture, people's thoughts and behavior may result in failure or inefficiency. In many cases, the international community sets development programs, without any consultancy, and implication of recipient countries. Therefore aid appears as a stranger, and taken for granted by developing countries. The resulting effect is the inefficiency in the expected outcomes. It is the case of the Structural Adjustment Programs, which has deteriorated the economic conditions of many African countries. Nowadays, most of comprehensive programs are set with a full or partial implication and commitment of recipient countries. For example, in the Local Agenda, within the framework of the Strategy of the Accelerated Growth for Sustainable Development, Recipient nations, local communities and NGOs formulate their conception of development, and how they could make efficient use of aid to improve people's lives (IMF, 2012).

Recipients have the most important responsibility in the failure of aid. Burnside and Dollar (1997, 2000) find that aid is effective under “good policy”. A country with good institutions, policy and management system tend to make efficient use of aid, compared to nations with poor policy. With poor governance, the risk of expropriation and corruption financing become high. In many African countries, aid has financed government palaces, cars, holidays and public officers' travels. In addition, the lack of transparency increases the risk of aid fungibility. Fungibility is when aid is used for purposes other than what it is assigned. Donors as well as recipient nations in many cases do not have the same targets and priorities. While donors expect aid to achieve some particular goals, recipient governments prioritize nation needs such as wages, taxes, healthcare, and

electoral promises. In many cases, governments use aid for their own interest (travel, holidays, purchases etc.). The risk of fungibility increases when approaching electoral campaigns.

The weak cooperation between government and the central bank can lead to inefficiency of aid (Martins, 2010). When the government spends the flow of aid for policy purposes, the resulting inflation can be controlled by the central bank's actions on the reserves of aid-related currency. In the case of inaction of the central bank, the resulting consequence can be painful for the economy, as the risk of inflation and private investment crowding-out effect can increase. On the other side, if aid is fully absorbed by the central bank's actions on international reserves, but not spent by government, the resulting sterilization effect on the economy can be effective if the economy is lacking stabilization. However, as the domestic sector has to finance public spending, the long-term growth can be difficult to reach in countries where domestic financial capacity remains poor.

This study is concerned with the absorption and spending capacity of aid in the Economic Community of West African States (ECOWAS), composed of 15 countries, namely, Benin, Burkina Faso, Cape Verde, Cote d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo. By focusing on an economic union characterized by common policy directives (which is the case of the ECOWAS), the study brings new insights. In effect the study shows how results can match or oppose studies that have focused on all developing countries (such as Morrissey et al., 2005), or African States (for instance, Martin, 2010). Besides, the collection of recent data brings more accuracy in the analysis compared with previous studies.

The study is structured as follows: chapter section 2 reviews the literature on aid. section 3 presents data as well as the methodologies followed in each approach. Following data and methodology, section 4 provides results and discussions. Section 5 concludes.

2. Literature review

Concerns about the attainment of the Millennium Goals for Development oriented the debates on aid effectiveness to the concepts of *capacity of 'absorption' and 'spending'*, suggested by While Berg et al. (2007). They defined absorption as the widening of the current account deficit and spending as the widening of the government fiscal deficit. While spending depends on fiscal authorities' capacities to transfer resources to the real size of the economy through consumption and investment, absorption is regulated by the central bank, and depends on the central bank maintaining the amount of external reserve at a certain level. Therefore, the absence of coordination between fiscal authorities and the central bank can be harmful for the macroeconomic stability (Aiyar and Ruthbah, 2008). For instance, in the presence of high spending, but low absorption capacity by the central bank, the level of government expenditure can have negative effects on the economy. Although public spending can justify the need to boost economic growth, the increment in interest rate that always follows high expenditure can crowd-out private investment and reduce long-term growth. In addition, the rise of price (inflation) can affect household consumption level as well as real wage. Therefore, the central bank can intervene to regulate the level of interest rate, and inhibit the aftermaths of high spending, by selling the aid-related foreign reserve. In line with the coordination between fiscal authorities and the central bank, Aiyar and Ruthbah (2008) distinguish four possible configurations that absorption and spending of aid can take.

The first configuration is the case where aid is fully absorbed and spent. This case is considered as an ideal situation. In fact, when aid is fully spent, government makes use of more financial resources to boost the economy. Through the increment in expenditure (or reduction in taxes), the improvement in households' disposable income, as well as the development of the business sector, more resources for the economy are generated. The negative effects of government expenditures, such as crowding-out effect, are cancelled out by the central bank's actions on international reserves (absorption). In addition, the supply of foreign currency to the economy releases more resources to finance imports.

For the second configuration, a full spending of aid can be associated with no absorption. In this regard, Hussain et al. (2009) argue that a full absorption associated with no spending of aid is similar to the case of budgetary policy when there is no flow of aid. While central bank builds the reserve of foreign currency, government finances its deficit using the traditional tools, such as note printing or open market. The increase in interest rate that follows the two policy tools (monetary creation, open market) can be harmful for the economy; the more so as private investment becomes crowded-out.

The third configuration is a full absorption associated with no spending: This configuration between absorption and spending of aid can justify a need for stabilization in countries facing high deficits, such as budgetary deficit, high debt level. The central bank releases all aid related reserves, while government does not spend the additional money inflow. Aid can therefore be used as a substitute for monetary creation (for financing government deficits), or for debt alleviation. On the other side, as foreign reserves increase, the additional domestic demand leads to the increment in net imports, which can create pressures on real exchange.

In the fourth configuration, there is no absorption and no spending of aid: This is a case of static behavior of both government and the central bank. Government does not spend the inflow of aid (which can be justified by some sterilization targets, or a need for stabilization), while the central bank increases the reserve of

international currencies. This configuration is not desirable as slow in government and central bank's actions delays the long-term growth of the economy.

Recent studies have proposed different approaches of absorption and spending. For example Henrik and Derek (2010) define aid absorption as the impact of aid on net import, and spending the impact of aid on domestic demand. In effect, a high level of import can be explained as the country's capacity to transfer foreign aid to the real economy. Absorption comes from the fact that the inflow of foreign reserve (related to the increment in aid) is transferred to the rest of the world through international purchases (import). As for spending, their definition includes a broader aspect. While Berg et al. (2007) and Aiyar and Ruthbah (2008) are limited to government deficit, Henrik and Derek (2010) include private consumption and investment. In their study, Henrik and Derek (2010) investigate their concept of absorption and spending using a VAR model as well as the Monte Carlo simulation in small developing countries categorized into two groups: aid-dependents and non-aid dependents. Their results suggest a negligible absorption and spending capacity in non-aid dependents countries. However, in aid-dependents countries, there is similarity between absorption and spending.

Apart from the two concepts of absorption and spending of aid, many studies have attempted to propose strategies to improve the effectiveness of aid. One of the major contemporary contributions started from Burnside and Dollar (2000). In their study on the impact of foreign aid on per capita GDP, they find that aid has a significant impact on income, under better monetary, fiscal and trade policy. These findings agree with those of Collier and Dollar (2002), as well as Radelet Clemens, and Bhavnani (2004), who emphasize the importance of the macroeconomic environment when examining aid effectiveness. However Rajan and Subramanian (2007) oppose any term under which assistance could be effectual. According to them, aid has always been inefficient in increasing income. Thus, an increment in aid is not desirable. These critiques were previously found in Rajan and Subramanian (2005). They denounced the harmful consequences of aid flows for growing industries in developing countries. Nonetheless, Malick (2008) opposed this argument and showed that aid flow has negligible negative impact on weak industries.

The overall literature shows a mitigated consensus about the macroeconomic effect of aid. If formers studies lacked more robust tools, and strong empirical evidences to address the effectiveness of aid, the recent development in the field of econometrics contributed to spread the debate among economists. One of the major findings that play crucial roles in the directives of policy makers are, the low spending capacity of aid in developing countries and the distinction between grant and loan when analyzing the efficiency of aid.

3. Data and Methodology

This study gathers data from different sources including the International Monetary Fund Balance of Payment Statistics (BOPS), the Africa Development Indicators (available in the World Bank Database), and the World Economic Outlook (WEO). For the democracy variable, the analysis uses the Unified Democracy Score developed by Pemstein et al. (2010) and released in 2014. Pemstein et al. (2010) construct the Unified democracy index by compiling varied governance indicators from different sources including Freedom House and Polity IV. Table 1 summarizes the list of variables used in the study. The study covers the period 1980-2011 (32 years) and is applied to the 15 countries composing the Economic Community of West African States (ECOWAS).

Table 1. Description and sources of variables

Data	Description	Source
Per Capita GDP (in logarithm)	Gross domestic product per inhabitant	Africa Development Indicators
Democracy score	Improvement in democracy (standard deviation)	The Quality of Governance (QOG) Standard Dataset
Terms of Trade (in logarithm)	Ratio export/Import	Africa Development Indicators
International Reserve (/ GDP)	The stock of international currency held by the Central Bank	World Economic Outlook
Gross fixed capital formation (/GDP)	Change in government physical assets. Also called public investment	Africa Development Indicators
Inflation (Percentage change)	Variation in domestic price (Consumer Price Index)	Africa Development Indicators
Government spending (/ GDP)	Government consumption expenditure on goods and services.	Africa Development Indicators
Domestic financing (/ GDP)	Domestic credit provided by financial sector	Africa Development Indicators, World Economic Outlook
Debt service ratio	Ratio total debt / export	Africa Development Indicators
Non-aid government budget (/GDP)	Difference between government tax and expenditure (net of aid)	Africa Development Indicators
Non-aid current account balance (/GDP)	Sum of net exports of goods and services, net primary income, and net secondary income (aid deducted)	Africa Development Indicators, IMF BOPS
Aid grant (/GDP)	Non repayable funds from multilateral, bilateral partnership, NGO etc.	Africa Development Indicators, IMF BOPS

Tables 2 presents a summary statistics of the main variables. Results show a deficit of both non-aid current balance and government budget. The deficit of the non-aid current account balance appears higher than that of the government budget (-0.13 against -0.1) indicating the important depletion of financial resources in absence of aid.

The large gap between the minimum value and the maximum value of the non-aid current account balance (-2.06 and 0.17) as well as the high standard deviation (0.20) show the high disparity between countries in terms of deficit. In the whole union, the amount of aid received during the study period represents 7% of GDP.

Table 2. Summary statistics of the main variables: ECOWAS countries

Variable	Obs	Mean	ECOWAS		
			Std. Dev.	Min	Max
Aid (/GDP)	383	0.07	0.18	0.00	1.88
Non-aid current account balance (/GDP)	375	-0.13	0.20	-2.06	0.17
Non-aid government budget (/GDP)	368	-0.10	0.11	-0.61	0.10
International reserve (/GDP)	451	0.11	0.09	0.00	0.74
Log GDP per capita	470	6.97	0.47	4.61	8.19

Table 3 establishes a comparative statistics between highly aid dependent and the relatively less dependent countries. Although highly aid dependent countries use more aid than others (10.16% against 3% for less dependent), their macroeconomic indicators remain unsatisfactory. In effect, they have the lowest per capita GDP (the log of per capita GDP is 6.85 for highly dependent countries against 7.15 for less dependent countries), and the highest deficit of both non-aid current account balance (-0.17 against -0.08 for less dependent) and non-aid government budget (-0.1 against -0.09). The reserves of international currency constitute around 11% of GDP in the union, with a higher ratio in highly dependent countries (11%) compared with less dependent countries (10%).

Table 3. Summary statistics: highly aid dependent ⁽¹⁾ countries vs. less dependent ⁽²⁾ countries

Variable	Obs	Less dependent				Obs	Highly dependent			
		Mean	Std. Dev.	Min	Max		Mean	Std. Dev.	Min	Max
Aid (/GDP)	156	0.03	0.02	0.00	0.10	227	0.10	0.22	0.00	1.88
Non-aid current account balance (/GDP)	156	-0.08	0.07	-0.19	0.17	219	-0.17	0.25	-2.06	0.09
Non-aid government balance (/GDP)	158	-0.09	0.13	-0.59	0.10	210	-0.10	0.09	-0.61	0.03
International reserve (/GDP)	172	0.10	0.08	0.00	0.39	279	0.11	0.10	0.00	0.74
Log GDP per capita	186	7.15	0.30	6.60	7.87	284	6.85	0.52	4.61	8.19

(1) : Cote d'Ivoire, Nigeria, Ghana, Togo, Senegal, Guinea

(2) : Cape Verde, Gambia, Liberia, Niger, Mali, Guinea-Bissau, Burkina Faso, Sierra Leone, Benin

The study uses the approach of Aiyar and Ruthbah (2008). Instead of looking at a worldwide picture of the absorption and spending capacity of aid, which can lack strong interpretations, this study focuses on a single economic union, namely the ECOWAS. By considering an economic union, the study shows how results and interpretations can be more pertinent when the union is composed of similar countries, with common general policy directives, which is the case of the ECOWAS. In addition, as the macroeconomic management of aid involves government, as well as the domestic sphere, limiting the control variables to few indicators, weakens the analysis, as the exclusion of relevant variables generates biases in the estimates. Therefore, this research introduces more control variables involved in both the management of aid and the financial sphere of the economy.

The following equation defines the specification for this research:

$$NACAB_{it} = \alpha_{1i} + \rho_1 NACAB_{it-1} + \beta_1 AID_{it} + \sum_{l=1}^L \sigma_{1l} X_{lit} + \varepsilon_{1it} \quad (8)$$

$$NAGB_{it} = \alpha_{2i} + \rho_2 NAGB_{it-1} + \beta_2 AID_{it} + \sum_{l=1}^L \sigma_{2l} X_{lit} + \varepsilon_{2it} \quad (9)$$

NACAB is the non-aid current account balance (divided by GDP); NAGB the non-aid government Budget (divided by GDP); AID, development grant (as divided by GDP); α_{1i} and α_{2i} are two constant terms reflecting the country i specific effect; ε_{1it} and ε_{2it} are error terms; σ_{1l} and σ_{2l} are two impact parameters related to the control variables; The subscript i represents the country index, and t the time; X_{lit} is a control vector of factors that can affect NACAB or NAGB. X_{lit} includes aid-grant, GDP per capita, democracy score, index of terms of trade, International reserves, gross fixed capital formation, inflation, government spending, domestic financing, and debt service ratio, as listed in table 1.

Three estimators are used in the analysis. The first estimator is the fixed effect OLS. This estimator is used to capture the impact of the dependent variables on the control variables overtime and across countries. The fixed effect model assumes that each country's characteristics affect the expected outcomes, and therefore need to be controlled. The second estimator is the Instrumental Variable (IV). IV is used to account for the possible endogeneity of the variable aid, and the spurious estimate that follows. The list of estimators found in the literature includes: lagged aid, lagged population (Burnside and Dollar, 2000), lagged inflation, land (Dalgaard et al., 2004), and infant mortality (Knack, 2000). Finally, the third estimator is the Generalized Method of Moments (GMM). GMM provides more robust results due to the strength of the estimator (consistent, and convergent), and its capacity to minimize biases, as compared to the Ordinary Least Squared, the Generalized Least Squared, and the Instrumental Variable (IV) etc.

Considering the fact that some countries are more highly aid dependent than others, the analysis provides 3 results: for the overall union, for highly aid dependent and for less dependent countries. To do this, first, the World Bank's ranking on aid dependency is used to select and classify countries with respect to their rank. Of 4 indicators (Aid as % of GNI, Aid as % of gross capital formation, Aid as % of central government expenditure and Aid as % of imports of goods and services) a preference is given to Aid as % of imports of goods and services, as it provides the longest time span data. Second, the top 9 countries, with a ratio above 30% are separated from the remaining countries. And finally, a comparative analysis between highly aid dependent and relatively less dependent countries is applied, using the three estimators (Fixed Effect, IV and GMM).

4. Results and discussion

Tables 4 and 5 report the absorption and spending capacity of aid in the whole union. As suggested by the result,

the three estimators show a higher absorption of aid, outreaching 0.8. In other words, a USD 1 increment in aid broadens the non-aid current account deficit by more than 0.8. The IV indicates a full absorption of aid (-1.08). On the contrary, the impact of aid on non-aid government budget (spending) is mixed. While the fixed effect indicates that around 20% of aid is spent, the IV estimation shows aid is rather used to reduce the deficit of government budget. However, the GMM estimator indicates non-significance of the coefficient.

This finding suggests that more aid related currencies are exchanged by the central bank than they are transferred to the real economy. Therefore, to finance its deficit, government can decide to either print notes, which could be harmful for the economy, as price of goods can increase, or to borrow from the private sector (domestic financing). In less-advanced countries such as ECOWAS, the fragility of the private sector as well as the financial system hinders the domestic financing capacity.

Government spending as well as public investment (gross fixed capital formation) has higher impact on the non-aid government budget than on the non-aid current account balance. A USD 1 increase in the government spending enlarges government budget by around USD 0.36 (table 5) and the current account deficit by USD 0.21 (table 4). In addition, a USD 1 increase in public investment broadens government budget by more than 0.32 on average (table 5), and increases the non-aid current account deficit by 0.17 on average (considering the fixed effect and GMM estimates in table 4). The relative higher impact of government spending and public investment on non-aid government budget is explained by the fact that these variables (government spending and public investment) are related to government actions on national budget, and therefore are likely to have more impact on non-aid government budget than non-aid current account balance. In contrasts, non-aid current account balance is closer to the central bank's interventions.

However, the impact of government spending and public investment appear lower than expected. Three reasons explain these results. First, the limited financial resources in the union reduces governments' flexibility on managing the national budget. An important contribution to the budget comes from external resources (loan, aid); the second reason is the problem of aid fungibility that affects the efficiency of aid. Fungibility is when aid is used for purposes different from the objectives for which it has been assigned. In many countries, aid has been used to finance government priorities (travels, palaces, electoral campaigns etc.); third, the issues of absorption, spending, and fungibility have developed a new way of support to poor countries. Many development partners invest directly to the partner country, with no involvement of government's actions. These types of support are not recorded in the balance of payment sheets.

Table 4. The impact of aid on non-aid current account balance (absorption)

VARIABLES	Non-aid government budget		GMM
	FIXED EFFECT	IV	
L.(Non-aid government budget)			0.4406*** (0.0858)
Aid (%GDP)	-0.2043* (0.1188)	0.1406*** (0.0373)	-0.0807 (0.1025)
GDP per capita	0.0711* (0.0411)	0.0932*** (0.0177)	0.1049*** (0.0349)
Democracy score (sd)	-0.0113 (0.1746)	-0.2027 (0.2236)	-0.0749 (0.1242)
Index of terms of trade	-0.0040 (0.0387)	-0.1147*** (0.0424)	-0.0034 (0.0368)
International reserves (/GDP)	0.2973*** (0.0717)	0.2174** (0.0861)	0.1046 (0.0749)
Gross fixed capital formation (/GDP)	-0.2925*** (0.0986)	-0.3782*** (0.0861)	-0.3166*** (0.0923)
Inflation	-0.0703 (0.0430)	-0.3570*** (0.0392)	-0.0674 (0.0473)
Government spending (/GDP)	-0.2397 (0.1625)	0.3581** (0.1391)	-0.2593 (0.1890)
Domestic financing (/GDP)	-0.3677*** (0.1270)	-0.1172 (0.1666)	-0.2843** (0.1447)
Debt service ratio (total debt/export)	-0.0434 (0.0332)	0.0181 (0.0403)	-0.0221 (0.0153)
Constant	-0.5018* (0.2754)	-0.4588*** (0.1349)	-0.6654*** (0.2536)
Observations	264	254	231
R-squared	0.2182	0.4192	
Number of id	15	15	15
Instruments	264	254	232
AR(1)	.	.	0.1464
AR(2)	.	.	0.4487
Hansen test of overid.	.	.	1

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5. The impact of aid on non-aid government budget (spending)

Variables	Non-aid current account balance		
	FIXED EFFECT	IV	GMM
L. (Non-aid government budget)			0.0041 (0.2560)
Aid (%GDP)	-0.8224*** (0.0743)	-1.0826*** (0.0188)	-0.8283*** (0.0623)
GDP per capita	-0.1209*** (0.0251)	-0.0060 (0.0087)	-0.1149*** (0.0438)
Democracy score (sd)	0.0467 (0.1083)	0.1406 (0.1113)	0.1028 (0.1465)
Index of terms of trade	0.0410* (0.0240)	0.0556*** (0.0211)	0.0339* (0.0193)
International reserves (%GDP)	0.1029** (0.0444)	0.0359 (0.0430)	0.0883 (0.0723)
Gross fixed capital formation (%GDP)	-0.1972*** (0.0606)	-0.1474*** (0.0431)	-0.1977 (0.1208)
Inflation	-0.0424 (0.0270)	-0.0089 (0.0197)	-0.0481 (0.0338)
Government spending (%GDP)	-0.0703 (0.1018)	-0.2072*** (0.0699)	-0.0032 (0.2099)
Domestic financing (%GDP)	-0.0739 (0.0791)	-0.0769 (0.0833)	-0.0590 (0.0694)
Debt service ratio (total debt/export)	-0.0611*** (0.0204)	-0.0500** (0.0200)	-0.0736 (0.0608)
Constant	0.7308*** (0.1671)	-0.0931 (0.0647)	0.6875*** (0.2593)
Observations	269	259	239
R-squared	0.4147	0.9567	
Number of id	15	15	15
Instruments	.	.	232
AR(1)	.	.	0.017
AR(2)	.	.	0.295
Hansen test of overid.	.	.	1

Standard errors in parentheses

p<0.01, ** p<0.05, * p<0.1

The difference between countries in terms of aid dependency prompts analyzing and comparing their performances regarding the use of aid. Tables 6 and 7 compare aid absorption and spending between highly aid dependent countries and less dependent countries. The analysis shows a higher absorption capacity of in highly aid dependent countries, outpacing USD 0.8 per USD inflow of aid as compared with less dependent countries (table 6). In less dependent countries, on average, around 50% of aid is absorbed by the central bank, lower than the whole union average (80%). However, the spending capacity appears better in less dependent countries, who have improved economic indicators, as well as good policy systems compared with highly dependent countries. As suggested by the result (table 7), although only the fixed effect shows a significant estimate for less dependent countries, the coefficient suggests that there is a full spending capacity in less dependent countries (-1.66). On the contrary, in highly dependent countries, aid is used to reduce government deficit rather than spent. Results show that a USD 1 increase in aid inflow reduces government deficit by around USD 0.08.

Moreover, the analysis indicates that government spending has higher impact in broadening budget deficit in less dependent countries (a USD1 increase in government spending increases the non-aid government budget by around USD 0.4), than highly aid dependent countries (USD 0.2), and the whole union (0.36). This finding shows that in less dependent countries, around 60% of government spending comes from external resources, against 80% in highly dependent countries. International reserve appears more effective in reducing non-aid current account balance in less dependent countries. A USD 1 increment in international reserves reduces the non-aid current account balance by USD 0.17. On the contrary, in highly aid dependent countries, the impact is more significant for the non-aid government budget. Around 40% of government deficit is reduced due to the central bank actions on aid-related reserves. This mitigated result shows that in less dependent countries, the central bank is more active in the use of aid, compared to highly dependent countries where

government has more control on aid (in many cases, for bureaucracy, and purposes rather than the objective for which aid has been provided).

A change in democracy score has different impacts on non-aid current account balance for both highly aid dependent countries and less dependent countries. Table 6 shows that improvement in democracy contributes to the enlargement of non-aid current account balance in less dependent countries, and reduces the non-aid current account balance in highly dependent countries. In both cases, the average absolute value of the impact is 0.3 for a 1 point change in the democracy score. This result is particularly important in the sense that it shows when democracy improves less dependent countries rely on borrowing more from the rest of the world. In effect, the non-aid current account balance can be interpreted as the difference between savings and investment (Olivei, 2010). On the contrary, highly dependent countries, through the stabilization of their financial system (due to the improvement in democracy), tend to borrow less from the rest of the world.

Table 6. AID ABSORPTION: Highly Aid dependents vs. less dependents countries

VARIABLES	Less dependents countries			Highly dependents countries		
	FIXED EFFECT	IV	GMM	FIXED EFFECT	IV	GMM
	Non-aid current account balance			Non-aid current account balance		
L.Non-aid current account Balance			0.5508***			-0.1768
			(-0.0859)			(-0.281)
Aid (/GDP)	-0.3767	-0.7828**	-0.3640*	-0.8270***	-1.0870***	-0.8239***
	(-0.2770)	(-0.3181)	(-0.2099)	(-0.0856)	(-0.0237)	(-0.0532)
GDP per capita	-0.0805	0.0519**	0.0271	-0.1361***	-0.0131	-0.1372***
	(-0.0518)	(-0.0225)	(-0.0166)	(-0.0311)	(-0.0176)	(-0.0432)
Democracy score (sd)	-0.3156**	-0.2504*	-0.0837	0.3846**	0.3862*	0.4637**
	(-0.1294)	(-0.1301)	(-0.1085)	(-0.1713)	(-0.2031)	(-0.2334)
Index of terms of trade	0.0229	0.0489*	0.0058	0.0221	0.0091	0.0394
	(-0.0283)	(-0.0251)	(-0.0197)	(-0.059)	(-0.0516)	(-0.1236)
International reserves (/GDP)	0.1782***	0.1705***	0.0353	0.0235	-0.043	0.0539
	(-0.0593)	(-0.056)	(-0.048)	(-0.0637)	(-0.0716)	(-0.0594)
Gross fixed capital formation (/GDP)	-0.2164**	-0.3444***	-0.1370**	-0.2150***	-0.1009	-0.1656
	(-0.1018)	(-0.0655)	(-0.0624)	(-0.079)	(-0.0635)	(-0.1438)
Inflation	0.0015	0.0732**	0.0417	-0.0461	-0.017	-0.0650*
	(-0.0417)	(-0.0362)	(-0.029)	(-0.0369)	(-0.0267)	(-0.0381)
Government spending (/GDP)	-0.4274***	-0.4633***	-0.1399	0.1346	-0.2023*	0.2082
	(-0.155)	(-0.1287)	(-0.1079)	(-0.1447)	(-0.109)	(-0.1975)
Domestic financing (/GDP)	-0.0517	-0.008	-0.0224	-0.175	-0.1624	-0.2161
	(-0.0785)	(-0.081)	(-0.0633)	(-0.2028)	(-0.2263)	(-0.1872)
Debt service ratio (debt / export)	-0.0194	-0.0465	-0.0241	-0.0687***	-0.0475*	-0.119
	(-0.0366)	(-0.0305)	(-0.0248)	(-0.0259)	(-0.0267)	(-0.0869)
Constant	0.5892*	-0.3865***	-0.1786*	0.7707***	0.0046	0.6849**
	(-0.3483)	(-0.1323)	(-0.1044)	(-0.217)	(-0.1594)	(-0.3443)
Observations	118	113	113	151	146	133
R-squared	0.4454	0.5717		0.4837	0.9685	
Number of id	6	6	6	9	9	9
Instruments			107			134
AR(1)	.	.	0.0739	.	.	0.0179
AR(2)			0.9285			0.149
Hansen test of overid.	.	.	1	.	.	1

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 7. AID SPENDING: Highly aid dependent vs. Less dependents countries

VARIABLES	Less dependents countries			Highly dependent countries		
	FIXED EFFECT	IV	GMM	FIXEDEFFECT	IV	GMM
	Non-aid government budget			Non-aid government budget		
L.(Non-aid government budget)			0.7941*** (-0.0705)			0.3739*** (-0.1307)
Aid (/GDP)	-1.6578*** (-0.5931)	1.8370 (1.1666)	0.4809 (-0.5399)	-0.1062 (-0.1058)	0.0827*** (-0.0281)	-0.0249 (-0.0879)
GDP per capita	0.2749** (-0.1207)	0.3176*** (0.0849)	0.0805* (-0.0462)	0.0094 (-0.0385)	0.0212 (-0.0209)	0.0675** (-0.0296)
Democracy score (sd)	-0.0348 (-0.2781)	-0.3624 (0.5327)	-0.084 (-0.2726)	0.1308 (-0.2118)	-0.2417 (-0.2409)	-0.0677 (-0.1532)
Index of terms of trade	0.1203** (-0.0603)	-0.3172*** (0.0894)	-0.0596 (-0.0535)	-0.0546 (-0.0729)	-0.1244** (-0.0612)	-0.0138 (-0.0806)
International reserves (/GDP)	0.0559 (-0.1275)	0.1404 (0.1668)	0.0313 (-0.1107)	0.5346*** (-0.0787)	0.3743*** (-0.0849)	0.2394** (-0.0955)
Gross fixed capital formation (/GDP)	-0.5166** (-0.2277)	-0.3376 (0.2236)	-0.0455 (-0.1419)	-0.2138** (-0.0977)	-0.2576*** (-0.0753)	-0.3034*** (-0.1088)
Inflation	0.0331 (-0.0905)	-0.3476*** (0.127)	-0.0374 (-0.0803)	-0.0702 (-0.0446)	-0.2666*** (-0.0317)	-0.0930** (-0.0384)
Government spending (/GDP)	-0.5483 (-0.3314)	0.1706 (0.3675)	-0.1987 (-0.2569)	0.1849 (-0.1788)	0.1884 (-0.1293)	0.082 (-0.1515)
Domestic financing (/GDP)	-0.2377 (-0.1667)	-0.2487 (0.2703)	-0.1612 (-0.1675)	-0.2847 (-0.2507)	-0.0096 (-0.2684)	-0.13 (-0.2231)
Debt service ratio (debt /export)	-0.0586 (-0.0792)	0.0614 (0.0916)	-0.004 (-0.0656)	-0.0424 (-0.032)	-0.0203 (-0.0316)	-0.0288** (-0.0119)
Constant	-2.0969** (-0.8272)	-1.6665*** (0.4245)	-0.4363 (-0.2831)	-0.0984 (-0.2683)	0.0607 (-0.1891)	-0.4423* (-0.2555)
Observations	113	108	110	151	146	129
R-squared	0.2737	0.5144		0.3914	0.529	
Number of id	6	6	6		9	9
Instruments	.	.	110	.	.	130
AR(1)	.	.	0.02	.	.	0.205
AR(2)	.	.	0.176	.	.	0.6283
Hansen test of overid.	.	.	1	.	.	1

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

5. Conclusion

For over 50 years, Africans and specifically ECOWAS countries have been waiting for an economic miracle, in spite of the huge amount of aid received every year. Concerns about the effectiveness of aid in improving countries' living standards justify the importance of this research. The study is aimed to analyze the absorption and spending capacity of aid inside the union, using appropriate econometric tools. The findings suggest the following: (i) the spending capacity of aid remains unsatisfactory in the whole union; (ii) the absorption capacity is found to be higher in highly aid dependent countries, than less aid dependent countries; (iii) spending appears to be high in less dependent countries. On the opposite, in highly aid dependent countries a little amount of aid (8%) is used to finance government deficit.

However, this study has some limitations. The first limitation is the exclusion of aid fungibility. The study does not investigate how the mismatches between development partners' expectations and recipient countries' actions affect the macroeconomic indicators. The second limitation is the approach itself. In effect, it would have been more pertinent to investigate the country-specific performance in terms of management aid, in order to have deep insight of the issue of aid effectiveness.

The union has been exploring different mechanisms to improve the effectiveness of aid in eradicating poverty, and improving people's living standards. The numerous forums on aid disbursement, followed by structural adjustments and all other reforms are expected to bring a change in the final outcomes. As developing countries are on the way to move from the Millennium Goals for Development (MGDs) to the Sustainable Development Goals (SDGs), the development partners as well as ECOWAS countries, in a coordinated manner have to be more responsible in their respective roles. On one hand, an assessment and revision of their roles in the development process is necessary. On the other hand, stronger commitment and prudent cooperation is required to make their actions more effective. With the SDGs, and all other new concepts, many indicators are on the way to being developed. This creates more challenges for the recipient countries, the donors as well as the researchers.

In the context of globalization, and the attainment of SDGs, countries' economic and political conditions have high knock-on effect on other regions. This research is a starting point for deeper investigation of the absorption and spending capacity of aid. Further research should not only consider the factors that affect the fungibility of aid, but also how the economic conditions and political stability of the regions affect the absorption and spending of aid, and how factors such as remittances, and foreign direct investment can influence government actions on aid.

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Appendix: Theoretical model

This section explores the theory behind the concept of absorption and spending of aid in the case of a small open economy, following the original model developed by Berg et al. (2010).

Suppose a small economy connected to the rest of the world, and having two types of goods: tradable and non-tradable, denoted by T and N, respectively. The economy is composed of four agents: households, firms, central bank, and government. Each agent has an important role in the economy, and is guided by a constrained utility or profit maximization. Government's action is guided by the concern to protect the economy from a sudden collapse.

1. Households constraints

Considering a continuum of households, the consumption function is given by a Constant Elasticity Substitution function (CES):

$$C_t^j = \left[\varphi^{\frac{1}{\chi}} \left(c_t^{jN} \right)^{\frac{\chi-1}{\chi}} + (1-\varphi)^{\frac{1}{\chi}} \left(c_t^{jT} \right)^{\frac{\chi-1}{\chi}} \right]^{\frac{\chi}{\chi-1}} \quad (1)$$

Price of goods is given by the CPI:

$$P_t = \left(\varphi \left(P_t^N \right)^{1-\chi} + (1-\varphi) \left(P_t^T \right)^{1-\chi} \right)^{\frac{1}{1-\chi}} \quad (2)$$

Where: P_t^T is the price of tradable goods; and P_t^N the price of non-tradable goods; χ the elasticity of substitutions between tradable and non-tradable goods; φ the bias in domestic consumption; j household index. From equation (1) the derived demands functions for tradable and non-tradable goods are respectively given by:

$$c_t^{jT} = (1-\varphi) \left(\frac{S_t P_t^T}{P_t} \right)^{-\chi} c_t^j \quad (3)$$

$$c_t^{jN} = \varphi \left(P_t^N \right)^{-\chi} c_t^j$$

Households are divided into 2 categories: asset holders and non-asset holders.

- Asset holders consume a portion of their income, and save the remaining for future consumption. Their objective is to maximize a long-term utility function:

$$E_0 \sum_{t=0}^{\infty} \beta^t \left[\log(c_t^a) - \frac{\chi}{1+\psi} (l_t^a)^{1+\psi} \right] \quad (4)$$

Subject to the budget constraint:

$$c_t^a + b_t^{ac} + s_t b_t^{a*} = w_t l_t^a + i_{t-1} \frac{b_{t-1}^{ac}}{\pi_t} + s_t i_{t-1}^* b_{t-1}^{a*} - s_t Q(b_t^{a*}) + \Omega_t^{aN} - \tau \quad (5)$$

Where: l_t^a the supply of labor; ψ the inverse of labor supply elasticity; i_t nominal interest rate; b_t^{ac} domestic bonds; b_t^{a*} real foreign asset; $Q(b_t^{a*})$ adjustment cost of assets; S_t nominal exchange rate, π_t domestic inflation, w_t real wage; Ω_t^{aN} profits received the non tradable sector's firms; τ is a lump sum tax (real value).

The resulting optimum solution for an asset holder is given by :

$$\chi (l_t^a)^{\psi} = \frac{w_t}{c_t^a} \quad (6)$$

- Non-asset holders maximize the same long-term utility, however, they face a rigid budget constraint:

$$c_t^h = w_t l_t^h - \tau^h \quad (7)$$

Where the superscript h denotes the non-asset holder.

The first order solution is given by:

$$\chi (l_t^h)^{\psi} = \frac{w_t}{c_t^h} \quad (8)$$

Aggregating both asset holder and non-asset holder's solution derives the consumer solution:

$$x_t = \wp x_t^a + (1-\wp) x_t^h \quad (9)$$

Where \wp is the fraction of non-asset holders and x_t a function of c_t , c_t^N , c_t^T , l_t , b_t^* , b_t^c , Ω_t^N

2. Firms constraints

There are two categories of firms: firms from the tradable sector and firms from the non-tradable good sector.

- In the non tradable good sectors, firm's objective is to maximize a “discounted flow of profit” (Berg et al. 2010, pp. 11):

$$E_0 \sum_{t=0}^{\infty} J_t \left[p_{it}^N \left(\frac{p_{it}^N}{p_t^N} \right)^{-\theta} y_t^N (1+\iota) - w_t^N \left(\frac{p_{it}^N}{p_t^N} \right)^{\frac{\theta}{\alpha}} \left(\frac{y_t^N}{z^N} \right)^{\frac{1}{\alpha}} - \Gamma(p_t^N, y_t^N, \pi_{it}^N) - \iota p_t^N y_t^N \right] \quad (10)$$

The first order condition provides the solution for at the optimum level.

$$\pi_t^N (\pi_t^N - 1) = \beta E_t \left[\frac{c_t^a}{c_{t+1}^a} \pi_{t+1}^N (\pi_{t+1}^N - 1) \right] + \frac{1}{\xi} \left[\frac{\theta}{(1+\iota)(\theta-1)} \left(\frac{w_t^N}{p_t^N} \right) \left(\frac{y_t^N}{z^N} \right)^{\frac{1-\alpha}{\alpha}} - 1 \right] \quad (11)$$

where:

$$J_t = \beta \frac{c_t^a}{c_{t+1}^a}$$

θ reflects the elasticity of substitution between tradable and non-tradable goods;

y production ; i the type of good; α the repartition of labor in each sector; z^N an index of productivity, and ι is the amount of subsidy received by firm i .

- In the tradable good sector, it is assumed a perfect competition. Price automatically adjusts to supply and demand. The maximizing function of profit is given by:

$$E_0 \sum_{t=0}^{\infty} J_t \left[s_t z^T (l_{it}^T)^{\alpha} - w_t^T l_{it}^T \right] \quad (12)$$

And the derived solution:

$$\frac{w_t^T}{s_t^T} = \frac{(y_t^T)^{\frac{1-\alpha}{\alpha}}}{(z^T)^{\frac{1}{\alpha}}} \quad (13)$$

3. Government and spending of aid

To finance its purchases (spending) government makes use of the following tools:

Taxes (??), foreign aid ($s_t A_t^*$), the central bank's reserve, domestic bonds in exchange of an interest rate b_t^c .

The budget constraint is given by:

$$p_t^g g_t = \tau - \frac{(i_{t-1} - 1) b_{t-1}^c}{\pi_t} + s_t A_t^* + \left(b_t - \frac{b_{t-1}}{\pi_t} \right) - \left(d_t - \frac{d_{t-1}}{\pi_t} \right) \quad (14)$$

Where g_t is tradable or non tradable goods; p_t^g the price of good.

Assuming that the variable aid follows an autoregressive process of order 1:

$$A_t^* = A^* + \rho_A (A_{t-1}^* - A^*) + A^* \varepsilon_t \quad (15)$$

Where A_t^* is the initial level of aid.

Deposit of aid gives a hint on government fiscal policy. The autoregressive process of deposit related to aid is therefore given by:

$$d_t = \rho_d d_{t-1} + (1 - \rho_d) d + (1 - \gamma) s_t (A_t^* - A^*) \quad (16)$$

In the equation, **spending** of aid reflected in \mathbf{F} . Following an increment in aid, government uses a portion \mathbf{F} to finance its purchases.

4. Central bank and absorption of aid

The monetary policy undertaken by the central bank follows the Taylor (1993) rule:

$$i_t = \frac{1}{\beta} (\pi_t^N)^{\phi\pi} \quad (17)$$

Combine with a long-term objective of reserve accumulation

$$R_t^* = \rho_R R_{t-1}^* + (1 - \rho_R) R^* + (1 - \omega)(A_t^* - A^*) \quad (18)$$

When the amount of aid in the reserve increases at a fraction $(1 - \omega)$, central bank draws a portion of the increment, at fraction ρ_R . The short-term **absorption** of aid is reflected by ω .

5. *Equilibrium and possible use of aid*

By adding all budgets constraints (households, firms, government and central bank,) the balance of payment equilibrium provides the three possible use of aid:

$$A_t^* = \left[c_t^T + g_t^T - y_t^T + \phi Q(b_t^{a*}) - (i_{t-1}^* - 1)b_{t-1}^* \right] + (b_t^* - b_{t-1}^*) + (R_t^* - R_{t-1}^*) \quad (19)$$

The right hand side of the equation indicates that aid can be used to finance a net aid current account deficit (first term), fill in the capital account (second term) or can be saved in the reserve of international currencies.