An Empirical Inquiry into the Impacts of Taxation on Poverty in Côte d'Ivoire

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Abstract

The universality of tax matters is a fact. Through taxes, nations raise funds and address the myriad of needs of their respective populations to provide the highest living standards by reducing poverty. Côte d'Ivoire (CIV), a new economic powerhouse in West Africa, does not escape this reality and is of interest in this paper. Using a Bayesian vector auto regression (BVAR) methodology and data spanning the 1980-2022 period, the impacts of tax policies on poverty in the country are investigated. No empirical evidence is found to suggest that poverty is moved in any way as a result of tax policies implemented in the country. However, it is corollary uncovered that prior poverty levels remain relevant in determining current ones.

Keywords: Côte d'Ivoire, Tax, Poverty

JEL Classification: O55, H20, I30, E60

I- Introduction

Tax matters are universal. Every country, developing or developed, must grapple with challenges pertaining to administering them. These challenges involve choosing and setting up a system, collecting dues, and providing a country-wide enforcement mechanism of tax legislation. In developing countries in particular, these tasks can prove to be daunting owing to the presence of a two-pronged problem involving relatively weak institutions and the limited level of tax civism, or lack thereof, with economic agents. These problems are themselves compounded by the existence of rampant poverty.

Côte d'Ivoire (CIV), a developing country in sub-Saharan Africa, does not escape this reality. In the past decade, this country has recorded yearly economic growth rates of 6-plus percent, which, along with ambitious and widespread investment programs, have thrust the country toward becoming the 10th largest economy on the African continent as of 2023. Being a member of the select top 10 club in Africa has yielded remarkable improvements on several international charts regarding, among others, security, ease of doing business, human development, prosperity, and even "happiness." These elements are turning the country into a contemporary case study of success stories in Africa. Hence, CIV's economic ascension has started to draw interest in the literature, as it is not without reverberations upon the living standard and poverty level across the country. To learn some valuable economic lessons associated therewith, this study focuses on tax related matters. Specifically, it endeavors to investigate the relationship between taxation and poverty in CIV. Otherwise stated, what are the incidence of tax policies in CIV on poverty?

As it moves forward, the paper is organized as follows. Part 2 surveys the literature and provides a background on Côte d'Ivoire from three key perspectives. Then, the methodology is discussed in Part 3, while results are presented in Part 4. Concluding remarks are made in Part 5.

II- Literature review and background

1- Literature review

A stylized fact that has come to light during the current research process is the taciturnity of the literature regarding the relationship between taxation matters and poverty in developing countries, in general, and sub-Saharan Africa, in particular. With that in mind, the investigation has managed to reckon some research works from a few scholars who directly or indirectly explored this relationship.

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Among others, Ezenagu (2019), and Kim and Kim (2018) have stood out. The former scrutinizes the implications of unitary taxation of multinationals on African countries as they pursue sustainable development goals (SDGs).Indeed, the pursuit of SDGs, if done successfully, would provide a solid platform to notably reduce poverty in these countries. The author argues that a new international tax system is needed for African countries to achieve SDGs. He contends that a unitary taxation of multinational firms is the solution, for it is a system wherein firms' profits are taxed where they are made as opposed to the current system that legitimizes the loophole of the base erosion and profit-shifting (BEPS) practices for taxation purposes. The latter paper conducts a comparative study of the effects of tax administration reforms in the two African countries of Tanzania and Uganda by considering two main metrics, namely, tax performance and quasi-voluntary compliance. The authors find that Tanzania outperformed Uganda in both metrics.

Gnangnon (2019) completes a comprehensive analysis looking at the implications of tax reform on total tax revenue through the channel of trade tax revenue. The author examines in practice how and to what extent changes in tax revenue structures drive or not trade openness using an unbalanced panel with 92 developing countries spanning the 1980-2014 period. Results show that tax reform enhances trade openness in least developed countries (LDCs). In addition, it is found that this impact of tax reform on trade openness is higher in less advanced LDCs as compared with relatively advanced LDCs.

Nnyanzi et al. (2016) focus on East African Community (EAC) countries in their quest for understanding the effects of regional economic integration on tax revenue. With data ranging from 1980 to 2014, empirical results uncover that ─belonging to─ the EAC boosts tax revenue because of institutional quality. On the other hand, an important question related to whether tax revenue improves economic complexity in Africa is asked by Ndoya and Bakouan (2023). Through the method of generalized method of moments (GMM) along with a dataset of 29 African countries ranging from 1995 to 2018, the authors unveil that tax revenue fosters economic complexity in Africa. This is accomplished, as much-needed financial resources are made available to pursue the production of more complex and sophisticated goods.

2- Background

To provide an educative and succinct background about Côte d'Ivoire (CIV), two focal points are worthy of discussion in the study at this juncture.

Firstly, from a geographical, cultural, and linguistic perspective, CIV is located in Western Africa with a land area of 322,462 km². Its capital city is officially Yamoussoukro, which isin theory the political capital. However, the major city of Abidjan, the economic capital, still harbors to this day every actual layer of both political and economic powers in the country. It's a status quo that the current and previous presidents have endeavored to alter, but to no avail. The country's northern borders are shared with Mali (MLI) and Burkina Faso (BFA), whereas its entire southern shores are covered by the Atlantic Ocean. Guinea (GIN), also known as Guinea-Conakry, and Liberia (LBR) are its neighbors to the west as Ghana (GHA) borders it to the east.

CIV is a former French colony that gained independence on August 7, 1960. These colonial ties contributed to the adoption of French as the official language. The cultural richness and diversity in the country is characterized by the existence of more than 60 local languages spread across five broad ethnic umbrellas: (i) Akan, (ii) Gour (or Gur),(iii) Northern Mandé,(iv) Krou (or Kru), and (v) Southern Mandé. Based upon the 2021 census, it had a population of about 28 million inhabitants.²CIV is member of two prominent regional organizations in Western Africa, namely, the Economic Community of West African States (ECOWAS), and the West African Economic and Monetary Union (UEMOA, in French). The former was created in 1975 and currently has 15 members, while the latter was founded in 1994 and currently hosts eight members.³

Secondly, from an economic perspective, three key takeaways can be underlined. On the first takeaway, as seen in exhibits 1 and 2, CIV is the largest economy in UEMOA and second largest in ECOWAS with real output standing at $68.4 billion, behind Nigeria (NGA)'s $535 billion and ahead of Ghana (GHA)'s$68.3 billion.⁴

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² This figure is approaching the 30-million mark, as of December 2023.

³ ECOWAS member states, as of December 2023: Benin, Burkina Faso, Cabo Verde, Côte d'Ivoire, The Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Niger, Nigeria, Senegal, Sierra Leone, and Togo.
UEMO Amember states, as of December 2023: Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Senegal, Togo, and Guinea-Bissau. The latter is a former Portuguese colony, while the remaining seven countries are former French colonies.

⁴All exhibits are available in Appendix. According to 2022 data from the World Bank Group in 2015 constant US dollars. In nominal terms, CIV has already leapfrogged Ghana using IMF data. The nominal metrics of GDP from both institutions are set to confirm this fact in 2023.

Furthermore, Exhibit 3 reveals that it boasts the highest real GDP per capita in UEMOA and is ranked third in ECOWAS with $2,430.3, behind Cabo Verde (CPV) ($3,642.856) and NGA ($2,449.588), but ahead of GHA ($2,040.043).[5] On the second takeaway, the domestic currency is the African Financial Community (CFA) franc, which was first created in 1945 as the French Colonies of Africa (CFA) franc.[6] It is currently pegged to the Euro and underwent notable reforms in 2020 in anticipation of the creation of ECOWAS' single currency, that is, the Eco. It should be underscored that the CFA franc, supported by a disciplined monetary policy conducted by the Central Bank of West African States (BCEAO, in French), has provided a great deal of stability spanning decades inprice levels of UEMOA member states.[7] Conversely, major non-UEMOA countries, such as NGA and GHA, have consistently suffered from relatively high inflation levels due to a combination of substantial volatility in their exchange rates and poorly-executed monetary policy choices. Case in point, according to Exhibit 4,average inflation rates in the top 5 countries[8]of ECOWAS from 2000 to 2022 were 12.62%, 2.36%, 16.66%, 1.99%, and 1.82% in NGA, CIV, GHA, SEN, and MLI, respectively. A stark contrast is evidenced as the three lowest and single-digit rates emanate from UEMOA member states.

On the third takeaway, CIV experienced an average economic growth rate of about 3.7 percent from 2000 to 2022. However, it has averaged around 7 percent since 2012, following a period of severe political instability that lasted more than a decade (Exhibit 5).[9] It is the best performance among the top 5 ECOWAS economies. It was driven by massive public investments across the country in all kinds of infrastructures ranging from roads, bridges, power and water grids to hospitals, schools, and universities, among others, under successive governments of President Alassane Ouattara.

3- Methodology

The theoretical underpinnings of this work can be traced in the Bayesian vector auto regression(BVAR) technique. Consideration for this approach is motivated by two fundamentals. On the one hand, Bayesian estimates treats model parameters as random variables, not fixed. On the other hand, this technique has the potential of delivering robust estimates even in an environment with limited data availability. In light of the sparseness of data points for Côte d'Ivoire, this approach appears appropriate. As a matter of fact, it addresses, through the shrinkage process, this common pitfall encountered when conducting macro-econometric empirical investigations involving developing countries. Bayesian forecasting and inference are discussed a great deal in the literature by many scholars, namely, Koop and Korobilis (2010), Geweke and Whiteman (2006),and Sims and Zha (1998), among others.

Let's introduce Q_t, a vector of random variables, such as $Q_t = (q_{1t}, q_{2t}, \ldots, q_{nt})'$. A generic form for a vector auto regression of order k, VAR(k), is as follows:

$$Q_t = c + \beta_1 Q_{t-1} + \beta_2 Q_{t-2} + \ldots + \beta_k Q_{t-k} + \varepsilon_t \quad (1),$$

for t = 1…, T;where Q_t, c, and ε_t are (n x 1) vectors, and β_1, β_2, …, β_k are (n x n) vectors, which are iid and follow $N(0, \Sigma)$. Σ is a (k x k) positive error covariance matrix. Equation (1) is estimated using the BVAR approach with n = 3 (poverty rate, tax, and output), and k =1.[10]For brevity, the paper does not provide a full review of the methodology regarding the Bayesian estimation method. As aforementioned, it has been extensively covered, and Ni and Sun (2005), and Moral-Benito (2012)provide further insights pertaining to the process along with the setting of prior distributions. The empirical estimations incorporate the Litterman prior distribution scenario.[11]

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[5]According to the World Bank Group, in nominal terms, as of 2022, CIV's GDP ($70 billion) ranked first in UEMOA, and third in ECOWAS behind Nigeria ($477 billion) and Ghana ($72.8 billion). Its GDP per capita ($2,486.4) is first in UEMOA, and second in ECOWAS behind Cabo Verde ($3,902.6), but ahead of Nigeria's ($2,184.4) and Ghana's ($2,175.9).

[6] From 1945 to 1958, it was called French Colonies of Africa (CFA) franc. From 1958 to circa independence year (i.e., 1960), it was termed French Community of Africa (CFA) franc. In the aftermath of colonies' independences, it stood for African Financial Community (CFA) franc. The French acronym (CFA) has remained unchanged since 1945.

[7] The CFA franc is the common currency of UEMOA's eight member states.

[8] As of 2022, based upon data from the *World Development Indicators*, the World Bank Group.

[9] The period of political instability started in 1999 with a military coup. It ended in 2011 with a civil war in the aftermath of bitterly contested results from presidential elections held in November of 2010.

[10] The optimal lag length as determined by the Schwarz information criterion (SIC).

[11] There exist in the literature seven main scenarios for prior distributions, namely, (i) Litterman prior; (ii) Normal-Flat prior; (iii) Normal-Wishart prior; (iv) independent Normal-Wishart prior; (v) Sims-Zha normal-flat; (vi) Sims-Zha normal-Wishart; and (vii) Giannone, Lenza and Primiceri (GLP) prior.

4. Data, Results and Policy Implications

4.1. Data

The dataset used for estimations ranges from 1980 to 2022. It is entirely sourced from the *World Development Indicators*, published by the World Bank Group. Five series are considered altogether.Two metrics are used to measure tax incidences: (i) goods and services taxes as a percentage of revenue (GSTAX), and (ii) income, profits and capital gains taxes as a percentage of revenue (IPCTAX).Two proxies are in order to account for poverty: (i) poverty headcount ratio at $2.15 a day as a percentage of population (POV2.15), and (ii) poverty gap at $2.15 a day (POVGAP2.15).[12] At last, real GDP (RGDP) is included to capture economic activities.

4.2. Results

Table 1 highlights some characteristics of the dataset regarding central tendency, dispersion, and normality. Unsurprisingly, for the latter, it appears that some series, namely, POVRAT2.15, POVGAP2.15, and IPCTAX are normally distributed, whereas some others, such as GSTAX and RGDP, are not. Furthermore, the correlation matrix (Table 2)indicates that pair wise correlations, both positive and negative, exist with magnitudes that appear more or less pronounced.

Table 1 – Summary Statistics

	POVRAT2.15	POVGAP2.15	GSTAX	IPCTAX	RGDP
Mean	24.45793	8.15766	23.94249	18.05074	3.27E+10
Median	28.87985	8.9	21.53298	17.43822	2.89E+10
Maximum	46.61398	21.82435	41.98046	25.47906	6.84E+10
Minimum	3.99910	0.59960	14.38109	10.136	2.05E+10
Std. Dev.	12.15953	5.20508	7.22315	4.67662	1.30E+10
Skewness	-0.22068	0.51832	1.40278	0.16418	1.329834
Kurtosis	1.80834	2.82019	3.68008	1.54273	3.674519
Jarque-Bera	2.89327	1.98335	14.9313	3.99801	13.48912
Probability	0.23536	0.37095	0.00057	0.13546	0.00117
Observations	43	43	43	43	43

Table 2 – Correlation matrix

	POVRAT2.15	POVGAP2.15	GSTAX	IPCTAX	RGDP
POVRAT2.15	1	0.96515	-0.31706	0.07719	-0.08091
POVGAP2.15	0.96515	1	-0.29161	0.15787	-0.03843
GSTAX	-0.31706	-0.29161	1	0.45158	0.89569
IPCTAX	0.07719	0.15787	0.45158	1	0.68703
RGDP	-0.08091	-0.03842	0.89568	0.68703	1

A necessary step before finding estimates using the BVAR procedure is to check the order of integration of series. As reported in Table 3, series are all found to beI(0) using three separate techniques to conduct unit root tests at the 5% significance level.

Table 3 – Unit Root Tests (Ho: Unit Root), Level

	Statistic	p-value
Im, Pesaran and Shin	-2.30374	0.0106
ADF - Fisher Chi-square[13]	32.2599	0.0004
PP - Fisher Chi-square[14]	19.2583	0.0371

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[12]Both proxies for tax incidences and poverty are notsimultaneously used in a single estimation.
[13] Augmented Dickey Fuller (ADF)
[14] Philip-Perron (PP)

The effects of taxation on poverty are compiled in tables 4 and 5 using POVRAT215, POVGAP215, IPCTAX and GSTAX. To have a comprehensive understanding of these effects, two variants are developed for each metric of poverty. Hence, Table 4 signals that poverty rate, as measured by the headcount ratio at $2.15 dollar a day, is not significantly impacted by either metric of taxation. On the other hand, it comes out that poverty rate in the previous period negatively drives current level of poverty, and it is highly significant. That is, an uptick in CIV's current poverty rate is expected to lead to a reduced rate in the following year. This reversal can be attributed to enhanced government's efforts to contain growing poverty when it is detected. This is achieved in practice through increased funding for social programs across the nation to alleviate economic woes faced by the most vulnerable segments of the population.

Table 5 considers a different metric of poverty to assess the impacts of taxation. Results confirm previous findings. No significant impacts of taxation upon poverty, as measured by the poverty gap at $2.15 a day, are detected. Yet, the degree of poverty gap in the previous period weighs negatively on current poverty gap, and it also

Table 4 – BVAR Estimates (Independent: POVRAT2.15)[15]

	I	II
GSTAX(-1)	…	1.05287
IPCTAX(-1)	-0.026799	…
RGDP(-1)	5.588039*	3.247744
POVRAT2.15(-1)	-0.951132***	-0.946014***
C	-135.4289	-107.6544
R-squared	0.797669	0.799729
Adj. R-squared	0.781695	0.783918
F-statistic	49.93702	50.58095

turns up highly significant. These other findings do corroborate what was already uncovered in Table 4. In fine, both sets of results provide similar findings regarding the irrelevance of taxation policies in directly shaping poverty in CIV, whereas past levels of poverty remain impactful.

Table 5 – BVAR Estimates (Independent: POVGAP2.15)[16]

	I	II
GSTAX(-1)	…	0.375941
IPCTAX(-1)	-0.024826	…
RGDP(-1)	2.168105	1.19117
POVGAP2.15(-1)	-0.927768***	-0.925551***
C	52.40703	39.32654
R-squared	0.706528	0.707208
Adj. R-squared	0.683359	0.684093
F-statistic	30.49478	30.59496

4.3. Policy Implications

This analysis' main outcome suggests that taxation policies bear no consequences on poverty in CIV. A corollary is the discovery that prior states of poverty matter. We start on the premises that the socio-economically optimal behavior is the pursuit of policies that can sustainably reduce poverty. As such, this paper argues that there's a critical need for decision-makers to lessen or break altogether the cycle, wherein previous poverty levels mostly dictate the nature and scope of current ones. To achieve such a goal, two paths could be explored to tackle the root causes of poverty in CIV and build a resilient social net.

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[15] *, **, and *** denote significance at the 10, 5, and 1%, respectively. It's noteworthy that RGDP is entered in logarithmic form for estimation purposes.
[16] Idem.

First, accentuate ongoing efforts and initiate additional social programs geared toward low-income households. It's noteworthy that on December 16, 2019, the government approved a vast, ambitious, and multifaceted program called Government Social Program (PS-Gouv, in French). It is funded by the government, the African Development Bank (AfDB) and some other financial partners to the tune of dozens of billions CFA francs. The program covers a variety of sectors, population classes, and it is run across many ministerial departments to support low-income individuals and the youth through direct monetary assistance and job-training, among others. Although these actions should be applauded, they should not be waned down. They should rather be expanded and enshrined in legislation for permanency with a special focus on the youth. Indeed, roughly 75% of CIV's population was younger than 35 years old, according to the 2021 census.

Second, the government should scrupulously enforce labor laws, especially the minimum wage. This is the elephant in the room. Countless working-class people are underpaid in small to relatively medium sized private businesses. Moreover, many of them are not declared to the national agencies in charge of retirement programs, as employers fail to pay for the retirement contributions these workers are lawfully entitled to. Labor law enforcement would certainly constitute a powerful tool in the fight against poverty and guarantee reasonable pensions for citizens in the medium to long-run.

5. Conclusion

Tax policies are essential in economic development for any nation. Côte d'Ivoire, which has garnered promising and remarkable economic performances since 2012, is not an exception as it grapples with relatively high levels of poverty like other developing nations. This paper has investigated the impacts of tax policies on poverty in the country. No empirical evidence is found to suggest that poverty is moved in any way as a result of tax policies implemented in the country. With data permitting, an expanded analysis of this relationship to include the whole UEMOA zone could be a rewarding economic exercise for regional decision-makers.

References

Chib, S. (1995). "Marginal Likelihood from the Gibbs Output," *Journal of the American Statistical Association*, 90: 1313–1321.

Ezenagu, A. (2019). "Unitary Taxation of Multinationals: Implications for Sustainable Development," Centre for International Governance Innovation. Available at https://www.jstor.org/stable/resrep30266.

Geweke, J. and Whiteman, C. H. (2006). *Bayesian forecasting*, in Elliott et al. (2006), chapter 1: 3–80.

Giannone, D., Lenza, M., and G. Primiceri (2012). "Prior Selection for Vector Autoregressions," ECB Working Paper Series No. 1494.

Gnangnon, S. K. (2019). "Tax Reform and Trade Openness in Developing Countries," *Journal of Economic Integration,* 34(3): 498-519.

Kadiyala, R. and S. Karlsson (1997). "Numerical Methods for Estimation and Inference in Bayesian VAR Models," *Journal of Applied Econometrics*, 12: 99–132.

Kim, S. and T. Kim (2018). "Tax Reform, Tax Compliance and State-building in Tanzania and Uganda," *Africa Development*, 43(2): 35-64.

Koop, G. and D.Korobilis(2010). "Bayesian Multivariate Time Series Methods for Empirical Macroeconomics", *Foundations and Trends in Econometrics*, 3(4): 267-358.

Moral-Benito, E. (2012). "Determinants of Economic Growth: a Bayesian Panel Data Approach," *The Review of Economics and Statistics*, 94(2): 566-579.

Ndoya, H. and P. Bakouan (2023). "Does Tax Revenue Improve Economic Complexity in Africa?" *Journal of Economic Integration*, 38(2): 278-301.

Ni, S. and D. Sun (2005). "Bayesian Estimates for Vector Autoregressive Models," *Journal of Business & Economic Statistics*, 23(1): 105-117.

Nnyanzi, J. B., Babyenda, P. and J. M. Bbale (2016). "Regional Economic Integration and Tax Revenue: East African Community." *Journal of Economic Integration*, 31(4): 932-967.

Sims, C. A. and T. Zha(1998). "Bayesian Methods for Dynamic Multivariate Model," *International Economic Review*, 39(4): 949-968.

Stock, J. H., and M. W. Watson (2002). "Forecasting Using Principal Components from a Large Number of Predictors," *Journal of the American Statistical Association*, 97: 147–162.

Appendix

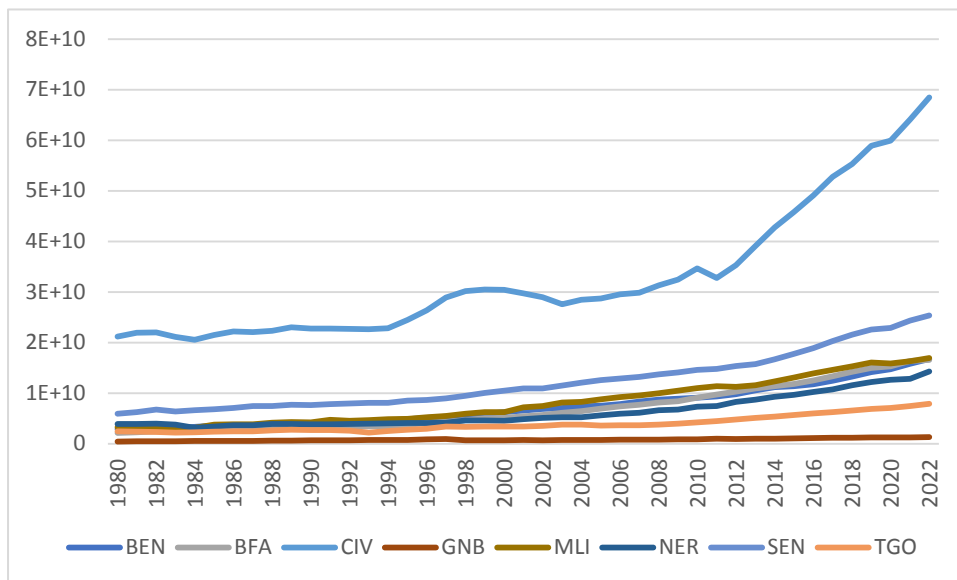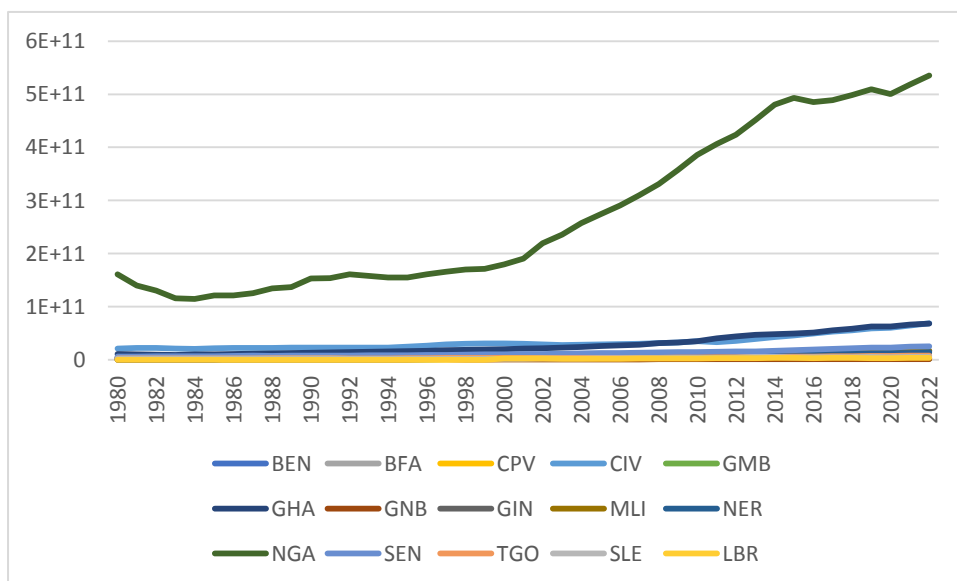**Exhibit1–Evolution of Output in UEMOA, Constant 2015 $US, 1980-2022[17]**

Exhibit2 – Evolution of Output in ECOWAS, Constant 2015 $US, 1980-2022[18]

[17] Source: *World Development Indicators*, the World Bank Group.
[18] Idem.

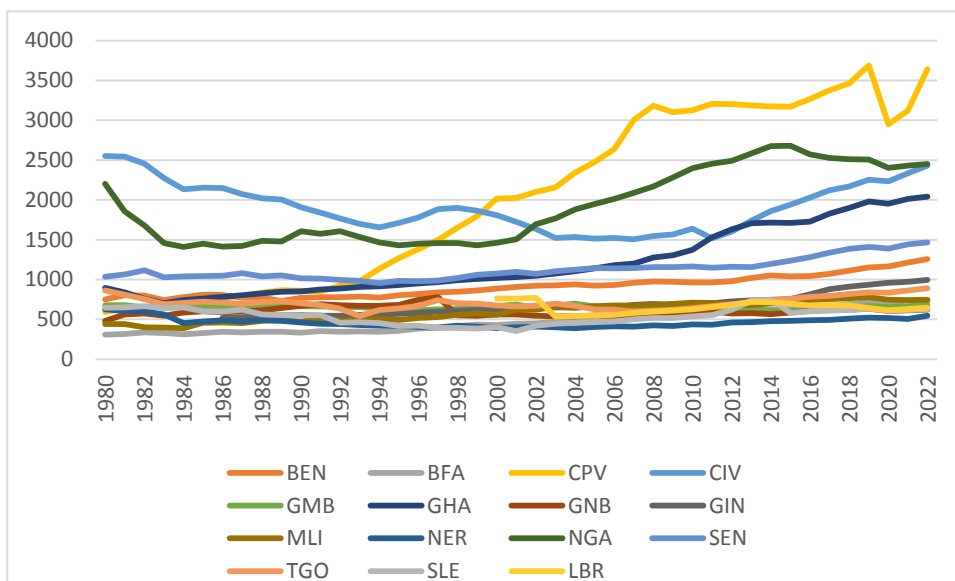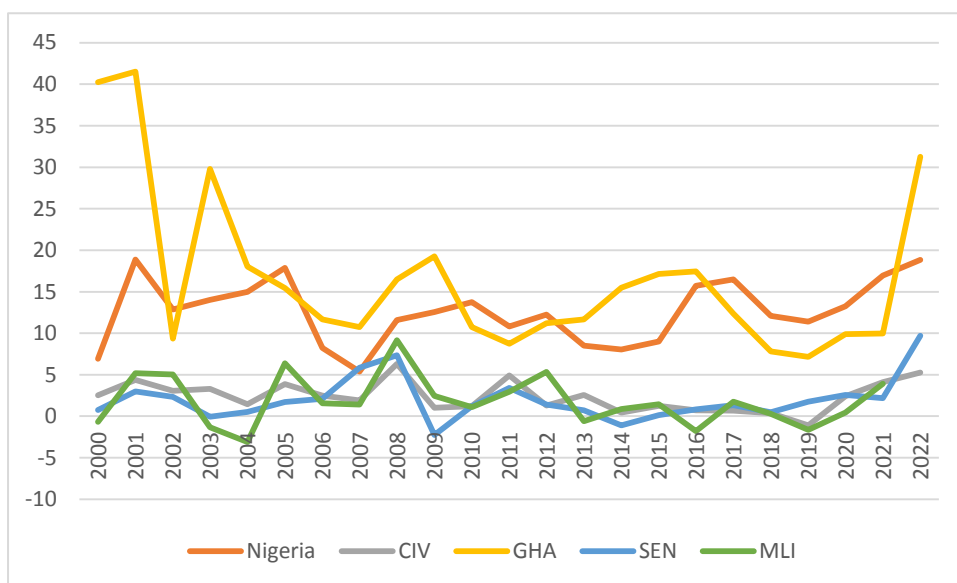**Exhibit 3 – Evolution of Real GDP per capita in ECOWAS, Constant 2015 $US, 1980-2022[19]**

Exhibit 4 – Evolution of Inflation in Top 5 ECOWAS countries, Percentage (%), 1980-2022[20]

Exhibit 5– Average Real GDP Growth of Top 5 ECOWAS countries for 2000-2022 and 2012-2022, (%)