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Public expenditure on physical activities and sports on Economic Growth in Cameroon

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Abstract
The objective of this work is to evaluate the effect of public expenditure on physical activities and sports on economic growth in Cameroon for the period 1990 to 2019. To do this, we drew on theories on productive public expenditure. In order to achieve this objective, we used the modified version of the model based on econometric analysis from the framework inspired by the work of Romer, Mankiw and Weil and which was taken up by Serge A. Ayekoe to model the relationship between public spending on sport and growth. We used the unit root test to check the stationarity of the variables, then for robustness, the Breusch-Godfrey test for autocorrelation of errors, the Breush-Pagan-Godfrey/BPG test for homoscedasticity, the Jarque Berra normality test and the Ramsey global goodness test for model specification. Then the Toda-Yamamoto causality test was carried out, after which the ARDL model was estimated to assess the long and short term relationships and finally the Pesaran *et al* cointegration test. The results of the estimates of the effect of public spending on PSA on economic growth in Cameroon show that public spending on PSA has a positive and indirect impact on economic growth in Cameroon. An increase in public spending on sports of 1% of GDP accelerates growth by 0.01% in CT and 0.037% in LT. The study shows that public expenditure on SPA has a role to play in economic development in Cameroon.

Keywords: Public Expenditure, Physical and Sport Activities, Economic Growth

1. Introduction

(Passive) sport and sport practice are primarily used for playful or competitive purposes, physical training, health, relaxation or simply for socialisation and entertainment (constitutive characteristics of the term) Rahmann *et al* (1998), Heinemann (1995), Weber *et al* (1995). However, according to micro-economic theory, physical and sports activities are also subject to economic laws, on the one hand, because they satisfy the needs of individuals and thus provide them with utility, on the other hand, because they consume scarce resources that are taken away from other alternative uses Büch (1996), Heinemann (1995).

The term physical and sports activities (PSA) covers all practices, whether they be sporting, competitive, leisure, extreme or free, during which the body is used, put into play, whatever the value (physiological, psychological, sociological) that the practitioner attributes to it. Indeed, the practitioners do not necessarily have a licence and do not always take part in official competitions. In addition, health and well-being concerns may lead people to engage in regular physical activity, not sport. We are no longer considering only sportsmen and women in the strict or institutional sense of the term, but people who devote a significant part of their time, their budget and their energy to a physical activity that often applies a sporting model, but not always when it comes to hunting, fishing or a Sunday stroll (collective expertise, 2008).

The practice of sport itself can therefore be interpreted as an economic activity or even as "an act of consumption" Andreff (1999, p. 135) by generating a demand for clothing, footwear and other sports articles as well as for sports equipment or sites and various goods and services accompanying the sports activity. This demand is, today, at the origin of real sports markets where it meets a diversified and specialised offer and where the preferences of economic agents are revealed in prices and quantities.

Therefore, the development of these relationships observed in the past years can be characterised more as structural changes (micro-economic relations) and as a total volume increase (macro-economic impact) than as a real novelty. In the twentieth century, physical activity and sport have become a mass social phenomenon involving billions of people worldwide. In developed countries, sport and physical activities, according to D. Gautier (2005), now represent an economic sector in its own right, accounting for about 2% of GDP.

On a global scale, a notch has been passed: with nearly €1,200 billion, sport and physical activities now generate nearly 2% of the world's GDP for an average growth of 4% (Statista study 2017). The strong development can be explained in particular by the emergence of new markets in Asia-Pacific (+4.6% average annual growth over the period 2014 -2015) with extremely active countries such as China, whose market recorded an average annual growth of +6.1%, and India with +7.6%.

Even if in Africa and in sub-Saharan countries like Cameroon, studies are rare on the subject, the fact remains that the practice of PSA generated 0.036% of the GDP in 2013 and with nearly 5000 stable jobs. Exports exist, even if they are minimal, Cameroon has been exporting sports goods for several years. In 2013, the turnover of these exports already reached 50 million FCFA. As in most emerging or developing countries, PSAs seem to have become a state affair in Cameroon for several years now. This political will is reflected in the allocation of considerable financial and human resources for the development and practice of PSA. Even if the primary objective remains the visibility of results, which is often translated into sports results on the international scene (games, international competitions, etc.), the creation of wealth.

In view of this observation, we have focused our attention on public spending on sport and physical activities, particularly on little-studied public operating and infrastructure capital, in order to highlight its effects on growth, hence the question that drives us: What is the effect of public spending on physical activities on economic growth in Cameroon?

2. Theoretical foundations of the effect of public spending on PSA on economic growth.

Research on the impact of public spending on sport on economic growth is relatively limited on the African continent in general and in developing countries in particular (Chapellet, 2005). In this paper, which is devoted to the analysis of the influence of public expenditure on growth, we focus on studies that have examined the impact of sports expenditure on human capital formation and public infrastructure capital in the field of sports on economic growth.

The extensions of the theory of human capital in the field of sport were observed in an article by Fluckinger and Morisset (1993). The approach proposed by Fluckiger and Morisset makes it possible to highlight the attitude of economists who, inspired by the work of G. Becker, generalise the logic of rational and maximising behaviours to a social fact such as sport. They analyse the impact of the transition of Eastern European countries from a planned economy to a market economy on their sporting performance, particularly through the theory of human capital. In a market economy, individuals decide to engage in a professional activity or to practice a sport (by extension) if the present value of the private benefits they derive from this individual choice is greater than (or equal to the limit of) the present value of the costs associated with this decision. Based on this very simple analysis, the authors establish a sport supply function as follows :

$$Xi = \alpha 0 + \alpha 1 Yi + \alpha 2 Yj \quad (1) \text{ with, } \alpha 1 > 0 \text{ et } \alpha 2 < 0$$

where, Xi : number of people practising sport i Yi : income that an individual practising sport i can expect to obtain Yj : alternative income that an individual could obtain by practising other activities j = 1, 2..., n. This formulation of the supply of sport is based on a certain number of postulates: on the one hand, it is assumed in particular that the only benefit linked to the choice of a sporting activity comes from the income expected from this discipline. On the other hand, it does not take into account the choice of sport in the form of leisure activities, thus the intertemporal dimension of the analysis disappears since the choice is made on the basis of future income gains, insofar as the presence of a famous champion in a given sport strongly influences individual or collective choices.

In a market economy, State intervention corrects the allocation of resources in the form of subsidies to federations or direct aid to high level athletes in order to internalise the external benefits linked to the practice of certain disciplines and likely to influence the supply function. This theoretical approach through human capital was also used by Ph. Fouques (1978) in his study on "Le marché du travail sportif". Inspired by the theory of human capital developed by G.S. Becker, the author studied the conditions of price formation in the sports labour market determined by the athlete's capital, consisting of his or her body and skill. In this market, remuneration is determined by the productivity of the individual who must rationally prolong his training until he reaches the equilibrium between the cost of his training and the expected future income. "The best paid wages are those who have invested the most in the acquisition of human capital [...] and the wage hierarchy reflects these differences", according to B. Reynaud (1994).

In other words, according to human capital theory, the best paid employees on the market are considered to be the most productive. However, this approach does not explain the variance in salaries by the investment in training of sportsmen and women through training centres, internships, etc. In sport, as elsewhere, a certain number of athletes have managed to become among the best with a minimum of training. "Sport is undoubtedly the environment in which the differences between individuals are the most perceptible and if some of them can be explained biologically or socially, others such as the vision of the game, the skill, the taste for risk, etc., cannot be explained scientifically and neither experience nor training time will be able to inculcate it" (Sobry, 2003).

Adaptations of this approach to other studies, for example the theory of efficiency wages applied to the wages of "stars or super-stars" by P. Bouvet (1996), nor the theory of equity wages developed earlier by J.W. Harder (1992), have not been able to establish a direct relationship between human capital formation, productivity and wages (Blass, 1992). Studies of the economic impact of sports infrastructure using econometric models are rare. They are the work of Baade (1996) [15], Baade and Dye (1990) [11], Baade and Sanderson (1997) [12] and Baim (1994). These studies can be divided into two categories:

The impact of sports facilities on output tested using an econometric model by Baade and Dye (1990) [11] for nine US cities between 1965 and 1983. The results of this estimation show that in eight of the nine cities, the coefficient associated with the dummy variable is not statistically different from zero, indicating that the presence

of a stadium does not influence the income of the cities studied. In only one case does the presence of a stadium have a significant and positive impact on income. The authors then estimated this model using panel data. The variable associated with stadiums, although positive, remains insignificant.

The impact of sports facilities on employment shows similar results to those obtained for the impact of sports facilities on production. Baade and Sanderson (1997) [12] estimated the impact of infrastructure and clubs on employment in the leisure, entertainment and sport sector in ten cities for the period 1958-1987. The increase in the number of stadiums or professional teams does not have a significant impact on the creation of jobs in the sectors mentioned, except in three cities in the sample, where the number of new jobs remains modest. Apparently, the increase in the number of stadiums in a city does not increase direct and indirect expenditure sufficiently to stimulate economic activity and job creation. Baim (1994) made a similar estimate, but without introducing the number of stadiums, leaving only two sport-related dummy variables : the presence of a professional football or baseball team.

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Regressing these variables on service sector employment for 15 US cities, the author finds that professional teams have a significant influence on job growth.

A study by Kesene and Task (2000) to measure the impact of the sport sector on the economy in Flanders by means of public expenditure in five provinces with at least 10. The study found that public administration investments in the construction of sports centres, subsidies to support sports federations, the organisation of sports events, promotion campaigns for "sport for all" and the training of managers, trainers/coaches at different levels, have resulted in an increase in household consumption expenditure on sport (70% of total sports expenditure) over the last 20 to 30 years, while public administration expenditure has stagnated at around 20%. These results are in line with the proportions obtained in studies commissioned by the Council of Europe to estimate the economic weight of sport in the Member States, Jones (1989); Andreff *et al*. The government's concentrated intervention in financing the construction and maintenance of a variety of sports facilities in favour of the promotion of sport for all has kept the economic dynamism of Flanders alive. The State's intervention, through regulatory mechanisms (legal framework) in the direction of the market, has succeeded in lowering the price threshold for low-income families.

3. Methodology approach

In this paragraph, we specify our basic model, and then define the variables of the model.

3.1 Specification of the model

In order to verify the effect of public spending on PSA on economic growth in Cameroon, we will use a methodological approach based on econometric analysis using the analytical framework inspired by the work of Romer, Mankiw and Weil (1992) [21] who used a Cobb-Douglas type production function augmented by human capital in their studies and which was taken up by Serge A. Ayekoe (2004) [24] to model the relationship between public spending on sport and growth using the following model Ayekoe (2004) to model the relationship between public spending on sport and growth using the following model:

Model 1 The effect of total public spending on sport on economic growth:

$$LnPIB=a_0+a_1LnDPS+a_2IDH+ a_3LnPPAC \quad (2)$$

Model 2 to show the effect of the ordinary component of sports expenditure on economic growth :

$$LnPIB=a_0+a_1LnDSF+a_2IDH+a_3LnPPAC \quad (3)$$

Model 3 to show the effect of sports capital expenditure on economic growth

$$LnPIB=a_0+a_1LnDPIS+a_2IDH+a_3LnPPAC \quad (4)$$

Where LnPIB is the logarithm of GDP that will be calculated, LnDPS is the logarithm of public expenditure on sport in Cameroon which represents the variable of interest for model 1, LnDSF is the logarithm of public expenditure on sport, LnDPIS is the logarithm of public expenditure on investment in sport, HDI is the human development index and LnPPAC is the size of the active population which are control variables measuring the macroeconomic environment. a_0 is the model constant. The coefficients a_i (i varying from 1 to 3) measure respectively the effect of public spending on sport and the control variables on growth.

3.2 Measures of variables and source of data

The data used in our work are extracted from the World Bank (WB) 2019 database, also known as World Development Indicators (WDI) 2019. The data on public expenditure come from the Directorate General of Budget and Finance (DGB) of the Ministry of Finance. They cover the period from 1990 to 2019, and the data come from archival documents on the various finance laws corresponding to this period. These include data on the share of the budget allocated to sport over the period 1990-2019. The other sources of data relating to real GDP (GDPR) and per capita GDP (GDPH) in purchasing power parity (PPP), data on the human development index (HDI) come from the "Perspective Monde" database of the University of Sherbrooke, CANADA : [http://perspective.usherbrooke.ca] which come from the World Bank's statistical tables. The data on the active population (PPAC) come from the World Bank's population statistics produced by the International Labour Organisation (ILO).

3.3 Method of estimation

Concerning the estimation method used to test our hypotheses, we use the unit root test to verify the stationarity of the variables, then for robustness, the Breusch-Godfrey test for the autocorrelation of errors, the Breush-Pagan-Godfrey/BPG test for homoscedasticity, the Jarque Berra normality test and the Ramsey global goodness test for the specification of the model will be used. Afterwards, the Toda-Yamamoto causality test will be carried out, to estimate the ARDL model in order to evaluate the long and short term relationships and finally the Pesaran *et al* (2001) cointegration test.

4. Presentation and analysis of econometric results

4.1 Presentation of the estimation results

In order to better understand the effect of public expenditure on PSAs on economic growth, we proceeded in three stages. The first step consists of estimating the effect of public operating expenditure on economic growth, then the effect of public investment expenditure on economic growth and finally the effect of public expenditure on economic growth in Cameroon. The following tables summarise the different results obtained for this purpose.

Results of public spending on PSA

Table 1: ARDL model estimation of public spending on sports

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOGPIB (-1)	0.739748*	0.027722	26.68484	0.0000
LOGDPS	0.012435	0.006533	-1.903329	0.0702
LOGIDH	-0.000168	0.000119	-1.410082	0.0725
LOGPPAC	0.133867*	0.022919	5.840881	0.0000
LOGPPAC (-1)	-0.000477	0.030559	-0.015600	0.9877
C	-0.102150	0.087509	-1.167309	0.0556

R-squared	0.994353	F-statistic	774.8380
Adjusted R-squared	0.993070	Prob(F-statistic)	0.000000
		Durbin-Watson stat	1.655640

*significant at 1%; ** significant at 5%; *** significant 10%.

Table 2: Causality between variables (DPS)

k	dmax	Variables dépendantes	Variables explicatives ou causales/vc(probabilité)			
			LogPIB	logDPS	logIDH	logPPAC
3	1	LogPIB	-	0.107104 (0.9479)	0.280082*** (0.0693)	6.582537** (0.0372)
		logDPS	1.079232 (0.5830)	-	1.226808 (0.5415)	3.624556*** (0.0633)
		logIDH	2.067710 (0.3556)	2.429058** (0.0268)	-	0.312242 (0.8555)
		logPPAC	1.125592 (0.5696)	0.849543** (0.0439)	0.373631 (0.8296)	-

*significant at 1%; ** significant at 5%; *** significant 10%.

The following diagram summarises the causal links found between variables:

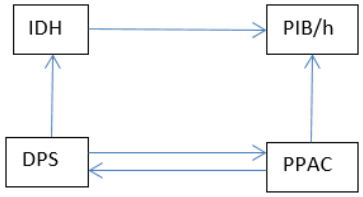

Table 3: Short-term coefficients (DPS)

log PIB				
Variable	Coefficient	Stde. Errer	t-Statistique	Probe.
D(LOGDPS)	0.012435**	0.006533	-1.903329	0.0402
D(LOGIDH)	0.000168**	0.000119	-1.410082	0.0425
D(LOGPPAC)	0.133867*	0.022919	5.840881	0.0000
Cointe (-1)	-0.260252*	0.027722	-9.388023	0.0000

*significant at 1%; ** significant at 5%; *** significant 10%.

Table 4: Long-term coefficients (DPS)

logPIB				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGDPS	0.037781**	0.025611	-1.865647	0.0455
LOGIDH	0.000646***	0.000449	-1.439036	0.0642
LOGPPAC	0.512542*	0.047750	10.733824	0.0000
C	-0.392504	0.341188	-1.150403	0.2623

*significant at 1%; ** significant at 5%; *** significant 10%.

Results of public expenditure on sport (DSF)

Table 5: ARDL model estimation of public expenditure on sport

Variable	Coefficient	Stde. Errer	t-Statistique	Prob.*
LOGPIB (-1)	0.803483	0.123458	6.508133	0.0000
LOGDSF	0.003692**	0.001436	2.570503	0.0187
LOGDSF (-1)	0.001627	0.001318	1.234261	0.2322
LOGIDH	0.000296**	0.000115	-2.579362	0.0184
LOGPPAC	0.730761*	0.208186	3.510139	0.0023
LOGPPAC (-1)	-0.573893	0.220426	-2.603565	0.0175
LOGPPAC (-2)	-0.045174	0.093493	-0.483178	0.6345
C	-0.216953	0.125490	-1.728853	0.1001
R-square	0.996184	F-statistic	708.5100	
Adjusted R-squared	0.994778	Prob(F-statistic)	0.000000	
		Durbin-Watson stat	2.180198	

*significant at 1%; ** significant at 5%; *** significant 10%.

Table 6: Causality between variables (DSF)

k	dmax	Variables dépendantes	Variables explicatives ou causales/vc(probabilité)			
			LogPIB	logDSF	logIDH	logPPAC
3	1	LogPIB	-	0.542491 (0.7624)	0.337592** (0.0447)	6.360348** (0.0416)
		logDSF	2.303444 (0.3161)	-	1.436463 (0.4876)	3.290462 (0.1930)
		logIDH	2.505995 (0.2856)	1.490620 (0.4746)	-	1.099380 (0.5771)
		logPPAC	0.476656 (0.7879)	0.125369 (0.9392)	0.170019 (0.9185)	-

*significant at 1%; ** significant at 5%; *** significant 10%.

The following diagram summarises the causal links found between variables :

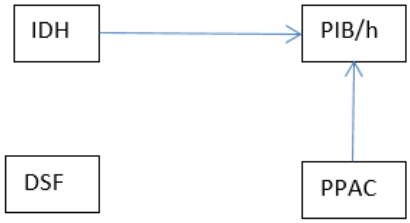

Table 7: Short-term coefficients (DFS)

logPIB				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGDSF)	0.003692	0.001436	2.570503	0.1187
D(LOGIDH)	0.000296**	0.000115	-2.579362	0.0184
D(LOGPPAC)	0.730761*	0.208186	3.510139	0.0023
D(LOGPPAC(-1))	0.045174	0.093493	0.483178	0.6345
CointEq(-1)	-0.196517	0.123458	-1.591772	0.1279

*significant at 1%; ** significant at 5%; *** significant 10%

Table 8: Long-term coefficients (DFS)

logPIB				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGDSF	0.027068	0.022844	1.184908	0.2507
LOGIDH	0.001505**	0.001336	-1.126555	0.0140
LOGPPAC	0.568369*	0.041900	13.564923	0.0000
C	-1.103990*	0.311136	-3.548251	0.0021

*significant at 1%; ** significant at 5%; *** significant 10%

Results of public investment expenditure on sport (DPIS)

Table 9: ARDL model estimation of public investment expenditure on sport

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOGPIB(-1)	0.377145**	0.106689	3.535009	0.0167
LOGDPIS	0.005401*	0.000726	-7.436609	0.0007
LOGDPIS(-1)	0.003608*	0.000558	6.465886	0.0013
LOGDPIS(-2)	0.002898*	0.000507	5.719984	0.0023
LOGDPIS(-3)	-0.001849*	0.000392	-4.711506	0.0053
LOGDPIS(-4)	-0.002697*	0.000647	-4.168325	0.0088
LOGIDH	0.000660***	0.000267	-2.466204	0.0568
LOGIDH(-1)	0.000903*	0.000311	2.899504	0.0338
LOGIDH(-2)	0.001712*	0.000276	6.201802	0.0016
LOGIDH(-3)	0.001280*	0.000200	6.385710	0.0014
LOGIDH(-4)	-0.000388*	7.27E-05	-5.336811	0.0031
LOGPPAC	0.485094*	0.116376	4.168330	0.0088
LOGPPAC(-1)	1.084189*	0.228536	4.744062	0.0051
LOGPPAC(-2)	-1.425269*	0.249692	-5.708112	0.0023
LOGPPAC(-3)	0.899725*	0.200769	4.481400	0.0065
LOGPPAC(-4)	-0.662870*	0.109702	-6.042485	0.0018
C	-0.693520*	0.098968	-7.007501	0.0009

R-squared	0.999454
Adjusted R-squared	0.997708

F-statistic	572.4227
Prob(F-statistic)	0.000000
Durbin-Watson stat	2.553798

*significant at 1%; ** significant at 5%; *** significant 10%

Table 10: Causality between variables (DPIS)

k	**dmax**	**Variables dépendantes**	**Variables explicatives ou causales/vc(probabilité)**			
			LogPIB	logDPIS	logIDH	logPPAC
3	1	LogPIB	-	0.803260 (0.7192)	0.266236** (0.0354)	7.159089** (0.0279)
		logDPIS	0.345912 (0.8412)	-	1.456911 (0.4827)	0.438403* (0.0032)
		logIDH	1.939726 (0.3791)	1.835011** (0.0395)	-	0.692248 (0.7074)
		logPPAC	0.744486 (0.6892)	1.625820* (0.0036)	0.101245 (0.9506)	-

*significant at 1%; ** significant at 5%; *** significant 10%.

The following diagram summarises the causal links found between variables:

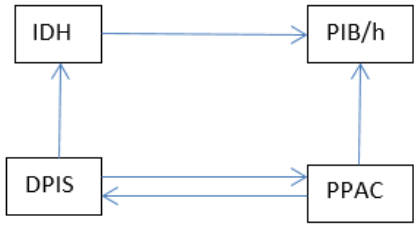

Table 11: Short-term coefficients (DPIS)

logPIB				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LOGDPIS)	0.031401*	0.000726	-7.436609	0.0007
D(LOGDPIS(-1))	0.020898*	0.000507	-5.719984	0.0023
D(LOGDPIS(-2))	0.001849*	0.000392	4.711506	0.0053
D(LOGDPIS(-3))	0.002697*	0.000647	4.168325	0.0088
D(LOGIDH)	0.000660***	0.000267	-2.466204	0.0568
D(LOGIDH(-1))	0.00171*2	0.000276	-6.201802	0.0016
D(LOGIDH(-2))	-0.001280*	0.000200	-6.385710	0.0014
D(LOGIDH(-3))	0.000388*	0.000073	5.336811	0.0031
D(LOGPPAC)	0.485094*	0.116376	4.168330	0.0088
D(LOGPPAC(-1))	1.425269*	0.249692	5.708112	0.0023
D(LOGPPAC(-2))	0.899725*	0.200769	-4.481400	0.0065
D(LOGPPAC(-3))	0.662870*	0.109702	6.042485	0.0018
CointEq(-1)	-0.622855*	0.106689	-5.838062	0.0021

*significant at 1%; ** significant at 5%; *** significant 10%.

Table 12: Long-term coefficients (DPIS)

logPIB				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOGDPIS	0.045525**	0.001766	-3.129639	0.0260
LOGIDH	0.004571***	0.001867	2.448530	0.0580
LOGPPAC	0.611489*	0.015438	39.609825	0.0000
C	-1.113453*	0.123025	-9.050610	0.0003

*significant at 1%; ** significant at 5%; *** significant 10%

4.2 Analysis of results

From the results of the different tests carried out according to the estimated models, we can see that the different variables are not of the same order. Therefore, we used ARDL modelling and the Toda-Yamamoto cointegration test. It is clear that the estimated models are well defined and explain the dynamics of GDP in Cameroon over the period 1990-2019. The various robustness tests carried out on the three optimal models allow us to verify that there is no autocorrelation of errors, no heteroscedaticity, no normality of errors, and that the models have been well specified. To go further, the Pesaran *et al.* (2001) cointegration test requires that the ARDL model be estimated beforehand.

The results of the cointegration test at the bounds confirm the existence of a cointegrating relationship between the series under study (the value of F-stat is > that of the upper bound 5.61), which makes it possible to estimate the long-term effects on each of the estimated models. This allowed us to test the correlation between the dependent variable and the explanatory variables and it emerges that for the three estimated models, the simple correlation matrix between variables does not indicate any link between the dependent variable (GDP) and the explanatory variables, the degree of association not exceeding 0.50 in the first column. This absence of correlation makes it possible to verify the causality between the variables using the Toda-Yamamoto test.

The results of the causality test show that for:

In Model 1 with public expenditure on sport in general as an explanatory variable, causality exists between public expenditure on sport and the labour force, between public expenditure on sport and the human development index. But not between public spending on sport and GDP, which shows that public spending on sport has an indirect effect on economic growth. And according to the coefficients in the long and short term, public spending on sport has an effect on economic growth in both the short and long term. An increase in public spending on sport of 1% of GDP accelerates growth by 0.01% in the short term and by 0.037% in the long term;

In Model 2 with public expenditure on sport as the explanatory variable, no causality exists between public expenditure on sport and the other variables. Thus not between public expenditure and GDP, which shows that public expenditure on sport has no effect on economic growth. And according to the long-run and short-run coefficients, this public expenditure on sport has no effect on economic growth in either the short or long run.

In Model 3 with public expenditure on sport as an explanatory variable, causality exists between public expenditure on sport and the labour force, between public expenditure on sport and the human development index. But not between public sport investment expenditure and GDP, which shows that public sport investment expenditure has an indirect effect on economic growth. And according to the coefficients in the long and short term, this public sport investment expenditure has an effect on economic growth in both the short and long term. An increase in public sport investment expenditure of 1% of GDP accelerates growth by 0.03% in the short term and by 0.045% in the long term.

Based on the different analyses, we can validate the following results :

- Public spending on sports does not influence economic growth in Cameroon. And this in the long or short term ;
- Public capital expenditure on sport has an effect on economic growth in Cameroon. This result is consistent with the work of Bassani ni and Scarpetta (2001), Baxter and King (2003), Gupta, Clements, Baldacci and Mulas-Granados (2005), Yu, Fan and Saurkar. (2009), Gemmell, Kneller and Sanz (2015) ;

- Public spending on sports has an effect on economic growth in Cameroon. This result is consistent with some previous studies on public spending. These include Gupta (1988), Devarajan, Swaroop and Heng-fu Zou (1996), Afonso and Sousa (2009), Akitoby *et al* (2006).

5. Conclusion

In this work, we analysed the effect of public spending on PSAs on growth in Cameroon. We were inspired by the modified version of the work of Romer, Mankiw and Weil (1992) [21] who used a Cobb-Douglas type production function augmented by human capital to model the relationship between public spending and growth. This model was modified and used by Serge A. Ayekoe (2004) [24].

The objective of this section was to study the effect of public expenditure on sports on economic growth in Cameroon from the point of view of its productive efficiency. The methodology followed for the statistical estimates was based on a Toda Yamamoto approach. To this end, stationarity tests, robustness tests, the Pesaran *et al.* test (2001), and Toda-Yamamoto causality tests in an ARDL model were carried out.

The results showed that: public operating expenditure on sport has no influence on economic growth in Cameroon, unlike public investment expenditure on sport which has an effect on economic growth in Cameroon in the short and long term, an increase in public investment expenditure on sport of 1% of GDP accelerates growth by 0.03% in the short term and by 0.045% in the long term. It should be noted that this effect is not direct, which probably explains the fact that overall public spending on sport has an indirect effect on economic growth in Cameroon, an increase in public spending on sport of 1% of GDP accelerates growth by 0.01% in the short term and 0.037% in the long term.

6. References

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