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Foreign debt sustainability and human development in Sub Saharan Africa

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Abstract

Despite the debt relief initiatives at the turn of the century, the external debt of Africa is rising again with some new worrying features: diminishing concessionality, growing private component and a strong presence of opaque Chinese loans. Sub-Saharan countries devote a relevant portion of their fiscal resources to service the debt, this prevents them from increasing development expenditures. The 2020 Debt Service Suspension Initiative, DSSI, by the G20 recognizes these difficulties but it falls shorts from providing long term solutions. We evaluate external debt sustainability in four SSA countries: Cote D'Ivoire, Ethiopia, Ghana, and Kenya plus a composite country called Wakanda, representative of the whole region. We adopt a framework called geometry of Debt Sustainability, GDS, (Vaggi and Prizzon 2014) which focuses on some structural aspects of sustainability, in particular on the current account. We add a Human Development factor to the basic GDS model in order to evaluate how debt sustainability could change if these countries should improve spending on health and education. The results confirm a clear trade-off between debt service and human development expenditures. The model shows that even before the Covid-19 pandemic the four countries and Sub Saharan Africa were on unsustainable debt trajectories; the debt to GDP ratios would stabilize only at extremely high values. The results are coherent with the Debt Sustainability Analysis of the International Monetary Fund and the World Bank.

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1. Old and new trends in SSA Debt Dynamics

1.1 The fall and rise of the debt ratio.

On March 6th, 2021 *The Economist*, the magazine has an article on developing countries debt by the title: *Here we go again*. The story of developing countries foreign debt is now almost forty years long and lasting solutions seem to be lacking, at least for the Low Income economies, particularly in sub Saharan Africa, which are the focus of this paper.

In august 1982 Mexico defaulted on part of its foreign debt; this was the beginning of a long sovereign debt crisis which involved more than 30 countries in four continents, and which led to two 'lost decades', stagnation of GDP per capita in three regions, Sub Saharan Africa, SSA, Middle East and Nord Africa, MENA, and Latin America and the Caribbean, LAC. In the 1990s many SSA countries reached extremely high level of public debt, with peaks over 100% of GDP and serious impact on economic growth.[1] After many years of rescheduling in 1996 the World Bank promoted the Heavily Indebted Poor Countries Initiative (HIPC) which at last was considering the possibility of debt cancellation. The Initiative was strengthened in 1999 at the Cologne G7 meeting thanks also an international advocacy campaign, Jubilee 2000. In 2005 the IMF and the World Bank launched the Multilateral Debt Relief Initiative (MDRI) for a partial cancellation of multilateral debt owed to the two financial institutions.[2] in order to sustain their development expenditures. Debt relief programs to 36 heavily indebted countries, 29 of which were from Sub-Saharan region, reduced their nominal public debt for a total amount of 110 billion of dollars.[3]

Even if the level of indebtedness of SSA countries are on average far from the ones reached before HIPC and MDRI programmes as Figure 1 shows that in SSA the average general government debt as a percent of GDP falls from 110 in 2001 to 35 in 2012, but then it raises again to reach 55 percent in 2017. According to the IMF, the projections after Covid-19 crisis in 2020 estimated an average SSA total public debt to GDP of 65,6% (IMF Regional Economic Outlook 2020, October, Box 1.2 p. 16).

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[1] It is the so called "Debt overhang" a situation in which potential investors are discouraged by of the already high debt and the fear that the returns from investments might accrued to previous lenders; a condition which damages both the debtor a country and its creditors.
(see for instance Krugman 1989).

[2] A comprehensive analysis of many debt episodes and of four major waves of debt is in Kose et al. 2021.

[3] According to the IMF, Policy Paper No. 19/028 the largest recipients were the Democratic Republic of the Congo ($ 16.2 billion), Ghana ($ 7.2 billion), Tanzania ($ 6.7 billion), Zambia ($ 6.5 billion), Ethiopia ($ 6.4 billion) and Cameroon ($ 6.1 billion).

Figure.1 SSA Total Public Debt % GDP, 1976-2018
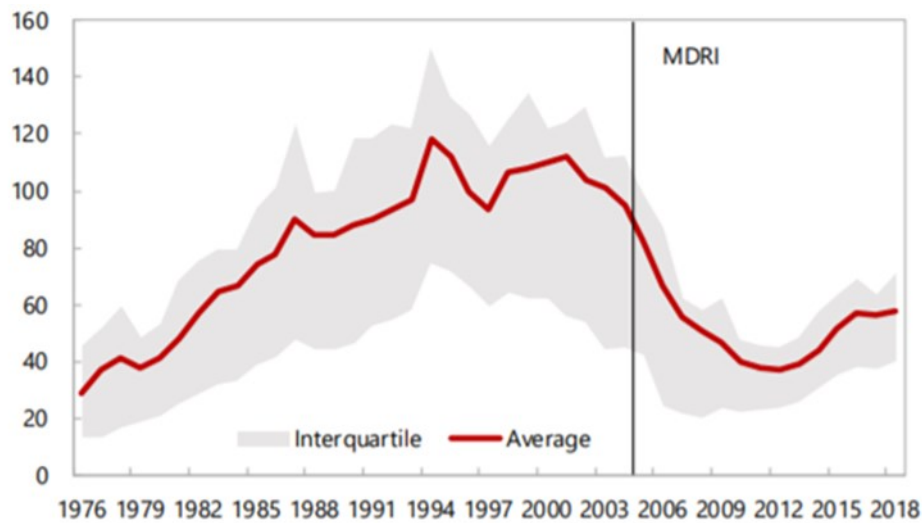
Source: Sustainable Development and Debt, IMF, African Department, 2019

As a result, the size of debt service as a share of government revenues and expenditures has increased close to 40% and to more than 30% respectively in 2018 (see Figure 2) reaching levels similar to the pre-debt relief ones.[4]

Figure.2 SSA average Debt Service as % of revenue (black) and expenditure (orange)

Source: Mandri, El Jai, 2019, Policy Center For the New South

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[4] On average in SSA region, the interest payments-to-revenue ratio doubled from about 5 percent in 2010 to 10 percent in 2018. For oil exporters, this ratio increased fourfold during that period. A growing number of countries spend more than 15 percent of their public revenues on interest payments. (International Monetary Fund "Sustainable development and debt", IMF African Department 2019, p. 14)

1.2 Drivers of the new debt accumulation

We can briefly look at the main causes of this new debt build up.

Global Financial Crisis. The global financial crisis in 2008 produced a reduction in foreign aid and capital flows to SSA, with a declining trend in Official Development Assistance (ODA); between 2005 and 2014 ODA inflows in SSA region decreased from 4.5 to 2.5 per cent of GDP (Authors' calculation based on IMF World Economic Outlook Database, October 2019 Edition).

Terms of Trade Shock. A second important shock was the 2014 terms of trade shock, when, starting from June 2014 the oil price declined by 70% as other commodity prices which led to a decrease in the value of export and to deficits in the current account, particularly in resource-intensive countries. Due to the two shocks the SSA region entered a period of twin deficits: since 2009 both the primary fiscal and the current account balance are in the negative, even before the 2000 Covid-19 pandemic, see Figure 3 (see also World Bank 2016, p. 17).

*Figure.3 SSA Average Primary Fiscal Balance and Current Account % GDP*
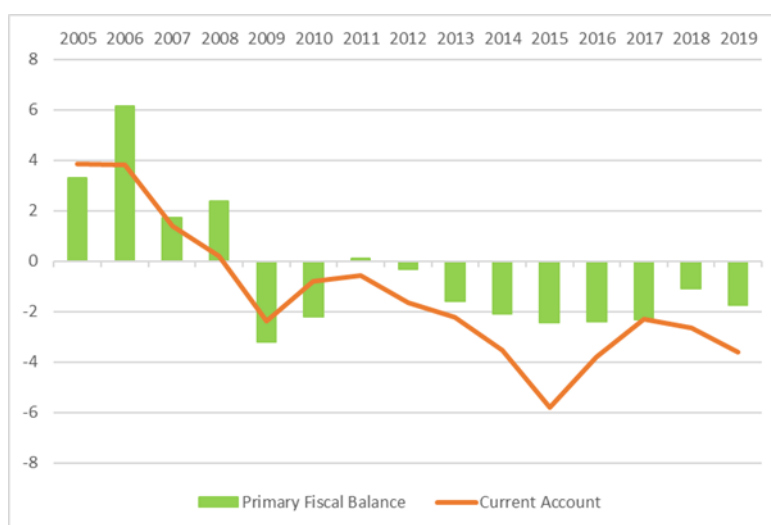
Source: Author's calculation based on IMF World Economic Outlook Database, October 2019

Decreasing domestic savings African governments have huge financing needs for development, but domestic savings are stagnating and even decreasing, between 2005 and 2019 they have decreased from around 25 to less than 22 percent of GDP (World Bank Open Data Database).

Low interest rates and new borrowing. These difficulties due to the external position and to the lack of fiscal space s were compensated by a wider access to international financial markets favoured by a period of low global interest rates. Many governments in high income countries reacted the US

Troubled Assets Relief Program, TARP of 700 billion dollars of fall 2008. Many Central banks used an expansionary monetary policy also through unconventional measures such as Quantitative Easing. These measures generated a low interest rate environment with even negative values and the so called zero-bound-level (see Baldwin and Teulings 2014). This situation led private investors to look for higher yields in emerging market economies but also in LICs countries in Africa, which after the two major debt relief initiatives had improved their debt indicators. Starting from 2006 with Seychelles many SSA countries issued bonds on international financial markets, to private creditors see Figure 4.

Fig.4 International Bond Issuances
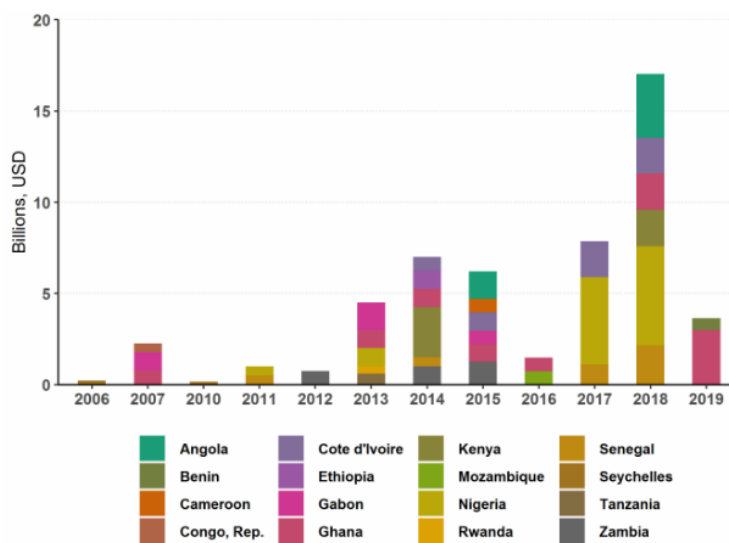
Source: Coulibaly et al,2019, Brookings, based on Bloomberg Data

The African market became relevant in 2013 when the total issuance reached almost 5 billion of dollars.[5] 2016 registered a cumulative issuance of 20,3 billion of dollars, with almost 80% of it being issued between 2013 and 2015. 2018 has seen the largest yearly issuance in the previous decade, about $17 billion (Figure 4).[6]

Bonds issuances brought more and faster financial resources to African Countries, but they boosted the external debt and increased its overall risk and the cost of the service,[7]

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[5] Returns on African bonds have always been pretty high, within a range of 5-10%, with some peaks even above 15% (Senga et al. 2018). Despite being called Eurobonds most of the issuances are in US dollars.

[6] From 2019 the bond market activity of African countries has slowed; however huge new issuances are expected in the future due to the fact that many bonds will reach maturity ones.

[7] External borrowing is becoming more and more important to fill the annuals financing needs that the African Development Bank (AfDB) estimates between 130 and 170 billion dollars with a financing gap between 68 and108 billion (see African Development Bank 2018, p. 70).

Exchange Rate Depreciation. Debt issuances generally are not hedged against currency risks, the domestic currency value of unhedged foreign debt increased, a worrying condition in a scenario of commodity trade slowdown and exports downturn, which have led to exchange rate depreciations. According to a report by Brookings (Brookings 2017) large primary deficits and exchange rate depreciation accounted for more than half the rise in public debt levels since 2014.[8] The same line is taken by the African Department of IMF, for whom the main source of debt accumulation is the growing primary deficit, especially in oil exporters countries (see IMF African Department 2019, p. 12, Figure 16).

1.3 Composition of debt

The debt that has been accumulated by SSA countries during the last fifteen years is far different from that of the last century.

Domestic and External Debt. There are two main components of public debt: domestic and domestic debt are scarce. We can find some data in the documents from some countries' Ministers of Finance or Treasury (MOF); however, they cover a small number of years. We follow Coulibaly et al. 2019 (p. 10), who show that the average level of domestic debt increased from 14 to 23 percent of GDP between 2012 and 2017, while external debt grew from 23 percent to 31 percent of GDP. Even after debt relief initiatives, external debt still represents the dominant component.

Concessional and Commercial Lending. The creditors composition has significantly changed in the last of the total; the private component portion of total external debt started to gain space in the early 2000's (Figure 5), but this was a result of the HIPC and MDRI debt reduction initiatives. In absolute value private external debt starts to expand since 2009.

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[8] In 2014Ghana and Zambia have already suffered the depreciations of the Cedi and Kwacha, leading to a 10% increase in the external debt-to-GDP ratios of both countries (see Van Cauwenbergh and Laleman 2018).

Figure.5 Private Debt Component Evolution since 1970
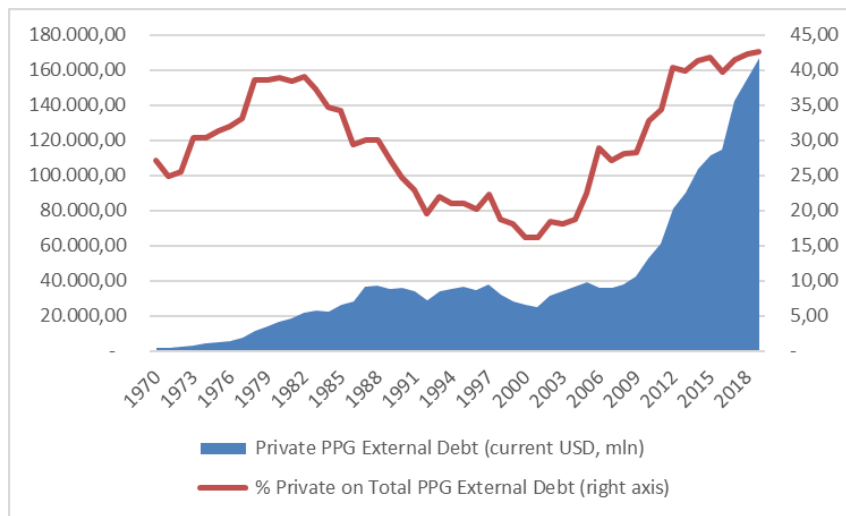
Source: Authors' calculation based on International Debt Statistics Database 2019 by WB

Today the private component represents on average more than 40% of the SSA external debt (see also UNCTAD 2020b). The access to international financial markets allows for a diversification of lending sources and catalyses more attention from advanced economies to the development of the region. However, the access to market financing carries some risks, including exposure to global market volatility, moreover private debt is contracted at higher interest rates and shorter maturities (Figure 6).

Figure.6 Average yields and maturity of new SSA bonds, 2009-2017.
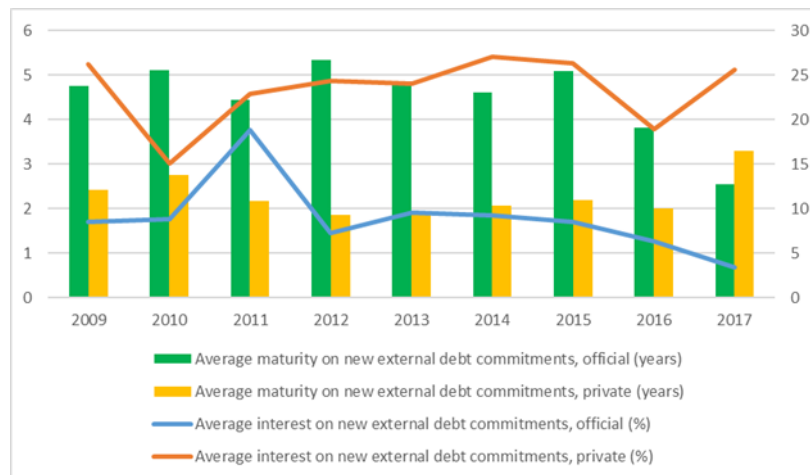
Source: Author's calculation based on International Debt Statistics Database 2018 by WB

For private loans there is also the risk of **legal costs for disputes**. One example is represented by the case of vulture funds which can buy sovereign debt on the secondary market at very high discount values and then open a cause against the country; bonds are issued mainly under foreign jurisdiction, as the English law or the New York State law, whenever there is a dispute, the court is more likely to favour creditor's interests and *"The legal characteristics of bonds may make them difficult to restructure"* (Bonizzi et al. 2020, p. 8).

Composition of bilateral creditors. The composition of bilateral creditors is changing The share of SSA public debt from Paris Club creditors has reduced from 15 percent in 2007 to 7 percent in has risen from 17 percent to 28 percent, the main Non-Paris Club bilateral creditors are India, Saudi Arabia, and Kuwait, and China. This is a double-edged sword, on one side it diversifies the sources of borrowing, on the other it complicates negotiations in case of rescheduling or default; a debtor country will have to negotiate on multiple fronts and face many debt disputes.

Resource-backed loans. Recently many SSA countries, have started to issue debt that is collateralized with commodities, the so-called resource-backed loans (RBL) and the repayment is either made directly in natural resources, or from the revenues deriving from their sale. According to a report by the Natural Resource Governance Institute of February 2020, 11 SSA countries have contracted a total of 30 resource-backed loans for an amount of 66 billion USD (Mihalyi et al. 2020, p. 16).[9]

The structure of public debt is becoming more complex for SSA governments, due to a diversity of creditors and growing use of complex financing instruments, however "the capacity in many SSA countries in this area remains weak, according to existing measures of debt management capacity" (Mustapha and Prizzon 2018, p. 6).[10]

1.4 Chinese lending in Africa

China first official loan to Africa was in 1960 to Guinea, however Chinese banks are relatively new to the continent, as the start of their lending activity was in 1994. Since then, Chinese financing proliferated in all SSA region and it grew in its intensity in 2013 with the Belt and Road Initiative (BRI). According to the data from the China Africa Research Initiative (CARI), the total amount of

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[9] 40 billion are collateralized with multisector projects, most of which are about oil and energy, in a smaller measure mineral, and few of them linked to infrastructures and education. The main creditors are China Eximbank and China Development Bank.

[10] The Country Policy and Institutional Assessment (CPIA) debt policy indicator has recently decreased since 2014. CPIA is a World Bank index of the quality of governance which is updated annually.

loans in 2018 reached the value of 148 billion dollars (Brautigam et al. 2020). 805 of the loans come from the Chinese government or state-owned banks like Exim Bank of China, China Development Bank, and many other industrial and commercial banks; the remaining 20% is made of companies (mainly state-owned).[11] In more than half of the countries at high risk of debt distress China represents less than 15 percent of total Public and Publically Guaranteed, PPG, external debt and debt service, and only in seven countries China accounts for more than 25% of all PPG debt (Brautigam et al. 2020).[12] However, if we consider only bilateral China accounts for 60% of total bilateral PPG debt, and 17% of total foreign interest payments of African countries.

Let us summarize the recent trend in SSA debt and the main differences the debts from the 1980s.

- Debt service is growing as a percent of revenues and expenditures.
- More domestic debt, but external component is still dominant.
- Private component is increasing due to the access to the international bond markets.
- New forms of loans, like resources-backed loans.
- Bilateral lending sees the growing role of China.

2. A weak response to Covid-19 Crisis: The Debt Service Suspension Initiative

With the advent of the Covid-19 pandemic many developing countries face a new challenge on top of those they are already facing also in view of the SDGs. So far, the main measure that has been promoted at global level for helping poor countries to avoid insolvencies and debt distress is the Debt Service Suspension Initiative (DSSI) announced by the G20 on 15 April 2020. The initial proposal was an agreement to suspend the debt services (both principal and interest payments) owed by the poorest developing countries to bilateral government lenders from 1 May to 31 December 2020, DSSI has been first extended to June 2021 and then to December 2021.

Among the creditor countries are the Paris-Club members and some other bilateral lenders: five are G20 participants: India, Saudi Arabia, South Africa, Turkey and China, plus Portugal, Libya and United Arab Emirates (Fresnillo 2020, Tables 5, p. 6). DSSI is a rescheduling or reprofiling not a

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[11] There are many types of Chinese lenders, the terms of lending are various and not always clear (Morris et al. 2020). The average interest of its loans is around 2 percent, China has a different approach from traditional western borrowers (Were 2018).

[12] In 2019 China published a debt sustainability framework for BRI adherents' countries (Ministry of Finance, People's Republic of China, 2019). There are some contact points with the IMF framework, but also remarkable differences (see Malm 2019).

cancellation, after a one-year grace period, each debtor country will have three to five years to pay back the debt.[13]

The countries allowed to ask for the suspension are the "Least Developed Countries" according to the United Nations definitions and those which eligible to borrow form World Bank's International Development Association (IDA), the lending window dedicated to Low Income Countries. Hence a total of 77 countries could access to DSSI, 35 of which are SSA countries. To access to the initiative indebted countries must request the DSSI to their bilateral creditors and have to apply for IMF emergency financing facilities. Once the suspension is activated, countries must commit the funds saved to social and welfare expenditures.[14]

Four of the 77 eligible countries were denied the participation: Eritrea, Sudan, Syria, and Zimbabwe indeed have an history of perpetual arrears with International Financial Institutions as World Bank and IMF. Within the remaining 73, just 46 are participating, 30 of which are in Sub-Saharan Africa. Of the African countries that we will analyse Cote D'Ivoire, Ethiopia and Kenya have requested DSSI, while Ghana stays out.

There are three main reasons for countries to refuse DSSI (see Fresnillo 2020, p. 3).

- As long as a country has a small and manageable level of debt, the suspension gives minimal benefits.

- To access DSSI is necessary to ask for IMF financing and many countries prefer to avoid it; they still remember the role the Fund played in the crisis of the 1980s and 1990s.[15]

- Many countries fear the downgrade of their rating by credit agencies after participating to debt suspension. The stigma indeed undermines the access to international financial markets and increase the cost of borrowing.[16]

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[13] This is a Net Present Value, NPV, neutral solution, in the sense that the Net Present Value of the debt does not change, there is only a delay in the repayment period.

[14] The country must not access new non-concessional borrowing above the limits agreed in the initiative are forbidden; the fear is that the money saved would be used to pay back private creditors. Hatchondo et al. find that the suspension of debt payments would be more effective if accompanied by voluntary haircuts (see Hachondo et al. 2020).

[15] In April 2020 IMF has modified for the COVID-19 events a debt service relief program created in 2015, the Catastrophe Containment and Relief Trust. However, its aim is just to provide fast resources for emergency rather than mitigate debt problems. Also, just 25 countries are eligible, and it covers not more than 6 months. Debt Stock relief could be activated but only under extremely catastrophic events.
See https://www.imf.org/en/About/Factsheets/Sheets/2016/08/01/16/49/Catastrophe-Containment-and-Relief-Trust

[16] This is the case of Kenya which initially did not adhere to DSSI: a large part of its external debt is owed to private creditors, an eventual stigma on its capacity to service it will entail huge costs that could outweigh the short-run benefits of a temporary suspension. Lang et al. 2021 find no negative impact on borrowing costs of countries eligible for DSSI (see Lang et al. 2021).

Table.1 SSA DSI

Country	Risk of External Debt Distress DSA	Date of the Publication of the latest DSA	Potential Savings May 2020-June 2021, % GDP	Potential Savings May 2020-June 2021, USD millions
Angola	…	…	3,30	3.027,70
Burkina Faso	Moderate	nov-20	0,30	36,90
Burundi	High	mar-15	0,30	7,30
Cabo Verde	High	ott-20	1,70	33,80
Cameroon	High	ott-20	1,60	609,20
Central African Republic	High	gen-21	0,70	16,10
Chad	High	lug-20	1,00	109,30
Comoros	Moderate	apr-20	0,40	4,20
Congo, Dem, Rep,	Moderate	apr-20	0,50	262,20
Congo, Rep,	In distress	gen-20	2,90	372,30
Côte d'Ivoire	Moderate	dic-20	0,50	291,70
Djibouti	High	mag-20	3,70	123,50
Ethiopia	High	apr-20	0,90	832,50
Gambia, The	High	gen-21	1,00	16,60
Guinea	Moderate	dic-20	0,70	99,80
Guinea-Bissau	High	gen-21	0,20	3,80
Kenya	High	mag-20	1,40	1.251,10
Lesotho	Moderate	lug-20	0,70	15,70
Madagascar	Moderate	lug-20	0,30	44,00
Malawi	Moderate	ott-20	0,40	34,10
Mali	Moderate	apr-20	0,80	128,80
Mauritania	High	set-20	2,40	193,30
Mozambique	In distress	apr-20	3,50	542,80
Niger	Moderate	ott-20	0,40	50,00
Sao Tome and Principe	In distress	feb-21	1,10	4,40
Senegal	Moderate	gen-21	1,00	236,90
Sierra Leone	High	mar-21	0,40	15,00
Tanzania	Low	gen-18	0,40	248,20
Togo	Moderate	apr-20	0,70	50,50
Uganda	Low	mag-20	0,50	198,10
Zambia	High	lug-19	1,50	349,40
		Avg.	1,14	297,07
		Total	…	9.506,27

Source: Authors' calculation based on WB Data and IDS Database[17]

The World Bank estimates that between May 2020 and June 2021 the 31 SSA countries participating to DSSI could potentially save 9.500 million of dollars (Table 1). On average each country will save 297,07 million, representing on average 1,14 percent of the GDP of these African countries.[18]

At the moment DSSI does not represent a long-run solution to debt sustainability of many developing countries both low and middle income. The time window of the suspension has been extended to December 2021, however in the immediate future further debt stock relief measures should be considered, as it is very unlikely that the GDP growth alone particularly after COVID-19 will be enough to create the conditions to pay back the suspended debt service. The situation reminds of the period 1982-1999 characterised by continuous rescheduling and many plans, Baker and Brady, and several conditions, the London, Toronto Naples terms to cope with the debt distress of many countries.[19]

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[17] For updates see https://www.worldbank.org/en/topic/debt/brief/covid-19-debt-service-suspension-initiative.
[18] The highest benefits by far go to Angola, that can potentially suspend the payment of 3.027,70 million, 3,3% of GDP; without Angola the average saving decreases to 206,25 million.
[19] A description of the different measures taken during the debt crisis of the eighties is in Vaggi 1993, chapter 5.

DSSI is an evolving approach on November 2020 the Paris Club and G20 approved the *Common Framework for Debt Treatments beyond the DSSI* (G20 and Paris Club 2020) which aims to improve the DSSI mechanism. The *Common framework* introduces the possibility of tailored debt relief measures for each country based on a case-by-case basis and it tries to distinguish between long term sustainability and liquidity issues (see https://www.imf.org/en/About/FAQ/sovereign-debt#Section%205). In particular the *Common framework* envisages a stronger mechanism to involve private creditors on the basis of a comparability of treatment with respect to the official bilateral creditors. There is some more flexibility for debtor countries, even if the leading principle of DSSI is still that of the postponement of debt repayment. There are hints of possible debt write off "in the most difficult cases", but not as a general possibility and a final footnote referring to HIPC and MDRI clarifies that "there is currently non consensus on how these previous options might apply to current circumstance" (G20 and Paris Club 2020).[20]

It is clear that DSSI is still an evolving tool and there are at least two problems which have to be faced. One is to convince the variety of reluctant private investors to participate bondholders, investment funds, banks, and other private sector lenders. In July 2020, the Institute of International Finance (IIF), a lobby group of financial investors, published a letter[21] which did not look very optimistic on the possible engagement of private creditors.[22]

The second problem relates to the role of rating agencies which in fact tend to downgrade the debt of the countries which enter these type of debt reliefs programs.

This is a very interesting issue because it touches on **one of the two major problems regarding debt sustainability**: the **time mismatch**. Rating agencies do their job having in mind the need of their clients which aim for high yields but want to limit the risks, which is a complicate pair to achieve in today financial system.[23] Rating agencies are particularly attentive to signals on a day-by-day basis, all the more so at times of high frequency trading and with an infinite number of investment opportunities. On the other hand, debt implies a long-run commitment, particularly in the case of bond issuance by low- and middle-income countries; funds must be invested into programs and projects which can lead to high growth rates, hopefully higher than the cost of debt, but this is a complicated long run process, which can hardly be the time perspective of rating agencies as they are

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[20] On the *Common framework* see Gallagher et al. 2020, Eurodad 2020.
[21] See https://www.iif.com/Publications/ID/4097/IIF-Letter-To-G20-Regarding-The-Debt-Service-Suspension-Initiative-DSSI
[22] There is a free riding problem as private investors might pay in full through the money saved under DSSI. EURODAD comments that the World Bank is doing the same thing, (Fresnillo 2020, p. 9).
[23] Systemic risk is an integral part of financial market and it is very difficult to calculate, see Minsky, H. P. 1974. on the working of modern financial markets and their short run bias see also Vaggi 2020.

organised and conceived now. It is not by chance that there are specialised development banks and concessional lending criteria, both in terms of interest rates and maturities, such a notice that once a debt has been contracted there is in-built mechanism which at any point through time determine the size of debt, which depends on whether or not the debt service is fulfilled; it is a sort of debt arithmetic with its own pace and strength, a point on which we will come back in the conclusions and which is the core of the next sections where we will discuss **the second major problem** of debt: **debtor's capacity to repay**.

3. Sustainable debts of Low-Income Economies

3.1 The Geometry of Debt Sustainability approach

Ever since the 1990s many authors have approached the issue of foreign debt from the borrowing country's perspective. Different sustainability criteria have been proposed, in general a debt stock is considered to be **affordable** if it can be serviced without compromising human development objectives.[24] Quite often the service of foreign debt is a priority and may crowd out public spending on health and education; affordability prioritises human development expenditures.

In order to examine the sustainability, in the sense of affordability, conditions of some African countries we adopt the Geometry of Debt Sustainability, GDS, model by Vaggi and Prizzon 2014 which builds on a contribution by Luigi Pasinetti (1998). The GDS follows the approach to sustainability based on the *stabilization of the debt to GDP ratio*, in the sense that *the ratio is no longer increasing* (see Blanchard et al. 1991).[25] This view of sustainability and the GDS in particular considers the long-term dynamic of the debt ratio for given values of certain macroeconomic magnitudes: typically, the growth and interest rates and the primary fiscal balance, net of interest payments. The approach tells if and at which level of debt the ratio will eventually stabilize. In the case of public domestic debt, the focus is on the primary balance needed to stabilise the debt ratio, but in the case of foreign debt the debt is owed to foreign investors and in it is denominated in foreign currencies, say dollars. This debt can only be repaid with dollars, which derive either from continuous borrowing or from a surplus in the current account (CA).[26]

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[24] See Northover, Joyner, and Woodward 1998, Berlage, Cassimon, Dreze and Reding 2003, Sachs 2002, Birdsall and Williamson 2002, Vaggi 1993).

[25] Notice that this approach was first adopted by Evsey Domar in two papers of 1944 and 1950, respectively.

[26] Only a surplus in the current account guarantees that over the years debt will be repaid in full; this is a long run solvency condition (see Cohen 1985).

CA includes many items:

$$CA = (X - M) + NPI + NSI \tag{1}$$

where $(X - M)$ is the balance of goods and services; NPI represents Net Primary Incomes, which include interest payment on external debt; NSI stands for Net Secondary Incomes which are composed by transfers not related to the use of factors and not related to the liabilities of a country.[27] A better indicator of the ability of a country to generate foreign currency and hence to service pay its foreign debt is that part of the CA which does not include the interest on foreign debt, the Non-Interest component of the Current Account, or $NICA$, which is similar to the primary balance in the case of public domestic debt:

$$C = NICA = CA - iD \tag{2}$$

where iD is the interest component of debt service, i is the nominal interest rate, D the debt stock.[28] We assume that the financial account includes only debt related flows hence the balance of payments equilibrium is:

$$-C + iD - \dot{D} = 0 \tag{3}$$

$\dot{D}$ is the change of the value of debt over time.

If we scale every variable to GDP, Y and multiply the term on the left-hand side by $\frac{D}{D}$, it is:

$$\frac{C}{Y} = i\frac{D}{Y} - \frac{D}{Y}\frac{\dot{D}}{D}$$

Finally, we have:

$$c = (i - \theta)d \tag{4}$$

Where $c = \frac{C}{Y}$, is the $NICA$ to GDP ratio; $d = \frac{D}{Y}$ the external debt stock to GDP ratio, $\theta = \frac{\dot{D}}{D}$ is the growth rate of the debt stock and g is the nominal growth rate of GDP.

$$c \geq (i - g)d \tag{5}$$

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[27] For the composition of the CA see IMF *Balance of payments manual* 2009, NSI includes personal remittances.
[28] Thanks to the assumption of constant exchange rate in equation (3) all magnitudes are measured in the same currency, changes in the exchange rate could be included.

The debt ratio is either stable or decreasing if $\theta \leq g$; in the GDS framework, this condition is met if: (5) is the sustainability condition.

Until now g and i are in nominal terms, but in the empirical analysis we will use the real growth rates of the economies, from the World Bank dataset, hence it is necessary to have the real interest rates. This can be done by subtracting from i the weighted average of the inflation rates of the currencies which compose the foreign debt, see section 4.2 below. Thus, we can now regard i and g as the rates in real terms.

The GDS scheme is illustrated a diagram (Figure 7); equation (5) is the *boundary relation* and is plotted in the upper panel where the vertical axis represents the NICA-to-GDP ratio, c, and the horizontal axis is the debt-to-GDP ratio, d. The slope of the relation depends solely on the value of $(i - g)$ here it is negative sloped because we assume $i < g$, as it is the case in many African LICs thanks to concessional borrowing[29].

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[29] $(i - g)$ is often referred to as interest-growth differential, see Mauro and Zhou 2020.

Figure.7 The Basic GDS Framework
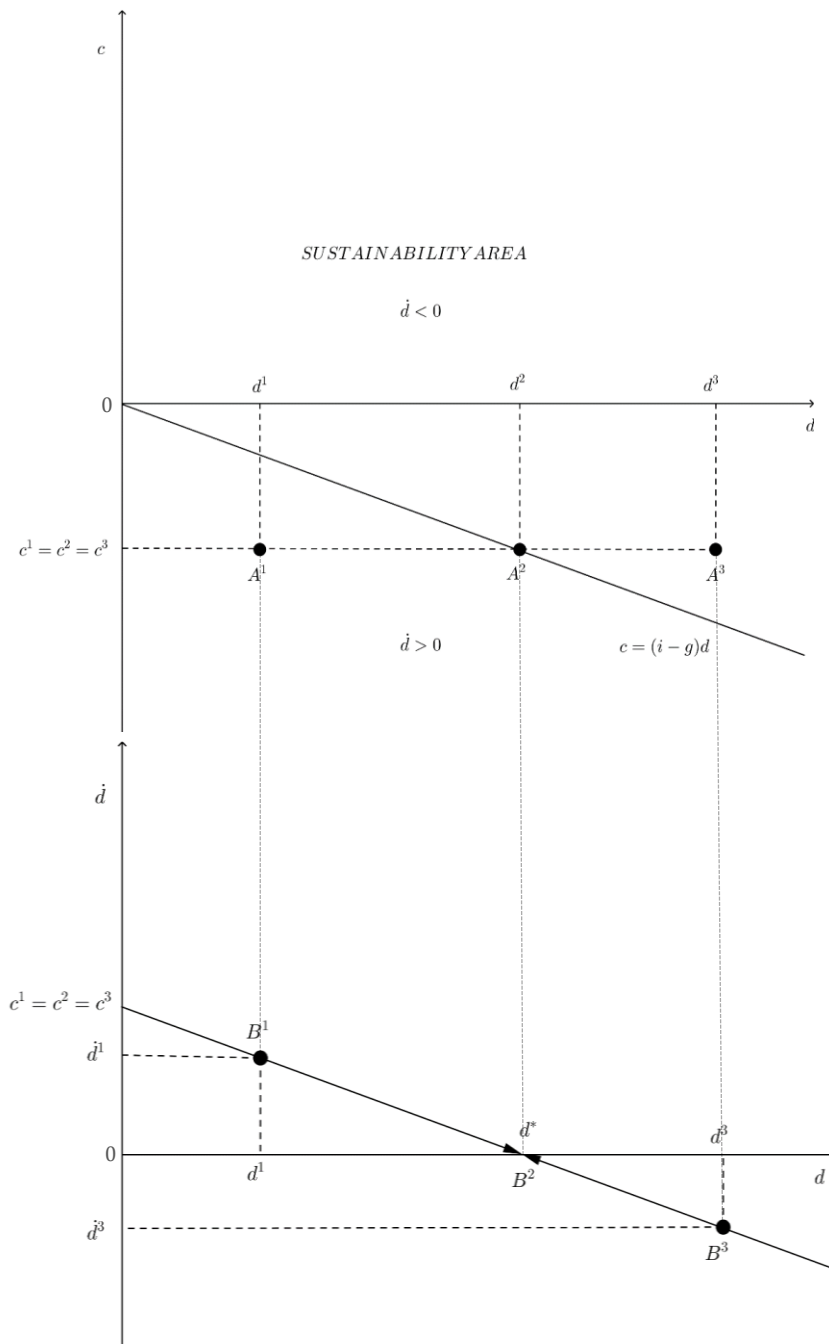
The position of a country depends on the combination of c and d. The points on the boundary line, like A^2, represent all the possible combinations of c and d for which the debt ratio d its stable.[30] If a country is above the boundary line, A^3 the debt ratio is decreasing, this is the "sustainability area",

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[30] In this case we can regard c as the value of NICA which stabilizes the debt ratio, an analogous of the primary deficit stabilizing debt ratio in the case of public domestic debt.

which includes the boundary line. Below the boundary line, A^1, the debt ratio is growing and thus unsustainable.

The GDS model describes the long-term dynamic of a debt ratio, when c, i and g are taken as constant. The change of the debt ratio over time can be expressed as:

$$\frac{\dot{d}}{d} = \frac{\dot{D}}{D} - \frac{\dot{Y}}{Y} = \theta - g \tag{6}$$

By substituting θ from equation (4) into (6) we obtain:

$$\frac{\dot{d}}{d} = i - \frac{c}{d} - g$$

And:

$$\dot{d} = -c + (i - g)d \tag{7}$$

We call (7) "State equation" and is represented in the lower panel of Figure 7.[31] On the vertical axis we have the variation in the debt ratio $\dot{d}$ while on the horizontal axis we still d. The state equation describes the long-term variations of the initial value of the debt ratio d, when i, g and c are assumed to stay constant through time.

The intercept of the state equation on the vertical axis is the value of NICA as a ratio to GDP, c, notice that *above the origin we have negative value*s, they are deficits as it is often the case in Sub Saharan Africa countries; positive values of c, NICA surpluses, appear below the origin, along the vertical axis. Countries position themselves on the state equation.

There is a clear link between the two panels of Figure 7, the stable debt ratio, d^*, is the same in both panels and in the lower panel it is at the point where the state equation crosses the horizontal axis, where $\dot{d} = 0$. If a country is inside the sustainability area, points A^3 and B^3 d decreases to d^*, the opposite if the country is outside the sustainability area, A^1 and B^1. Notice that the two countries have very different initial conditions but the same stable debt ratio, because c and $(i - g)$ are the same. The value of d^* can be derived by the state equation imposing the condition $\dot{d} = 0$. If a country is on the boundary line, A^2 then it must be at B^2 because both positions correspond to the steady state value d^*.

The GDS framework presents a sort of paradox: the higher the debt ratio the higher the probability of being within the sustainability area. This happens because of the accounting structure and the

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[31] For the 'state equation' see Harck 2000.

assumption on which the model is built; we are considering a LICs country, with a negative NICA and low interest rates. In state equation (7) $\dot{d}$ has two potential sources of variation, $-c$, and $(i - g)d$. Consider $(i - g)d$, for any NICA deficit ratio c the larger the difference $(i - g)$, which is negative, the larger the sustainability area as GDP grows faster than the interest component of the debt stock and the intensity of the reduction improves the higher is d. Thanks to $(i - g) < 0$, LICs which are inside the sustainability area have a decreasing debt-to-GDP ratio, and the speed of the decrease is higher the higher the initial debt ratio. If a country manages to further reduces d and moves to the left of A^2 the debt ratio will start to rise again; given c and $(i - g)d^*$ is a stable equilibrium position.

Now consider the term $-c$ in equation (7), since c is a deficit $-c$ is a positive magnitude, this means that an increasing deficit will make the debt grow. Notice that a negative NICA is compatible with a sustainable debt, in the sense that the debt ratio will reach a stable value d^*, but the debt will not be fully repaid. However, a growing NICA deficit will lower the position of the country in the upper panel, and it will lift up the intercept of the state equation with the vertical axis in the lower one, in both panels we see that the stable debt ratio d^*, increases.

The GDS approach highlights the two components of foreign debt dynamic; usually the focus is on $(i - g)$, particularly in the case of public debt, but for a Low-Income country the current account is much more relevant, because the foreign debt must be paid back in foreign currency and because there are both limitations and rising cots to borrowing from abroad. Hence the way in which the country is linked to the international economy through the balance of gods and services, that is to say her import and export structure, and the NICA becomes the constraint to debt sustainability and also to economic growth.[32]

We have assumed $i < g$ as a typical feature of most SSA countries, however, the recent changes in the debt composition, with a larger share of private creditors, shows that the cost of the debt, i, is rising. When $i > g$, the slope of the boundary line in the upper panel of Figure 7 turns positive, greatly reducing the sustainability area. The debt ratio is growing because the high interest rate offsets the growth rate; a NICA surplus becomes a necessary but not sufficient condition for debt sustainability. The state equation shows that the debt ratio d will grow whatever its initial dimension; there will be no convergence to any stable value, the debt ratio will "explode".

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[32] This is in line with the gaps literature, which highlights the impact on economic growth of low domestic savings and of foreign resources (see Taylor 1994, Bacha 1990).

3.2 Debt Sustainability and Human Development

So far, we have used the GDS to describe the "Economic" Sustainability of external debt, but in low-income countries if a lot of the resources are used to serve the debt many human development policies might become impossible to implement. The GDS approach can be adapted to evaluate the "Affordability" of foreign debt of SSA countries, that is to say the conditions which allow both economic and human development sustainability.

In national accounting domestic savings must equal the current account balance, CA:

$$(S_p - I_p) + (T - G) = CA \qquad (8)$$

with S_p and I_p as private savings and investments, T taxes, e.g., public savings, and G government expenditures, public investments. Suppose that the country increases expenditures in health and education in order to ensure a minimal level of improvement in Human Development and to approach some of the Sustainable Development Goals. Each year G increases by an amount of additional public spending, G_h, which in the short and medium run has a negative accounting impact on the current account. The country has to import more medicines and medical tools, but also it needs to organize laboratories for better technical vocational training schools and universities. Increasing employment in the two sectors is a positive move also for long run growth perspectives and it does not have a direct negative impact on CA, but in the short run it worsens the public budget $(T - G)$ on the left-hand side of (8), thus leading to a worsening of CA. The private sector could take care of part of these new expenditures, but again this would imply an increase of I_p, if the overall fiscal capacity of the country is not increased private net domestic savings will be reduced.

All these measures will worsen the current account and the non-interest part of it, the NICA,[33] for the sake of simplicity, we assume that the additional expenditures in health and education, G_h, fully translate into a worsening of the NICA, which becomes c_h:

$$c_h = NICA - G_h = c^1 - G_h \qquad (9)$$

It must be pointed out that the sectors which involve human development is much larger than only health and education; the IMF includes five main areas on which developing countries should increase their spending in order to close the SDGs gap: health, education, roads, electricity, and water.

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[33] Of course, if the additional resources for health and education should come from grants and donations from abroad this would improve CA because international cooperation is part of the secondary, or unilateral, transfers (IMF 2009).

UNICEF also mentions child protection, food and WASH among the expenditures dedicated to social protection and which have already been reduced by poor indebted countries (UNICEF, 2021)[34].

In the GDS framework a higher NICA deficit implies a shift downward of the position of the country from c^1 to c_h which makes it more difficult to be within the sustainability area, see Figure 8.

*Figure.8 GDS with Additional Spending*

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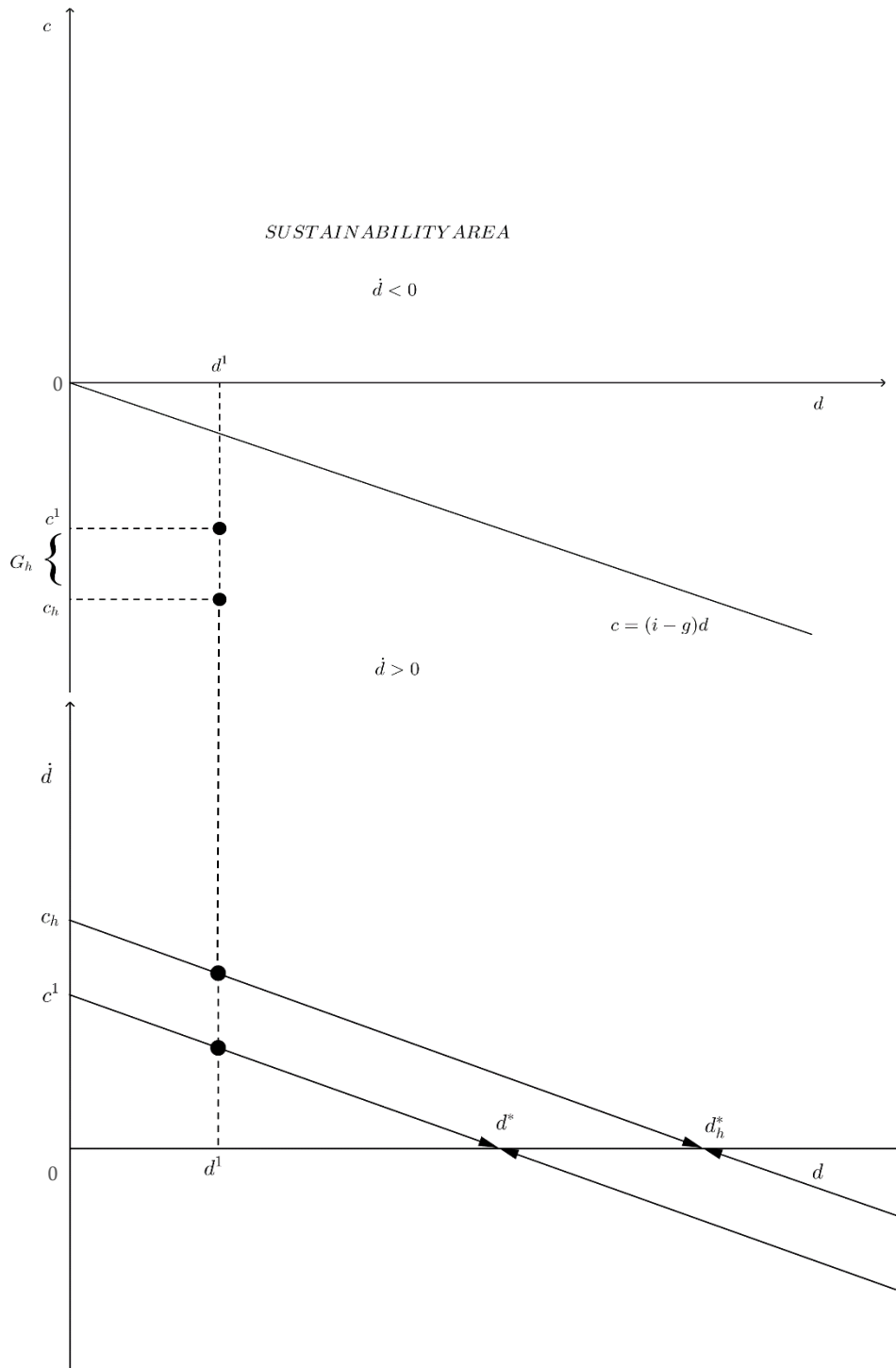
[34] On the possible opposition between debt service and public expenditures see Fosu A.K. 2007

Given the initial values of c^1, d and $(i - g)$ the additional spending on health and education increases the long run value of the stable debt ratio to d_h^* lower panel of Figure 8.[35] The new stable debt ratio is much higher than before and might reach levels which could be deemed to be unsustainable by the international community and above by financial markets and private investors.

The GDS scheme shows also another pretty binding condition to have both economic and human development sustainability. It is possible to calculate the level of Nica-to-GDP ratio, c, which would ensure at the same time debt service and additional expenditures on health and education. In the GDS scheme G_h becomes an exogenously given parameter in equation (5) which becomes

$$c \geq (i - g)d + G_h \tag{10}$$

The boundary line shifts upwards and above all it does not start from the origin but from a NICA surplus equal to G_h in Figure 9, where $d = 0$. The old boundary line describes the Economic Sustainability Area, the new Human Development Sustainability Area, the dashed line. Given i and g at d^1 to have both economic and human development sustainability the country should be at point A_h on the new boundary line, which is possible only if there is a NICA surplus equal to c_{hs}.

Figure.9 Human Development Sustainability Area
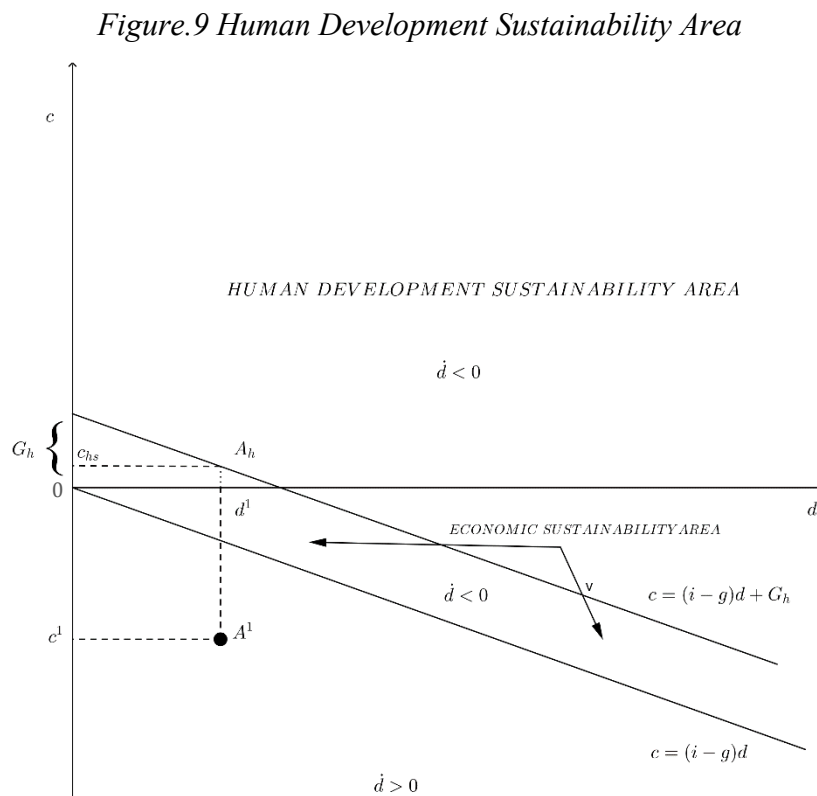
[35] The increase depends on the slope, $(i - g)$ of the state equation: the smaller the difference between the two rates, the larger the increment of d^*.

Of course, if $g > i$ and there is a NICA surplus the debt-to-GDP ratio tends to zero and the country will eventually build a positive net external position, that is to say the state equation crosses the vertical axis below the origin.

4. Economic and human development sustainability; case studies in some SSA countries

4.1 Five-year averages

We apply the GDS model to evaluate the debt path some Sub-Saharan African countries even before COVID-19. We selected four countries: Cote D'Ivoire, Ethiopia, Ghana, and Kenya. These countries have significant values of the external debt-to-GDP ratio, they also have an important share of private PPG debt and we exclude big oil exporters like Nigeria and Angola, whose debt ratios are influenced by oil price variations. According to the IMF three countries are all classified at high risk of debt distress.[36] We add a fifth country called "Wakanda"[37], it is a hypothetical nation whose data are those of the SSA region in the World Bank dataset, excluding high income countries. Wakanda represents a sort of 'representative country for Low- and Middle-Income African countries and her position inside the GDS framework gives a picture of debt dynamics in the region.

For each country we build a dataset of the magnitudes needed in the GDS framework.[38] For i, g and c we take the average of the five values from 2015 to 2019; in different ways the three magnitudes describe some structural conditions of a country, the five-year average reduces the impact of short-term shocks.[39] g is the growth rate and c the NICA are derived from the World Bank database, d and i need some explanation. Debt refers to total external debt, meaning the sum of public and publicly

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[36] We wanted to consider also Zambia which in November 2020 defaulted being unable to repay $42.5 million Eurobond, see Jubilee Debt UK https://jubileedebt.org.uk/blog/zambias-debt-default, https://developingeconomics.org/2020/11/24/haemorrhaging-zambia-prequel-to-the-current-debt-crisis/. But the balance of payments figure for Zambia has very large oscillations which do not see to be linked only to the price of copper to problems in the reporting and classification of figures, (see Fischer 2020). In the paper there are some ad hoc comments about Zambia.

[37] Wakanda is the name of a fictional African country created by Stan Lee and Jack Kirby for Marvel Comics in 1962.

[38] From International Debt Statistics Database and WB Open Data Database. The countries are: (in brackets the DSA assessment date): Cote d'Ivoire (12/01/2020), Ethiopia (04/01/2020), Ghana (04/01/2020), Kenya (05/15/2020).

[39] The data for each country are available with the authors. For each variable we have values from 2015 to 2019. Sometimes, there are incomplete time series, like in the case of the health and education expenditures. 2014 has been a turning point for the external position of many SSA countries which during that year suffered a negative term of trade shock.

guaranteed debt (PPG), private non-guaranteed debt (PNG) and short term public external debt, ST.[40] For the debt-to-GDP ratio d we take the last available value of 2019. Notice that by taking the data of the five years to 2019 we deliberately do not include the impact of Covid-19, some considerations on the situation of SSA economies following the 2020 pandemic is in section 5.

4.2 The real effective interest rate

For the choices of the nominal interest rate there are different possibilities. One could use the "Average interests on new external debt commitments" from the International Debt Statistics database, this is an average interest to be paid in the future on the loans that have been committed in a specific year. We follow a different path, and we take the value of the interests that the countries have actually paid each year between 2015 and 2019 and dividing them by the debt stock of the previous year. This figure provides a better indication of the capacity to pay of the country which the focus of this paper and it avoids the problem of the oscillation of bond issuances and other obligations undertaken by the country over the years.[41] Taking the 'effective interest rate' which has been paid in the past is more in line with the fact that the empirical analysis is based on magnitudes derived from the recent past in order to try be close to the actual situations of the countries.

We calculate the "Nominal Effective Interest" (NEI) in year t by dividing the interest payments of that year by the total external debt stock of the previous year.

This interest rate is a weighted average of the Nominal Effective Interest rates of the three debt components. Where ip is the interest payment; eds stands for external debt stock.

$$NEI_t = \left(\frac{PPG\ ip_t}{PPG\ eds_{t-1}} \frac{PPG\ eds_t}{TOT\ eds_t} + \frac{PNG\ ip_t}{PNG\ eds_{t-1}} \frac{PNG\ eds_t}{TOT\ eds_t} + \frac{ST\ ip_t}{ST\ eds_{t-1}} \frac{ST\ eds_t}{TOT\ eds_t} \right) * 100 \quad (11)$$

In the World Bank Dataset, the growth rate of the economy, g, is in real terms and i must be measured in real terms too, which can be done by subtracting the inflation rate from NEI_i. However, the total external debt of a country could be composed by obligations in different currencies. The IDS

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[40] **Public debt** is an external obligation of a public debtor, including the national government, a political subdivision (or an agency of either), or autonomous public bodies. **Publicly guaranteed debt** is an external obligation of a private debtor that is guaranteed for repayment by a public entity.
Private Non-Guaranteed Debt is an obligation that has been contracted by private entities. **Short Term Debt** has an original maturity of one year or less. In the IDS database data do not distinguish between public and private nonguaranteed short-term debt.
[41] Often SSA have difficulties to service their external debt in full and each year there might some interest arrears, therefore it would be more correct to include these arrears within each year interests, which thus would include not only the interest paid, but also those due and not paid. However, data about arrears are available only for the PPG debt, where arrears are extremely small compared to the overall interest payment, thus we left them out. Of course, this assumes that also for the public non-guaranteed debt the proportion of interest arrears is irrelevant.

Database 2019 gives the per cent currency composition of PPG External Debt according to eight possible items, five of them are currencies: Euro, Japanese yen, Pound sterling, Swiss franc, U.S. dollars. The other three items are: Multiple currencies, Special Drawing Rights and "all other currencies"; we assumed that the latter item represents the Chinese Renminbi, while for "Multiple currencies" the deflator is assumed to be null. Hence, we must calculate a deflator which considers the composition of the external debt.

For each country and in each year, we calculate a weighted deflator based on the currency composition of PPG debt.[42]

$$Weighted\ Deflator_t = \sum_{j=1}^{N} CC_{tj}\ D_{tj} * 100$$

Where CC_{tj} is the currency composition in percent j in year t and D_{tj} is its deflator.

The value of the Real Effective Interest(REI) in year t is:

$$REI_t = NEI_t - Weighted\ Deflator_t \qquad (12)$$

The value of t to use in the GDS model is the 5 years average:

$$REI = \frac{1}{5} \sum_{t=2015}^{2019} REI_t \qquad (13)$$

4.3 Bringing in the Human Development Factor

We run simulation based on the GDS model for all the five countries, but we also want to understand how the debt dynamic and its sustainability would change if these countries should increase their spending on health and education[43], also in order to improve their path towards SDGs 3 (Health) and 4 (Education).[44] Below we determine a reasonable the additional spending on health and education for the five countries.

The target on health spending is set at 5% of GDP. In 2001, with the Abuja Declaration, African countries pledged to increase their health spending to at least 15% of the national budget and about 4-5% of GDP; after twenty years few countries in SSA have achieved this goal. The average

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[42] The currency composition is not shown for PNG and short-term debt, we assume that they have a currency composition similar to PPG one.

[43] The targets must be expressed as a ratio to GDP in order to implement it within the GDS model. We do not explore the composition of health and education expenditures and what kind of costs should be covered. Moreover, in the long run both types of expenditures might have a positive impact on the growth rate of the economy, but here we just focus on their impact on the balance of payments.

[44] Despite some recent improvements Sub-Saharan Africa is still the worst performing region on both SDGs.

government health spending is estimated to be only around 7.2% of the annual budget (Asante et al., November 2020). The World Health Organisation estimates an average 1,9% of GDP on health expenditures in SSA in 2017, against the global mean of 3,3% (Xu K. et al. WHO 2019). In his 2010 World Health Report (WHO 2010, p. xv) WHO notices that on average countries with universal health care systems have a mandatory number of resources for health coverage around 5-6% of GDP, this could be a decent medium-term target for low- and middle-income countries.[45]

None of our five countries is spending for health more than 2% of GDP (see Table 2), Kenya spends slightly more than the other four countries; hence 5% of GDP seems to be an appropriate target for health expenditures.

The target on education spending is set at 6% of GDP. The Third International Conference on Financing for Development in Addis Ababa in 2015 set the following benchmarks for educational spending, also adopted by the UNESCO 2030 education agenda:

- at least 4 percent to 6 percent of GDP
- and at least 15 percent to 20 percent of total public expenditure

African countries spend on average around 5% of GDP on education, among the highest in developing countries (African Economic Outlook 2020, January, Chapter 3 on Education Financing, from page 101 to 133),[46]. During 2010–17, African countries allocated on average 16 percent of their government annual budgets to education, meaning that the two above criteria are satisfied. But if we look at each single country's levels of education spending, the situation is less optimistic: just 20 countries in a sample of 42 African countries meet both UNESCO spending targets by allocating 15 percent or more of their government budgets to education and 4 percent or more of their GDP. Seven countries meet only one of the criteria, while 15 countries met neither one (Africa Economic Outlook 2020, Chapter 3, page 103)

All our five countries satisfy the target of education spending in terms of total budget, while in terms of GDP there are oscillations: Cote D'Ivoire is less than 4%, Ethiopia ranges between 4 and 5%, never above 6% (according to last data available in 2015), Ghana is around 4%, with some years below 4%, Kenya constantly between 5% and 5,5%. It seems reasonable to have a target of 6% of GDP for education; these countries still need fundamental improvements in the educational system.

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[45] Similar numbers on the spending targets for universal health coverage of at least 5% of GDP emerge from a variety of studies (Mcintyre et al. 2017, p. 135).

[46] However, according to the Africa Economic Outlook 2020, p.103, per student expenditure in education is the lowest at global level.

Table.2 summarizes the situation, the additional spending required to achieve the two targets is determined by subtracting the five-year averages of expenditures on health and education from the targets.

Table 2 Expenditures on health and education, 2015-19 five years averages and possible additions. *Per cent of GDP.*

Country	Expenditure Type	Avg. Gov. Spending 2015-2019	Targets	Additional spending to meet targets, G(a)
Cote D'Ivoire	Health	1,17	5,00	3,83
	Education	3,63	6,00	2,37
	Total	4,80	11,00	**6,20**
Ethiopia	Health	0,92	5,00	4,08
	Education	4,74	6,00	1,26
	Total	5,66	11,00	**5,34**
Ghana	Health	1,35	5,00	3,65
	Education	4,15	6,00	1,85
	Total	5,50	11,00	**5,50**
Kenya	Health	2,10	5,00	2,90
	Education	5,33	6,00	0,67
	Total	7,43	11,00	**3,57**
Wakanda	Health	1,83	5,00	3,17
	Education	3,70	6,00	2,30
	Total	5,53	11,00	**5,47**

*Source: Author's calculations based on WB open Data Database*

It must be noticed that of 5 and 6 per cent of GDP for health and education respectively are very moderate targets. In the Sustainable Development Report 2020 the progress of SSA towards SDGs 3 and 4 are classified as stagnating (J. Sachs et al. 2020, pp. 500-501). In a 2019 paper the IMF analyses current spending in five SDG areas: health and education, but also water sanitation, infrastructures, and electricity in 155 countries: 49 low-income developing countries, 72 emerging market economies, and 34 advanced economies (Gaspar et al. 2019). The authors estimate the additional annual spending required for a significant progress in these five areas. According to this study in order to achieve the SDGs in 2030 Sub Saharan African countries on average should increase their development expenditures by 20% of their GDP with respect to the baseline scenario. Obviously, this is a much more ambitious target than the ones we have set for health and education expenditures, of course the

authors consider a broader number of areas even if health and education play a leading role among them.[47]

4.4 Human development sustainability

We use the GDS model to estimate how the additional spending on health and education would impact on the external debt path of a country. The graphs for the four countries plus Wakanda are shown below with the dashed lines describing the situation when additional spending equal to G_h is included. Next to each graph there are the figures for the relevant magnitudes; g is the real growth rate of GDP, all other figures are per cent of GDP, d^* is the stable debt ratio in the baseline scenario and d_h^* is the new level with additional development expenditures. The circle and the square are the levels of c before and after additional spending, respectively.
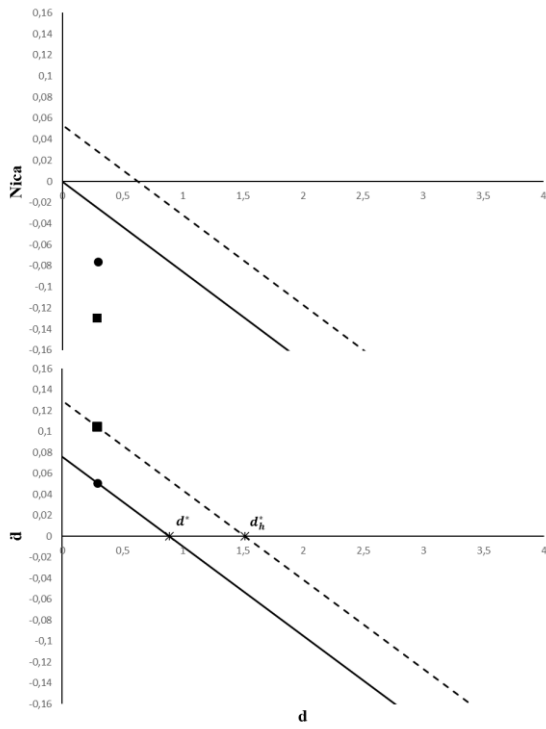
Figure.10 GDS Cote D'Ivoire
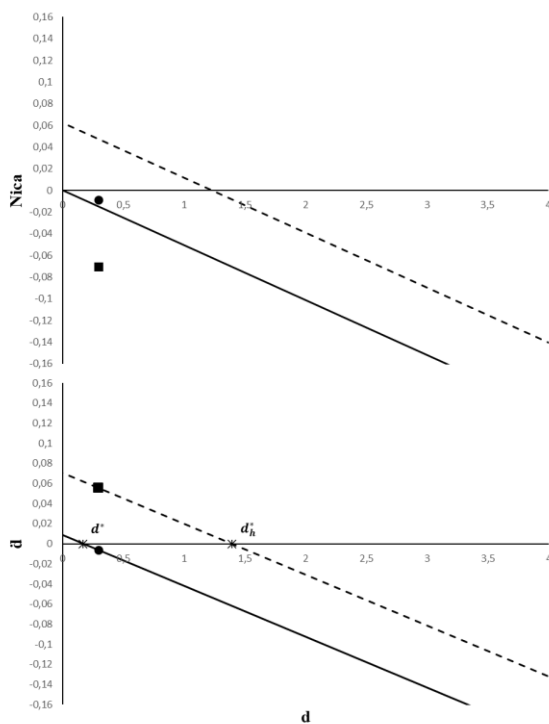
c	-	0,86
i		2,34
g		7,40
i-g	-	5,06
d		29,50
d*		16,94
G(h)		6,20
d*(h)		139,42

Figure.11 GDS Ethiopia

c	-	7,59
i		0,36
g		8,90
i-g	-	8,53
d		29,43
d*		88,97
G(h)		5,34
d*(h)		151,59

Figure.12 GDS Ghana
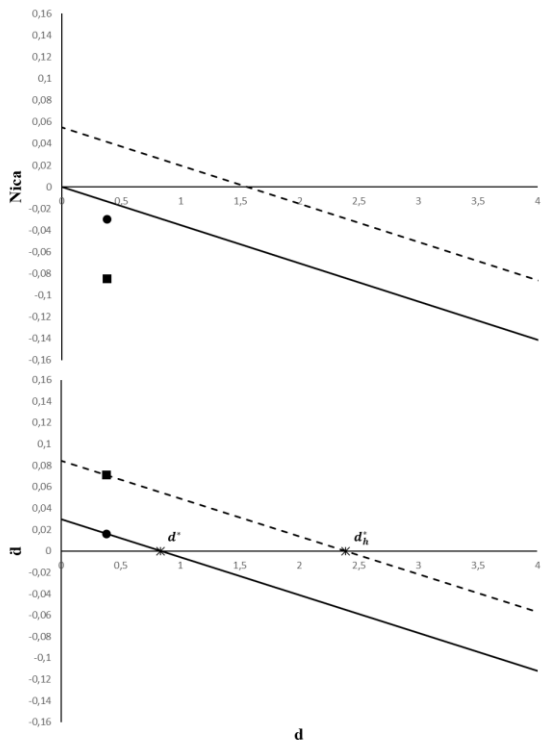
c	-	2,95
i		1,77
g		5,30
i-g	-	3,53
d		37,89
d*		83,35
G(h)		5,50
d*(h)		239,03

Figure.13 GDS Kenya
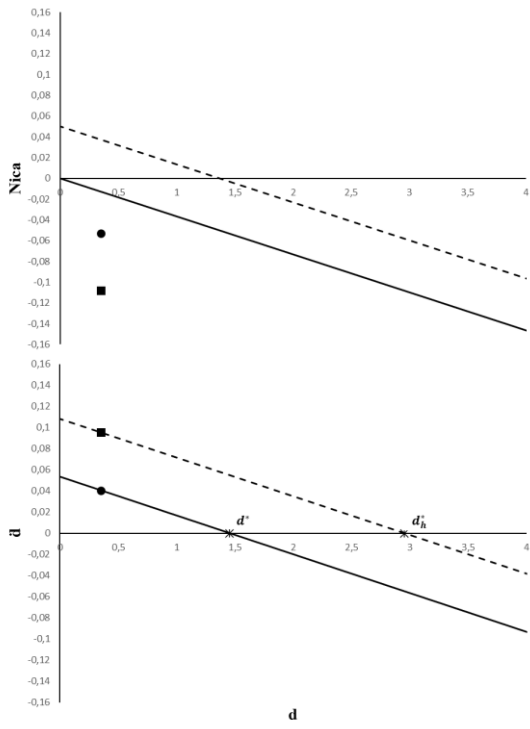
c	-	5,32
i		1,95
g		5,62
i-g	-	3,66
d		35,07
d*		145,28
G(h)		5,50
d*(h)		295,42

Figure.14 GDS Wakanda
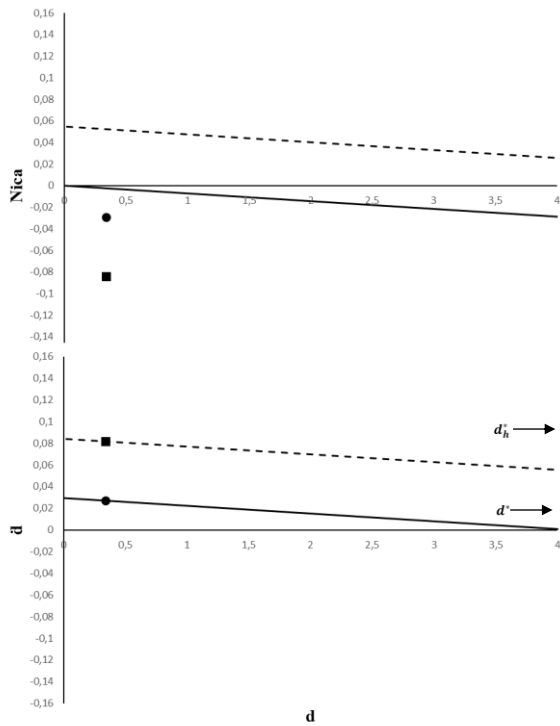
c	-	2,94
i		1,53
g		2,25
i-g	-	0,72
d		34,07
d*		408,95
G(h)		5,47
d*(h)		1.169,43

Few comments are needed, in brackets the IMF DSA classification as at April 27, 2021.

- Cote D'Ivoire (Moderate risk): it is the only country that locates itself within the sustainability area in the basic GDS. Thanks to good economic growth and a very low NICA deficit the already low debt ratio will further diminish; in the long run and with constant $(i - g)$, and c, it will converge to a stable value lower than 20%. However, when the additional spending is introduced, the country is pushed out of the sustainability area, and the stable debt-to-GDP ratio becomes almost 140%.

- Ghana, Kenya, and Ethiopia (all three are classified at High risk) have similar situations; they have good growth performances and moderate levels of debt ratios, below the 55% threshold indicated in the IMF Debt Sustainability Analysis. The problems for all three countries are the high NICA deficits, in particular for Ethiopia and Kenya respectively at 7.6 and 5.3 per cent of GDP, which put them well outside the sustainability area. In the baseline scenario the stable debt ratios are very high: 89% for Ethiopia, 83% for Ghana and 145% for Kenya. When additional spending on health and education is brought into the model the stable debt-to-GDP ratios, d_h^*, increase to extremely high levels: 151% for Ethiopia, 239% for Ghana and 295% for Kenya!

- Wakanda, the representative SSA country, has a relatively high initial debt ratio and a small difference between the interest rate and growth rate, due to a very low average growth much smaller than those of the four countries. The slow growth coupled with a NICA deficit of almost 3% of GDP leads to a stable debt ratio d^* higher than 409%. Additional expenditures will lead the debt ratio, d_h^*, to the unbelievable level of 1.169% of GDP! Of course, this figures signal that debt dynamics is out of control; unless there will be significant and rapid improvements in the parameters of the GDS model, in practice the growth rate and the non-interest current account, there will be either partial or total defaults or some major relief measures will have to be taken: cancellations, swaps, etc. The GDS model suggests that given the present figures and even before Covid-19 on average SSA was on a totally unsustainable debt trajectory.

5. Debts sustainability and Covid-19 in SSA

The 5 and 6 per cent targets for additional expenditures on health and education are very prudent goals; they represent a minimal improvement in human development and are far from what is needed for closing the SDGs gap in the coming years. All the more so because we use figures which do not

yet include the impact of the COVID-19 pandemic. Applying the IMF 20% of GDP target for social expenditures would drastically increase the already large current account deficits and the external debt would tend to extremely high and unsustainable values.

Between 2000 and 2015, in SSA some key development indicators improved; primary school enrolment rates rose to close to 80 percent, and infant mortality rates diminished from about 100 to 50 per 1000 live births, poverty headcounts rates have decreased from about 60 percent to 40 percent of the population. However, significant steps must still be made; extreme poverty remains the highest in the world, and the region remains far from achieving the Sustainable Development Goals. SSA's median composite SDG index score, a measure that tracks performance across all SDG areas, is around 50 percent, much lower than that of Emerging Market Economies, 66 percent, and Advanced Economies, 78 percent. [48]

GDS shows that even before Covid-19 SSA was already on a very strict debt path as to the economic sustainability of foreign debt with no possibilities of reconciling regular debt service and additional human development expenditures. Signals of possible debt crises are already showed by the evaluations of the IMF Debt Sustainability Analysis before the Covid-19 pandemic; in 2019 7 SSA countries were in debt distress and 9 countries were at high risk and the numbers have doubled since 2014 ("Sustainable development and debt", IMF African Department, 2019, p. 8),

One of the most dramatic impact of Covid-19 pandemic is that the number of people living below the extreme poverty line of 1,90 dollars a day might increase between 70 and 100 million people in 2020 alone (see Valensisi 2020). Of course, there are many other ways in which Covid-19 might have a very negative and lasting influence of developing countries (see IMF 2021, ch.2).

In the GDS scheme the impact of Covid-19 is related to possible changes in the value of the three parameters, i, g and c, remember that $(i - g)$ regulates the slope of the boundary relation.

The interest rate, *i*. An increase in international interest rates could lead to a higher debt service and to flight to quality type of outflows. Remember the *taper tantrum* of 2013, when rates increased because of the fear that the Federal Reserve could stop buying Treasury bills. Expectations about rising inflation might also lead to increasing rates.

Recall that we are examining debts issued in a foreign currency and if we relax the assumption of constant exchange rate, Capital flights plus exchange rate depreciation would lead to a much higher debt service and the debt will become unsustainable even without the human development component.[49]

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[48] It is an index that express the percentage of completion of the SDGs, introduced in 2016 by Sustainable Development Solutions Network (SDSN) and the Bertelsmann Stiftung, see https://www.sdgindex.org/
[49] On the impact of exchange rate variations see FitzGerald 2005, pp. 21-22.

The growth rate g. COVID-19 is causing the largest recession in SSA since 1945. According to IMF in 2020 Sub-Saharan Africa real GDP contracted by -1,9% with Middle Income Countries down by 4.4%; 2021 and 2022 should see the GDP growing by 3.4 and 4.0% respectively (see IMF 2021, p. 39). The World Bank has more pessimistic estimates with a decrease of 3.7% of GDP in 2020 and more modest increases in 2021 and 2022 (see World Bank 2021, p.107).

Between 2000 and 2008 SSA countries had overall relatively good performance in terms of GDP growth, with the growth rate oscillating around 6%, thought it has never reached the pre-financial crisis levels. Since 2008 the average growth rate has been slowly but continuously declining, between 2010 and 2014 average growth has been 4,5%, not high enough to achieve most of the SDGs, but it is since 2015 that SSA average growth is very low at around 2%.[50] This value is lower than population growth rate still around 2.5% with negative implications on GDP per Capita Growth, where African performances are the worst among all the regions of the world.

There are some obvious channels through which the pandemic is generating negative effects of Sub Saharan Africa growth. One effect through is the direct impact on the health system, particularly because it makes additional expenditures even more needed. Remember that SSA countries have a very limited fiscal space, primary balance has been in the negative since 2009, see Figure 3, even if some countries have tried some fiscal and social policies such as public work schemes or conditional cash transfers (Ethiopia, Guinea), tax exemptions/deferrals (Angola, Burkina Faso or Zambia), mainly through the extensions of existing programs. It is hard to imagine how SSA countries could either increase their public revenues or reduce public expenditures in the short run. Since the global financial crisis many Emerging and developing countries have experienced major contractions in their fiscal space(see Kose et. al. 2017).[51]

Another negative effect is on the educational system, because of disruption in school attendance, in a situation where a lot of children were already out of school and connectivity to guarantee distance learning is very poor. According to IMF World Economic Outlook of April 2021 the education losses, in terms of missed days of instructions in 2020 reached almost 70% in LICs (see IMF 2021, see also UN 2020 and UNICEF 2020).

In a very synthetic way, there are three other channels through which Covid-19 negatively affects economic growth in SSA: the disruption of international value chains (see ILO 2020), tourism with

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[50] In 2019 some countries were still growing at very high rates: Ethiopia 8,28%, Ivory Coast 6,85% in 2019 and Tanzania 5,79%. Mauro and Zhou warn about taking the condition $(i - g) < 0$ as an indication that debt path will not create problems (Mauro and Zhou 2020).

[51] "Expansionary austerity" does not seem to apply to SSA countries. On the debate about fiscal consolidation and economic growth see Alesina et al 2019 and for a critique of this approach Breuer C. 2019.

hundreds of tourist arrivals lost (see UNWTO 2020) and the depressed prices of commodities that constitute important exports of many African countries.

The NICA, *c*. The stronger impact of Covid-19 on SSA economies will be through the Balance of Payments channel; tourism is an export item, so are commodities and Africa is a net importer of medical equipment. Besides the Balance of Goods and Services there are other components of the Current Account which are negatively affected by the pandemic in particular in the Secondary Incomes which include remittances and international cooperation. Remittance flows to low and middle-income countries are projected to fall by 7 percent, to $508 billion in 2020, followed by a further decline of 7.5 percent, to $470 billion in 2021 (World Bank 2020).[52] According to OECD it seems that Official Development Assistance, ODA, has increased to "USD 161.2 billion in 2020, up 3.5% in real terms from 2019, boosted by additional spending mobilised to help developing countries grappling with the COVID-19 crisis"(OECD 2021). This is a small amount, 1%, of what has been up till now globally mobilised for coping with the pandemic and in any case the value of ODA is one third of those of remittances and Foreign Direct Investments, FDI. FDI flows to Low Income Countries appear in the financial account of the Balance of payments and they too might also be negatively affected by the pandemic.[53] Always in the financial account side it might be more difficult to refinance the bonds coming to maturity, in particular because of the growing role on private creditors.

Figure.15 SSA Region aggregated Current Account (excluding high income)
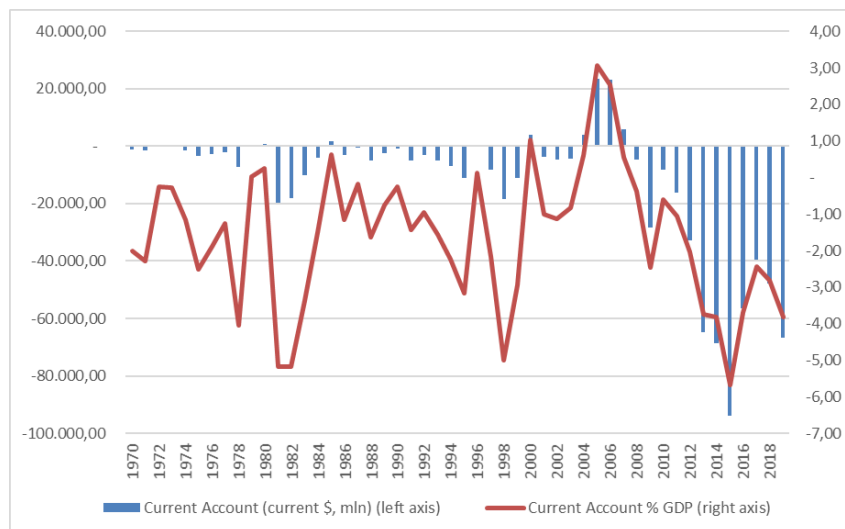
Source: Author's calculation based on WB Open Data Database

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[52] However, remittances also show some resilience particularly in some Latin American countries where they seem to support domestic consumption (see World Bank 2021, pp. 22, 24, 82).
[53] Investment flows to SSA have been predicted to decline between 25 and 40 per cent in 2020 (see UNCTAD 2020).

But the real worry is linked to the diagram in Figure 15, which shows that the aggregate Current Account of SSA has been in the negative for almost 50 years, since 1970, with very few years of surpluses, mainly linked to the commodities prices boom between 2004 and 2007.

6. Conclusions; a time mismatch

The Geometry of Debt Sustainability, GDS, approach is built on some very simple assumptions, which are also quite rigid, the constancy of the three magnitudes, g, i and c, through time but it shows the in-built long run dynamics of foreign debt. GDS also focuses on some structural features of the economy namely the international position as described by the Current Account balance.

Three simple conclusions can be drawn from the exercises done in this paper.

First, even before Covid-19 apart from Cote d'Ivoire the other three countries examined were on very complicated debt trajectories in the sense of being able to stabilise the debt to GDP ratio only at very high level. The same is true for Wakanda, the representative Sub Saharan Africa country.

Second, even a modest increase in human development expenditures, dedicated to health and education would lead the unbearable levels of the stable debt ratios. Of course, there is no way in which by themselves Low Income African countries may afford the resources needed to achieve the most basic SDGs.

Third, the Debt Service Suspension Initiative, DSSI, is a most welcome plan but by itself and as it is built at the moment cannot lead to any sensible condition of future sustainability. The good thing is that the experience of the so called "muddling through" of the debt crisis of the eighties has taught that when debt ratios reach certain levels more drastic and timely solutions are needed, substantial restructuring cum cancellation cannot wait ten or more years. In the case of debt time is a compelling element.

These conclusions and the GDS model allow further considerations.

First, the fact that the growth rate is higher than the interest rate is often taken as a guarantee that a country will be able to sustain its debt. The very high debt to GDP ratios reached by some high economies, such as Japan and Italy, are often mentioned as a case not to worry too much about them, provided that growth will pick up. Whatever the consideration for the growing debt levels of advanced economies one must remember a major difference: debt is denominated in their own currency, which is not the case of Low Income Countries. If the growth rate of SSA countries stabilizes at around 2% even a modest increase in the interest rate could lead to a positive slope of the boundary relation in Figure 7, compounded with structural NICA deficits this situation will violate any possibility of

solvency, even in the future. This could be a problem for many Middle Income Countries. Also, outside Africa, whose foreign debt is contracted at much higher interest rates than those on the debt of LICs. Expectations about future growth rates show pretty large deviations from the baseline scenario (see IMF 2021, p. 22).

Second, the GDS scheme focus on another structural element: Non Interest Current Account, that is to say on the capacity of a country to generate the currency needed to repay foreign debts, which is linked to the structure of its foreign trade, the import and export composition. Of the three gaps which could constrain economic growth, the fiscal, savings and foreign exchange ones (see Bacha 1990 and Taylor 1994) the third seems to be the most binding one. In Sub Saharan Africa growth rates are still linked to the cycles of primary commodity prices; few years around 2005-06 have given the illusion that growth could go back to the values experienced before the two lost decades starting with the debt crisis of 1982. Volatility of commodity prices will stay in the future and even though there might positively upswings a high volatility *per se* is destabilizing, in the case of some African countries it led to more borrowing on international financial markets.

To conclude: "even debt cancellation may not be a sufficient condition to avoid a new external debt crisis" (Vaggi and Prizzon 2014, p. 1156), the reason is inherent the *time mismatch* related in the debt of Low Income Countries. They need funds now to improve their economic performances, but this a long time and in between debts have to be repaid and refinanced. Pending a Current Account deficit, it is very complicated to cope with long term structural changes and the regular service of debt. Sustained improvements in the growth rate and in export capacity require structural changes in the trade balance which modify the income and price elasticities of exports and imports as many authors have highlighted, see Fitzgerald 2005, Bhaduri1987, Thirlwall 2011. This is a complicated long run challenge which should need long run financial support for these weak economies, this should be the task of development finance. Grants and concessional loans play this role, but the debt must also be serviced in the short run, grace periods may help, but may not be long enough.

Many Low and Lower Middle Income countries desire to abandon concessional finance, the dependence on foreign aid and there are discussions to abolish the classification of Least Developed Countries. These elements are seen as reasons of a possible stigma by international investors and rating agencies. The desire to diversify financial sources and to access international markets is understandable; blended finance is a legitimate goal, and it might also provide additional necessary resources. However, this will not solve the time mismatch between long run structural change and the ability to service the debt and to expand human development; all the more so because of the way in which international financial markets have moved in the last thirty years: very fast transactions,

very complicated hedging instruments and above all the growing power imbalances between some big traders which manage trillion of dollars and many developing countries, litigations have become part of the normal landscape.

A modest attempt to orientate development finance should at least include three transformations: an appropriate debt restructuring mechanism, first proposed Anne Krueger almost twenty years ago (Krueger 2002), plus dedicated financial instruments which already exist, but should be supplemented by separate markets for long run development lending, similar to the separation between commercial and investment activities before the Glass-Steagall Act was repealed in 1999.[54]

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