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The effect of external debt on domestic investment in sub-Saharan African sub-regions

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Abstract
This paper investigates the effect of external debt on domestic investment in sub-Saharan Africa (SSA) during the period 1980-2017. It focuses on four zones in SSA (EAC, ECOWAS, CEMAC and SADC) and the methodology adopted is the Generalized Method of Moments (GMM). The Results show that external debt has a positive effect on domestic investment in SADC and EAC, with bearable debt threshold, which account for 74.33% of Gross Domestic Product (GDP) in the EAC zone. For CEMAC and ECOWAS, the effect of external debt on domestic investment is rather negative, but for a debt threshold below 94.73% of GDP in CEMAC, the effect on investment is positive. Our results imply that public policies for improving domestic investment and assuring sustainable debt should be promoted: to concentrate investments in sectors with ripple effects that can boost other sectors; to observe multilateral surveillance across countries over the long term; and strengthening investment thanks to the improvement of the business climate.

Keywords: External debt, Domestic investment, Generalized Method of Moments

JEL classification : C23, H63, O19

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1. Introduction

The debate on debt efficiency is still topical (Hakimi et al. 2019; Ogunjimi, 2019; Omodero, 2019; Agyapong, 2020). There is no unanimity on debt efficiency. In fact, two main conflicting strands of debate exist in the literature: the Classicals and the Keynesians. For the Keynesians, advocates of interventionism, indebtedness does not cause any burden, either for future generations or for present generations because of the investments it generates (Lerner, 1948; Modigliani, 1961; Buchanan and Wagner, 1978; Otaki, 2015). However, the Classicals see indebtedness as a burden

likely to compromise the accumulation of capital, present and future consumption (O'Brien, 2004; Àkos and Istvàn, 2019). They liken debt to a future tax and attribute a negative connotation to the State intervention (Yapo, 2002). From this theoretical controversy stems the problem of the ability of external debt to enhance investment.

This puzzle is also visible in the empirical studies on the relationship between debt and investment. Many studies are focused on the negative effect of debt on investment (Deshpande, 1997; Kamgnia and Touna, 2002; Hakimi et al. 2019; Omodero, 2019); but for the large majority of works, the relationship is rather positive and is reflected in a non-linear relationship (Sachs, 1989; Gürbüz and Raffinot, 2001; Pattillo et al. 2002; Rockerbie, 2004; Benedict et al. 2005; Tafah et al. 2012; Sharafat, 2013; Apere, 2014; Popov and Barbiero, 2018; Agyapong, 2020).

Over the past two decades, SSA have experienced mixed investment episodes: an average of 26.12% during the period 1980 to 2000, 21.71% from 2000 to 2008, 20.94 % in 2010; 21.63% in 2012; 22.75 % in 2014, 20.9 % in 2016 and 20.52 % in 2017 (WDI, 2018). The same period noted that external debt took considerable proportions in SSA. The region's level of indebtedness, as percentage of GDP, rose from 22.37 % to 53.97 % between 1980 and 2000 (WDI, 2018). Despites reaching the Heavily Indebted Poor Countries (HIPC) Initiative, countries' foreign debt falls substantially but progressively increases after. Indeed, the total foreign debt stock of states now amounts to 19.51 % and 21.94 % respectively in 2008 and 2010, 23.12% in 2012, 24.08% in 2014, 31.12 % in 2016 and 32.84 % in 2017 (WDI, 2018).

This study is relevant for at least three reasons. Firstly, most studies in the literature are interested in a linear relationship. We consider a non-linear form that highlights the existence of a threshold beyond which any increase in external debt would degrade domestic investment. Secondly, to the best of our knowledge, this paper provides the first empirical study that analyses the effect of external debt on the level of domestic investment in SSA sub-regions. Indeed, in the literature, several works have explored the effect of indebtedness on macroeconomic indicators, always with an emphasis on economic growth (Cohen and Sachs, 1986; Krugman, 1988; Ojo, 1989; Idlemouden and Raffinot, 2005; Sami and Mbah, 2018; Senadza et al. 2018; Bernadin et al. 2018; Njamen et al. 2020). However very little work, especially in African context, has focused on the relationship between external debt and domestic investment, despite the fact that investment is one of the main channels through which debt affects growth (Benedict et al. 2005; Avom et al. 2015; Oumou, 2016). Thirdly, since the work of Modigliani and Miller (1958) on the leverage effect of indebtedness in financial policies (mechanism for increasing equity capital through the intensive use of borrowed capital), several authors have highlighted the role of debt in the financing of investments as major in a context of optimal use of resources (Touna, 1985; Pattillo et al. 2002; Tafah et al. 2012; Ogunjimi, 2019). Nonetheless, the stylized facts in SSA showed that despite the gradual increase in external debt in recent years, investment rates are almost stagnant. The previous interrogates the ability of external debt to promote investment in SSA. Thus, the objective of this paper is to analyse the effect of external debt on domestic investment in SSA.

After this introduction, the remainder of this paper is organised as follows. Section two criticises the existing literature; followed by section three which gives highlights on the econometric strategy and data; thereafter the empirical finding will be presented in section four and section five concludes the paper.

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2. Theoretical and empirical review of the external debt-investment relationship

2.1. Review of theoretical works

This sub-section focuses on theoretical work related to debt and investment, these include: the debt-cycle theory and the theory of the virtual debt burden are presented

The debt cycle theory of Avramovic (1964) is based on the neoclassical approach to optimal debt. It distinguishes three stages in the debt cycle. In the first, domestic savings are insufficient for financing needs. External borrowing helps to partially finance investments and pay interest. In the second stage, domestic savings increase and supports a significant part of investments, but remain insufficient. In the third stage, debt begins to decline and domestic savings exceed investment. The length of a cycle varies according to the assumptions made about the target growth rate, the interest rate, the savings rate, the investment rate and the average loan duration. Avramovic considers that starting from zero debt, the debt cycle can last 36 years, of which 26 years for the growth phase and 10 years for the decline phase. Furthermore, this theory is problematic because most developing countries remain confined in the first phase of the cycle with an explosion of debt and poor economic performance. Therefore, Avramovic considers that debt ratios that do not experience an explosive trend would be sufficient to ensure the possibility of continued indebtedness. But, this condition is not sufficient because the level of indebtness reached may be high and unbearable in the long term. Faced with these limits, Aliber (1980) questions the optimal debt level. Thus, the consequences for debt growth can be analysed separately for solvency and liquidity problems. To ensure long-term solvency, it is essential that the real interest rate on the additional external debt is equal to the marginal productivity of capital. Therefore, the growth rate of external debt must be equal to the real interest rate. The debt then increases at the same rate as the country's capacity to pay debt service.

In a cyclical approach, the work of Cohen and Sachs (1986), Krugman (1988), Cohen (1995) gave rise to the theory of the virtual debt burden. According to this theory, starting from a threshold, debt discourages consumption and investment. However, if external debt has an undesirable effect on investment, the effect is not systematic and only manifests itself at a certain level. Based on the view that there is a theoretical link between investment behaviour and the amount reimbursed by the debtor country, an inverted U-shaped curve linking foreign debt to investment rate was created. It allows a more suitable empirical method for low-income states (Pattillo et al. 2002). The main lesson of this theory is that beyond the sustainable threshold, the debtor country is no longer able to honour its commitments without compromising the welfare of the population. It is then in the creditor's interest to reduce the debt stock. But this approach has a major drawback because the authors do not say what happens after the decline phase. Indeed, this conception suggests that investment declines indefinitely. Despite criticisms of these theories, they have been subjected to a number of empirical tests.

2.2. Review of empirical works

The link between the degree of indebtedness and investment has been the subject of several empirical studies. Gürbüz and Raffinot (2001) study the effect of public debt on private investment in Turkey over the periods 1963-1998 and 1988-2000. Their results suggest that external debt has a positive effect on private investment in the first period and, through over-indebtedness, has a negative effect on investment in the second period. Kamgnia and Touna (2002) examine the consequences of external debt on private investment in Cameroon. These authors seek to test the hypothesis that the succession of budget deficits and the steady increase in external debt during the 1980s contributed to the fall in private investment. They conclude that external debt compromises the granting of credit to the private sector, which hinders private investment. On a sample of Latin American countries, Rockerbie (2004) shows that the effect of debt on investment depends on the country considered and the period studied (a structural break with the crisis was noted from the 1980s onwards). The results allow him to conclude that only Mexico suffered from over-indebtedness prior to the 1980 crisis. For the other countries in the sample, on the contrary, the debt effect was beneficial for investment.

Tafah et al. (2012) evaluates the impact of external debt on Cameroon's economic performance. The authors use two indicators of economic performance, namely the domestic investment rate and the GDP growth rate. The results show the existence of a U-inverse relationship between external debt and economic performance. Thus, external debt positively affects domestic investment up to the threshold of 44.82% of GDP, beyond which the impact on investment becomes negative. Following the same reasoning, Apere (2014) examines the impact of public debt on private investment in Nigeria over the period 1981-2012. The results show that domestic debt has a linear and positive effect on private investment. The study also highlights the existence of a debt threshold of 124.69% of GDP, beyond which the effect of external debt on private investment becomes negative. Recently, Ogunjimi (2019) investigate the impact of public debt on investment in Nigeria over the period 1981-2016. The results indicate that domestic debt improves both private and public investment in the short-run and long-run. The results also showed that external debt crowds-in and crowds-out private investment and public investment in Nigeria, respectively.

Despite the relevance of these works, many of them neglect threshold effects in their analysis, so the importance in terms of economic policy is no longer to be demonstrated. Based on the reasoning that a moderate debt level can contribute to enhanced investment, this study adopts a quadratic approach by estimating a non-linear relationship between external debt and investment in Sub-Saharan Africa.

3. Methodology

3.1. Econometric Specification and estimation method

In this study, we adopt a dynamic quadratic model based on the model proposed by Pattillo et al. (2002), Benedict et al. (2005), Tafah et al. (2012), as presented in equation 1:

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$$Tinv_{it} = a_1 Tinv_{it-1} + a_2 Servexp_{it} + a_3 Open_{it} + a_4 Tinteret_{it} + a_5 Txpop_{it} + a_6 Apd_{it} + a_7 Dext_{it} + a_8 Dext_{it}^2 + E_{it} \quad (1)$$

Where, *Tinv* is the domestic investment rate. The variables of interest are debt service ratio (*Servexp*), external debt/GDP ratio (*Dext*) and the squared of the previous ($Dext^2$). With "*i*" the individual effect, "*t*" the time effect and E_{it}, the error term. Description of the control variables and the expected signs for the variables of equation 1 are presented in table 1.

Table 1 - Description of variables

Variables	Description	Expected signs	Justifications
Tinv	Gross capital Formation as percentage of GDP	+	Jorgenson (1971)
Servexp	Total debt service as percentage of exports of goods, services and primary income	-	Pattillo et al. (2004)
Open	sum of exports and imports of goods and services measured as a share of GDP	+	Sare et al. (2018)
Tinteret	Real interest rate in percent	-	Chouraqui et al. (1986)
Txpop	Annual population growth rate in percent	- / +	Njamen et al. (2020)
Apd	Logarithm of net official development assistance and official aid received (current US$)	+	Nafiou, 2009
Dext	External debt stocks as percentage of GDP	+	Sachs (1989) Pattillo et al. (2002)
$Dext^2$	Dext Squared	-	

Source: authors, starting from a review of the literature.

The method used to determine the coefficients of equation 1 is the system GMM of Blundell and Bond (1998). This method presents three main advantages (Magnac, 2005): *(i)* it allows identifying effects that are not observable in cross-section; *(ii)* it controls the presence of unobservable heterogeneity; *(iii)* it formulates dynamic models. This last characteristic is of great interest for this study. This method also has the advantage of correcting the problem of endogeneity that may arise in the estimates due to the fact that the lagged investment rate is taken into account as an independent variable (Hansen 1999). We use three main instruments (*Open*, *Txpop* and *Apd*) which are correlated with the dependent variable. The robustness of the results obtained is based on two main tests: the absence of second order autocorrelation and the validation of the Sargan over identification test. This results in convergent and its coefficients are efficient (Roodman, 2009).

3.2. Data

Our sample is made up of 33 SSA countries with annual data collected over the period 1980-2017. The study focuses on four regional groups in SSA: CEMAC (Central African Economic and Monetary Community), ECOWAS (Economic Community of West African States), EAC

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(East African Community) and SADC (Southern African Development Community). Taking countries into groups is justified by the fact that the overall results can hide important disparities in the sample. The distribution of countries by sub-region is shown in table 2.

Table 2. List of countries

SADC (10)	EAC (5)	CEMAC (5)	ECOWAS (13)
Botswana, Democratic Republic of Congo, Lesotho, Madagascar, Malawi, Mozambique, South Africa, Swaziland, Zambia, Zimbabwe	Burundi Ethiopia Kenya Mauritius Rwanda	Cameroon Central African Republic Chad Gabon Republic of Congo	Benin, Burkina Faso, Ivory Coast, Gambia, Ghana, Guinea Bissau, Sierra Leone, Liberia, Mali, Niger, Nigeria, Senegal, Togo

Source: authors.

The data are from secondary source, gotten from the World Bank database (WDI, 2018). The choice of study period and number of countries depends exclusively on the availability of data. Descriptive statistics are presented in table 3. Estimates are made using Stata software. The results of estimations are presented in the next section.

Table 3 - Descriptive statistics

	SADC					EAC				
	Obs	Mean	Std.Dev.	Min	Max	Obs	Mean	Std.Dev.	Min	Max
Tinv	360	22.66	10.75	2.537	75.17	180	19.14	8.276	-8.629	64.98
Servexp	360	11.99	15.76	0.229	208.6	180	19.77	19.17	0.969	134.8
Open	360	73.32	40.95	7.335	183.0	180	41.31	27.44	5.001	156.8
Tinteret	360	4.825	5.608	0.125	43.55	180	7.653	8.473	0.0940	56.37
Txpop	360	2.309	0.972	-0.192	6.099	180	2.456	1.928	-7.597	10.26
Apd	360	4.6e+08	6.3e+08	-1.4e+07	5.5e+09	180	5.4e+08	7.1e+08	1.02e+07	3.8e+09
Dext	360	71.62	63.78	3.839	338.5	180	68.38	73.52	4.311	664.8
$Dext^2$	360	9185	16113	14.73	114553	180	10052	41528	18.59	442025
	CEMAC					ECOWAS				
	Obs	Mean	Std.Dev.	Min	Max	Obs	Mean	Std.Dev.	Min	Max
Tinv	180	20.29	9.563	0.831	54.49	468	16.75	7.584	0.817	57.73
Servexp	180	11.77	10.00	0.389	51.60	468	16.80	14.75	0.306	116.3
Open	180	50.77	26.97	14.04	118.4	468	50.49	18.36	12.94	133.9
Tinteret	180	4.631	3.999	0.104	23.89	468	6.941	6.333	0.0824	43.82
Txpop	180	2.656	0.434	1.643	3.857	468	2.722	0.724	-1.004	4.780
Apd	180	2.3e+08	2.7e+08	-1.0e+07	1.9e+09	468	4.020e+08	6.950e+08	2.130e+07	1.140e+10
Dext	180	69.21	54.77	11.91	304.9	468	88.64	67.14	1.985	469.5
$Dext^2$	180	7773	13847	141.9	92934	468	12355	22343	3.939	220447

Source: authors, from the collected data, using Stata.

4. Results

4.1. Baseline results

In this sub-sections, the results prior to the estimation of the effect of external debt on investment are presented. Due to economic and financial globalisation materialised by financial

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integration in Africa, as well as common shocks that affect African countries, we have to account for cross-sectional dependence when implementing the estimations (Carrera et al. 2020). This test is very important because it allows to choose between the first generation and second-generation panel unit root test. Indeed, in the presence of cross-sectional dependence, the first generation panel unit root test can lead to a biased result (Hoechle, 2007). To avoid any bias related to the omission of potential inter-country dependence, we implement the test of weak cross-sectional dependence (WCsD) developed by Pesaran (2015) on each variable included in equation 1. Among several cross-sectional dependence test, we choose Pesaran (2015) cross-sectional test because the test is robust when T<N (Belaïd and Zrelli, 2019). The results of the test are recorded in table 4. The null hypothesis suggests that cross-sectional dependence is absent in our data.

Table 4 – Test of cross-sectional dependence

Variables	SADC		EAC		CEMAC		ECOWAS	
	CD-test	P-value	CD-test	P-value	CD-test	P-value	CD-test	P-value
Tinv	0.730	0.463	4.960	0.000	-0.300	0.767	2.390	0.0170
Servexp	14.17	0.000	0.580	0.562	3.630	0.000	23.31	0.000
Open	1.390	0.164	8.450	0.000	6.480	0.000	7.290	0.000
Tinteret	13.81	0.000	1.910	0.0560	7.440	0.000	31.26	0.000
Txpop	4.600	0.000	-1.910	0.0570	0.920	0.355	0.470	0.641
Apd	19.33	0.000	11.81	0.000	5.980	0.000	33.24	0.000
Dext	11.82	0.000	3.22	0.001	15.23	0.000	34.54	0.000
$Dext^2$	8.93	0.000	3.66	0.000	14.56	0.000	29.70	0.000

Source: authors, from the collected data, using Stata.

The results presented in Table 4 reject the null hypothesis and thus confirm the existence of strong inter-country dependence in different sub-regions, with the exception of *Tinv* and *Open* in SADC, *Servexp* in EAC, *Tinv* and *Txpop* in CEMAC, and *Txpop* in ECOWAS. To account for this properties, we use a second generation unit root test named the Covariate Augmented Dickey-Fuller (CADF) test developed by Pesaran (2007) to test the unit root null hypothesis in a heterogeneous panel in the presence of cross-sectional dependence. The results of CADF test is presented in table 5.

Table 5 - Pesaran's unit root test

Variables	SADC		EAC		CEMAC		ECOWAS	
	Z[t-bar]	P-value	Z[t-bar]	P-value	Z[t-bar]	P-value	Z[t-bar]	P-value
Tinv	-3.099	0.001	-10.34	0.000	-9.461	0.000	-2.949	0.002
Servexp	-3.973	0.000	-9.415	0.000	-3.330	0.000	-4.842	0.000
Open	-1.356	0.088	-2.544	0.005	-3.488	0.000	-2.993	0.001
Tinteret	-3.751	0.000	-8.983	0.005	-3.604	0.000	-6.457	0.000
Txpop	-1.899	0.029	-2.777	0.003	-6.45	0.000	-8.80	0.000
Apd	-3.596	0.000	-2.250	0.012	-4.238	0.000	-4.177	0.000
Dext	-3.348	0.000	-7.443	0.000	-3.253	0.001	-2.753	0.003
$Dext^2$	-4.432	0.000	-8.401	0.000	-4.412	0.000	-4.012	0.000

Source: authors, from the collected data, using Stata.

As shown in Table 5, the unit root null hypothesis is rejected for all variables in SADC, EAC, CEMAC, and ECOWAS. which means that our variables are stationary, despite weak cross-

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sectional dependence concerning some independent variables in some sub-regions. Globally, these baseline results show that the selected variables can be used to assets the effect of external debt on investment and ensure valid statistical inference. The results of estimation itself are presented in the following sub-section.

4.2. Effect of external debt on domestic investment using GMM method

Table 6 summarizes the different results. It shows the absence of second order autocorrelation (*P-value test AR2* > 5%) for all groups. The p-value associated with Sargan over-identification test (*P-value Sargan test*) is above the 5% threshold for all sub-regions. We therefore accept the hypothesis that instruments are valid. Furthermore, the probability associated with Wald statistic (*Prob > chi2*) is below 5% threshold. This implies that the selected variables significantly explain the variations in domestic investment in these groupings.

Table 6 - Effect of external debt on domestic investment per sub-regions

	SADC	EAC	CEMAC	ECOWAS
$Tinv_{it-1}$	0.750 ***	-0.058	0.026***	0.764***
	(0.0517)	(0.0737)	(0.00455)	(0.0291)
Servexp	-0.061	-0.105**	0.014**	0.012
	(0.0889)	(0.0495)	(0.00698)	(0.0235)
Open	0.063 ***	0.223***	0.0069***	0.0377***
	(0.0164)	(0.0265)	(.00143)	(0.0118)
Tinteret	0.390	0.201*	-0.028	-0.0365
	(0.3022)	(0.1112)	(0.02057)	(0.0560)
Txpop	-0.831 *	0.356	0.081	0.0912
	(0.433)	(0.2510)	(0.0662)	(0.2836)
Apd	1.590 ***	0.958**	0.031	0.477**
	(0.5568)	(0.3927)	(0.0328)	(0.2371)
Dext	1.148	4.020***	-0.252*	-1.745**
	(1.570)	(1.388)	(0.1367)	(0.8183)
$Dext^2$	-0.866	-2.704***	0.133**	0.605
	(0.820)	(0.7584)	(0.06813)	(0.4319)
Observations	278	175	174	455
Number of countries	10	5	5	13
Wald chi2	516.08	147.48	254.50	935.35
Prob> chi2	0.000	0.000	0.000	0.000
P-value test AR2	0.685	0.313	0.636	0.468
P-value Sargan test	0.920	0.140	0.290	0.324
Threshold		74.33	94.73	

Note: standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: authors, from the collected data, using Stata.

These results provide room for more commentaries. The domestic investment rate lagged by one period ($Tinv_{it-1}$) has significantly enhanced domestic investment in SADC, CEMAC and ECOWAS. This result is in line with the theory of investment behavior (Jorgenson, 1971), which states that investment' level adjusts itself each period until it reaches the optimal investment

stock. In contrast, in the EAC zone, the domestic investment rate lagged by one period has a negative but not significant effect on current investment rate. This result of EAC zone is contrary to our expectations. This may be explained by the deterioration of business climate in the majority of EAC countries (caused by maritime piracy in Somalia, social and political crises in Rwanda and Burundi).

Estimated debt-service ratio (*Servexp*) negatively affects investment in the SADC and EAC (significant at 5% in the EAC). Indeed, if debt-service ratio increases by one point, it reduces domestic investment by 0.061 and 0.105 point, respectively in SADC and EAC. This result corroborates Benedict et al. (2005) and Pattillo et al. (2004). In contrast, debt service positively affects investment in CEMAC (significant at 5%) and ECOWAS. This result can be explained by the HIPC Initiative, which reduced external debt of CEMAC and ECOWAS countries to sustainable levels.

Trade openness (*Open*) positively affects domestic investment in all sub-regions. This result is in line with Sare et al. (2018). Openness to the world economy enhances domestic investment. This is specifically evident when openness leads to technological spillovers which are used in the production process leading to economic of scale; increase in economics of scale leads to further investments (Prabir, 2012).

Regarding of interest rate (*Tinteret*), our results show a positive effect on investment in SADC and EAC (significant at 10% in the EAC). In contrast, concerning CEMAC and ECOWAS, results show a deleterious effect on investment. This result is explained by the following paradox: on the one hand, excess bank liquidity in most African countries as highlighted by Fouda (2009) which contributes to falls in interest rates (this explains the positive effect gotten in SADC and EAC; fall in interest rates enhances investment); on the other hand, difficult conditions for granting credit considerably compromises the allocation of funds to investment projects (this explains the negative effect obtained in CEMAC and ECOWAS; the restrictions on credit supply hampers investment).

Population growth rate (*Txpop*) negatively and significantly affect investment in the SADC. This an indication that, despites investment in human capital in this sub-region, a labour force has been unproductive (Manwa et al. 2019). In the other sub-regions, the effect is positive, but not significant. Official Development Assistance (*Apd*) positively enhance economic growth in all regional groups. This result is consistent with Nafiou (2009).

External debt stock/GDP ratio (*Dext*) and the same variable squared ($Dext^2$) have the expected signs in the SADC and EAC (significant at 1% in the EAC). In both group, external debt enhances domestic investment (positive *Dext* coefficient). But above a certain threshold, this effect become negative (negative $Dext^2$ coefficient). This result is in conformity with the virtual debt burden theory (Cohen and Sachs, 1986; Krugman, 1988; Cohen, 1995, Pattillo et al, 2002). This threshold, labelled as bearable threshold (Touna, 1985), is obtained by equation 2 (Pattillo et al. 2002; Njamen et al. 2020).

$$Debt\ threshold = -\frac{coefficient\ Dext}{2 \times coefficient\ Dext^2} \times 100 \quad (2)$$

Thus, based on equation 2, for an external debt level above 74.33% of GDP, external debt has a negative effect on investment in the EAC. Debt threshold is not determined in SADC because the *Dext* and $Dext^2$ coefficients are not significant.

In the CEMAC and ECOWAS, external debt stock/GDP ratio (*Dext*) rather have a negative effect on domestic investment. This predictable result in both zone is interesting in more than one ways. Indeed, countries in both groups experienced high external debt ratios, which led to the debt crisis of the 1980s. However, the implementation of HIPC initiative allowed a considerable debt cancellation for these countries. This is confirmed by the trend reversal observed in these two sub-regions (positive $Dext^2$ coefficient), which means that the HIPC initiative produced the desired effects. It is accepted in the present cases that for a sustainable level of debt, the positive impact of the debt on domestic investment is observed (in relation with positive coefficient of $Dext^2$) in CEMAC and ECOWAS. Always based on equation 2, this debt threshold is 94.73% of GDP in CEMAC, other things being equal. This threshold, which is slightly higher than that of the 70% of GDP threshold defined by the CEMAC multilateral convergence criteria (CEMAC, 2018), offers additional budgetary margin of maneuver to the countries to face with investment financing constraints. But authors such as Avom et Gbetnkom (2003), Fouda (2009), Gammadigbe et al. (2018), Avom et Noumba (2019), Barat et Ehrhart (2020), draw the attention of governments and international financial institutions to the speed at which states are re-indebting themselves. Debt threshold is not determined in ECOWAS because the $Dext^2$ coefficient is not significant.

4. Conclusion and policy implications

The main objective of this paper was to analyse the effects of external debt on domestic investment in SSA sub-regions from 1980 to 2017. The empirical model was estimated using the system GMM. Our findings suggested that external debt affected domestic investment differently in these sub regions. In SADC and EAC, the results showed a non-linear relationship between external debt and domestic investment; with a bearable debt threshold estimated at 74.33% of GDP in the EAC. Concerning the CEMAC and ECOWAS, results showed a negative relationship between external debt and domestic investment, but for a debt threshold below 94.73% of GDP in the CEMAC, the effect on domestic investment is positive. In order to control external debt flows in the different sub-regions and enhancing investment, the recommendations suggest to maintain external debt at sustainable rates; strengthens investment thanks to the improvement of the business climate especially in the EAC. The situation in SADC is relatively encouraging, but particular emphasis should be placed on managing population growth because of its harmful effect on domestic investment. It is also necessary to encourage states to observe multilateral surveillance across countries over the long term in CEMAC and ECOWAS because, despite reaching the HIPC Initiative, countries' foreign debt continues to increase. Finally, to optimize the effects of investment on growth, investment should be concentrated on growth-enhancing sectors, mainly in infrastructure and the modernization of manufacturing sector.

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