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Abstract

This paper sheds light on the role that multilateral development banks can play in the Economic Community of West African States' single-currency adoption process. It uses the instrumental variable, namely the Generalized Method of Moments (IV-GMM), for estimates over the 2010–2022 period. The results show that an increase in total exports and in exports of medium- and high-tech goods has a positive impact on international reserves accumulation. Additionally, an increase in world trade uncertainty leads to an increase in international reserves for insurance purposes. More interestingly, an increase in multilateral development banks' disbursements in the industrial and financial sectors positively impacts exports, which in turn positively impacts central banks' reserve accumulation.

Keywords: International reserves, central bank, multilateral development bank, uncertainty
JEL: E58, F15, F31; G20.

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The Role of Multilateral Development Banks in the ECOWAS Single-Currency Adoption Process: An Export Promotion Analysis Under Trade Uncertainty

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Abstract

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I. Introduction

Since its establishment in May 1975, the Economic Community of West African States (ECOWAS) has made trade liberalisation and regional economic integration one of its main strategic objectives (ECOWAS 1975; Olayiwola et al. 2015; Adegboye et al. 2020). On this path, the community decided in June 1983 to create a single monetary zone within ECOWAS (ECOWAS 1983). To support this project, the community authorities decided to set up the ECOWAS Monetary Cooperation Programme in July 1987. The programme was designed to be implemented in three phases. The short-term objective was to improve and strengthen the West African Clearing House mechanism to facilitate increased intra-regional trade transactions and payments through greater use of national currencies (ECOWAS 1987). In the medium to long term, the ECOWAS Monetary Cooperation Programme was designed to enable the community to limit currency convertibility and to create a single monetary zone with one monetary authority, a single convertible currency, reserves pooling and management, and a shared policy on short-term external liabilities arising from the trade and balance of payments financing.

Thus far, member states have failed to launch the Eco, the community's proposed single currency, due to their inability to comply with the Macroeconomic Convergence and Stability Pact and their lack of institutional readiness. At its 59th Ordinary Session on 19 June 2021 in Accra, the Authority of Heads of State and Government adopted a new roadmap for the launch of the Eco. The roadmap comprises 10 programmes, including the new pact. The new pact requires member states to sustainably meet all four primary convergence criteria (described below and detailed in Appendix 1) over the last three years of the convergence phase from 1 January 2022 to 31 December 2026 (WAMA 2024). This phase leads to the stability phase, beginning 1 January 2027, and, finally, to the launch of the ECOWAS single currency in 2027 (WAMA 2024).

The four primary convergence criteria are (1) the budget deficit must be maintained at a level less than or equal to 3% of gross domestic product (GDP), (2) the average annual inflation must be less than 5%, (3) the financing of the budget deficit by the central bank must be less than 10% of the previous year's tax revenues, and (4) the gross external reserves must be maintained at a level greater than or equal to three months' imports of goods and services.

While the literature on the ECOWAS single currency has focused on the inflation convergence criterion (Ndiaye 2021; Mati et al. 2023; Miles 2024) and the budget deficit convergence criterion (Amadou and Kebalo 2019), it has remained silent on the external reserves convergence criterion amid growing international trade uncertainty. Although many member states consistently satisfy this criterion (WAMA 2024), others have struggled to do so. For example, Ghana failed to meet this criterion in 2022 and 2023 due to excessive demand for foreign currency for imports amid recent economic challenges (Ministry of Finance of the Republic of Ghana 2023; WAMA 2024). Guinea also failed to meet this criterion in 2023 due to transfers made abroad by the Central Bank of the Republic of Guinea on behalf of certain resident entities (WAMA 2024). Moreover, according to WAMA (2024), gross external reserves in import cover months declined significantly in most ECOWAS member states in 2023, reflecting the impact of pressures on the foreign exchange market. This decline in reserves could become a structural problem preventing the adoption of the Eco in 2027.

In executing their mandate to finance development projects and programmes, multilateral development banks can play an essential role in the adoption of the ECOWAS single currency—a goal that depends on satisfying the four main convergence criteria. This paper demonstrates that multilateral development banks can support central banks in satisfying the convergence criterion on the buildup of the necessary international reserves equivalent to at least three months of imports. In addition, the paper provides scientific proof that through the financing of certain strategic sectors that promote exports, multilateral development banks are participating in the international reserves buildup required for the adoption of the single currency in the Economic Community of West African States.

Using panel data from 2010 to 2022 and instrumental variables estimations in the context of the Generalized Method of Moments (IV-GMM) estimator, this paper makes three findings. First, an increase in total exports and in exports of medium- and high-tech goods has a positive impact on the accumulation of international reserves. Second, an increase in world trade uncertainty leads to an increase in international reserves for insurance purposes. That is to say, central banks build reserves in uncertain periods to guard against a run on the currency. Third, an increase in multilateral development bank disbursements (using the African Development Bank and the ECOWAS Bank for Investment and Development as case studies) in the industrial and financial sectors positively impacts exports, which positively impact central banks' reserve accumulation.

The paper contributes to the literature in three ways. First, it appears to be the only analysis to date of the role of African multilateral development banks in adoption of the ECOWAS single currency—specifically, through export promotion to achieve the international reserves convergence criterion. Second, the paper validates the mercantilist theory of accumulating international reserves through export promotion in West Africa. This finding bolsters the argument for supporting domestic production to meet export requirements. Doing so would satisfy the international reserves convergence criterion and provide the basis for a solid domestic production sector to support the new currency. Third, the paper advocates for a single currency in West African countries as a step toward continental integration of regional economic communities—the building blocks of the African Continental Free Trade Agreement.

The rest of the paper is structured as follows: Section 2 presents the literature review, Section 3 discusses the data and methodology, Section 4 focuses on the presentation and interpretation of results, and Section 5 concludes with policy recommendations.

2. Literature review

The literature identifies three main reasons for the accumulation of reserves: insurance (Calvo 1998; Alfaro and Kanczuk 2009; Lutz and Zessner-Spitzenberg 2023; Benigno et al. 2022; Céspedes and Chang 2024), mercantilist theory (Dooley et al. 2003; Aizenman and Lee 2007; Jiang and Yoon 2024), and exchange rate management (Pontines and Rajan 2011; Ramachandran 2023).

Theoretically, large precautionary demand for international reserves arises as self-insurance to avoid costly liquidation of long-term projects when the economy is susceptible to sudden stops (Aizenman and Lee 2007). Most of the recent papers advancing the insurance motive for reserve accumulation have been motivated by the sudden loss of access to international capital markets and the collapse of domestic production, both of which characterized the emerging markets crises of the

1990s (Alfaro and Kanczuk 2009; Davis et al. 2023). Calvo (1998) calls this phenomenon "sudden stop."

The sudden stops of capital inflows are defined as situations in which the flow of capital coming into a country is reduced significantly in a very short period (Edwards 2007). Some circumstances lead to large precautionary demand for international reserves, providing self-insurance against the adverse output effects of sudden stop and capital flight shocks (Aizenman and Lee 2007). Three striking stylized facts characterize sudden stops: large reversals in the current account, followed by deep recessions, and finally, collapses in real asset prices and the price of non-tradable goods relative to tradable goods (Mendoza 2006).

During the 2008 subprime mortgage crisis, countries with higher international reserve holdings had less adjustment costs (Silva Jr. 2016). In the aftermath of a crisis, countries that must deal with higher perceived sovereign risk and higher fiscal liabilities will opt to increase their demand for reserves (Aizenman and Marion 2003). Central banks hold international reserves to provide liquidity when financial frictions arise (Céspedes and Chang 2024). The possibility of using reserves to provide liquidity during crises amplifies the positive impact of reserve accumulation on growth (Benigno et al. 2022). Central banks revise their reserve policy and significantly increase their reserves in the aftermath of a crisis (Steiner 2013). After the 2008 global financial crisis, the International Monetary Fund adopted a new reserve adequacy measure (IMF 2011, 2013). This new reserve adequacy measure specifies that optimal reserve holdings for precautionary purposes depend on four factors that capture various sources of risk for balance-of-payments pressures, which are a combination of the stocks of external short-term debt (12 or fewer months maturity), portfolio equity liabilities, broad money, and exports of goods and services (IMF 2011, 2013).

The insurance motivation supporting the accumulation of international reserves is, however, countered by the mercantilist motivation (Dooley et al. 2003). According to the mercantilist motivation, international reserve buildups are triggered by concerns about export competitiveness (Dooley et al. 2003; Aizenman and Lee 2007). Reserve accumulation is interpreted as a by-product of export promotion, which is necessary to create decent jobs, thereby absorbing the abundant labour in traditional sectors, mainly agriculture (Dooley et al. 2003). Reserve accumulation may facilitate export growth by preventing or slowing currency appreciation for greater competitiveness (Dooley et al. 2003, Aizenman and Lee 2007).

The mercantilist motive was a significant factor in the massive accumulation of reserves in emerging and developing countries before the global financial crisis, and it was almost as important as the precautionary motive (Cabezas and De Gregorio 2019). The Asian central banks' asymmetric exchange rate intervention, which worked more to prevent currency appreciation than to prevent depreciation, explains both the relative exchange rate stability as well as the sustained reserve accumulation in emerging Asian economies (Pontines and Rajan 2011). The sustained reserve buildup resulted because of a desire to keep currencies from appreciating significantly (Pontines and Rajan 2011). After the 1997 Asian crisis, the international reserve buildup in China and Hong Kong was explained by mercantilist motives in response to the appreciation of the local currency (Lee and Yoon 2020).

The literature shows that the insurance motive is as valid as the mercantilist motive in explaining the international reserve accumulation (Ghosh et al. 2017). The mercantilist motive clearly presents

exports as one of the factors whose promotion contributes to the growth of international reserves; the insurance motive less clearly presents exports in this way. However, the IMF's new reserve adequacy measure (IMF 2011, 2013), adopted after the 2008 global financial crisis, clearly shows that exports are an important factor in determining precautionary reserve adequacy, thereby revealing the importance of exports in the international reserve accumulation process. Literature linking export promotion by multilateral development banks to reserve accumulation in West Africa is lacking. This study seeks to fill this gap in the literature by testing the following hypotheses:

Hypothesis 1: International reserve accumulation in ECOWAS central banks results from export promotion[1].

Hypothesis 2: Multilateral development banks play a critical role in the ECOWAS single-currency adoption process through export promotion.

3. Data and Methodology

3.1.Data Sources

This study uses panel data on the 15 ECOWAS member states from 2010 to 2022. Table 1 presents the data's descriptive statistics, and Appendix 2 summarises the variables.

Table 1. Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Central bank international reserves	332	4.14	1.75	0.18	12.10
Total exports of goods and services	297	24.44	8.43	4.57	48.80
Medium- and high-tech exports	154	17.28	18.05	0	78.45
Agricultural raw material exports	255	12.23	18.47	0	76.84
AfDB's disbursement in the financial sector	345	3.78	13.69	0	94.26
AfDB's disbursement in the industrial sector	345	0.53	3.53	0	43.32
EBID's disbursement in the industrial sector	195	7.07	19.29	0	100
Domestic credit to the private sector	341	15.26	12.37	0.0016	69.39
World Trade Uncertainty Index	322	0.35	1.24	0	7.71
Industry value added	343	19.62	6.66	3.24	34.28
Gross Domestic Product	344	4.46	4.49	-28.97	26.43
Debt	337	66.36	75.48	7.28	600.12
Exchange rate	343	673.97	1455.23	0.54	9565.08

[1] Given that a central bank has several mechanisms to increase its international reserves, this hypothesis is formulated to test the mercantilist theory. It justifies international reserve accumulation by the dynamism of exports, thus supported by the strength of economic activity. However, among the mechanisms that a central bank has at its disposal to increase its international reserves, this study cites the purchase of foreign currency by the local currency or by special drawing rights, investment in foreign assets, bilateral currency swap agreements, international borrowing (sovereign bond issues or direct borrowing on international markets), reinvestment of returns generated by reserves, and the use of foreign exchange reserves of other multilateral institutions.

Table 1. Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Imports of goods and services	297	36.51	11.73	18.92	82.47
Gross fixed capital formation	322	19.22	9.25	4.56	49.38
Net foreign direct investment	344	4.70	9.94	-2.72	103.34
Inward remittances	338	5.07	4.59	0.04	26.84
Political stability	330	-0.55	0.82	-2.48	1.22
Regulation quality	330	-0.65	0.38	-1.86	0.27

Note: AfDB = African Development Bank; EBID = ECOWAS Bank for Investment and Development.
Source: Authors.

3.2. Methodology

3.2.1. Modelling

Given that the dependent variables used in this study can be explained by their previous values and other explanatory variables and that the study uses panel data, wherein the number of individuals (N) is greater than the number of periods (T), the study refers to the theoretical framework developed by Anderson and Hsiao (1982), Holtz-Eakin et al. (1988), Blundell and Bond (1998) and Roodman (2009). This framework is based on an autoregressive panel data model presented as follows:

$$y_{it} = a y_{i,t-1} + X_{it}^{'}\beta + \varepsilon_{it} \quad \text{with} \begin{cases} |a| < 1 \\ \varepsilon_{it} = \mu_i + \gamma_{it} \\ E(\mu_i) = E(\gamma_{it}) = E(\mu_i \gamma_{it}) \end{cases} \qquad (1)$$

Where a and β represent the coefficients to be estimated; $i = \{1,...,N\}$ and $t = \{2,...,T\}$, such that N is large and T is small, with $N > T$; y_{it} represents the dependent variable; $y_{i,t-1}$ represents the lagged values of the dependent variable; X_{it} represents a vector of explanatory variables; ε_{it} represents the error term composed of fixed effects μ_i and the idiosyncratic shock Y_{it}.

Building on this model, the study specifies equation 1 to test the two hypotheses. Given the increase in world trade uncertainty in recent years, the study tests the first hypothesis in two ways. The first way does not consider the existence of world trade uncertainty in the model, as specified by equation 2. The second way does consider the influence of world trade uncertainty, as specified by equation 3. Equation 4 allows for a test of the second hypothesis under the influence of world trade uncertainty. The different specifications of equation 1 are as follows:

$$R_{it} = a_1 R_{i,t-1} + \lambda_1 Exp_{it} + X_1' \beta_1 + \varepsilon_{it} \qquad (2)$$

$$R_{it} = a_2 R_{i,t-1} + \lambda_2 Exp_{it} + \delta_1 WTUI_{it} + \varphi Exp_{it} * WTUI_{it} + X_1' \beta_1 + \varepsilon_{it} \qquad (3)$$

$$Exp_{it} = \tau Exp_{i,t-1} + \gamma MDB\_Dis_{it} + \delta_2 WTUI_{it} + X_2'\beta_2 + \varepsilon_{it} \quad (4)$$

In equation 2, a_1, λ_1, and β_1 represent the parameters of the model to be estimated; R_{it} represents the international reserves of a country i at a time t; and $R_{i,t-1}$ represents the international reserves of the previous year. International reserves are expressed as a percentage of months of imports, rather than as a percentage of GDP, to comply with the ECOWAS convergence criterion on this indicator. In addition, this ratio avoids the influence of fluctuations in economic activity or the exchange rate that are not driven by an increase or decrease in reserves, as is the case when the reserves/GDP ratio is used (Aizenman and Lee 2007; Cabezas and De Gregorio 2019). Exp_{it} is used to capture the total export of goods and services or the specific export of a certain number of goods and services such as agricultural raw material exports and medium- and high-tech exports. To test the mercantilist motivation for international reserve accumulation through export promotion and, at the same time, to determine the type of export product that significantly accumulates international reserves, our model uses total exports of goods and services and some of its components. Given the structure of the ECOWAS economies, the study uses export components such as medium- and high-tech exports and agricultural raw material exports. Exports are expected to have a positive influence on reserves. Similarly, to test the robustness of mercantilist behaviour in reserve accumulation, Ghosh et al. (2017) used exports. However, their study used exports above a level predicted by a trade gravity model.

X'_1 represents a vector of control variables, namely, industry value added, GDP growth, total debt, exchange rate, import of goods and services, domestic credit to the private sector, net foreign direct investment, inward remittances, political stability, and regulation quality; ε_{it} represents the error term in all the equations.

In equation 3, a_2, λ_2, δ_1, φ, β_1 represent the parameters of the model to be estimated; R_{it} and $R_{i,t-1}$ represent the international reserves of country i at time t and the reserves of the previous year as in equation 2. Exp_{it} represents either total exports of goods and services or agricultural raw material exports. $WTUI_{it}$ represents the World Trade Uncertainty Index. This study used the World Trade Uncertainty Index from Ahir et al. (2022) to assess the impact of uncertainty on international reserve accumulation and export dynamics. If the insurance motive also explains the international reserve accumulation, trade uncertainty will positively influence international reserves. A negative sign will be observed when this is not the case. The impact of world trade uncertainty on ECOWAS countries' exports is mixed, given the structure of their exports. $Exp_{it} * WTUI_{it}$ is used to capture either the interaction between total exports and the World Trade Uncertainty Index or the interaction between agricultural raw material exports and the World Trade Uncertainty Index; X'_1 represents the same vector of control variables used in equation 2.

In equation 4, T, Y, and δ_2 represent the parameters of the model to be estimated; Exp_{it} represents total exports of goods and services of a country i at a time t; $Exp_{i,t-1}$ represents the total exports of goods and services of the previous year; MDB_Dis_{it} captures the African Development Bank's (AfDB) disbursements in the industrial sector or in the financial sector or the ECOWAS Bank for

Investment and Development's (EBID) disbursements in the industrial sector.[2] African Development Bank and ECOWAS Bank for Investment and Development disbursements in the industrial and financial sectors capture the real impact of multilateral development bank interventions on export promotion. Due to data availability, this study used only data on disbursements from the two multilateral development banks mentioned above. Multilateral development bank interventions are expected to impact exports positively. $WTUI_{it}$ represents the World Trade Uncertainty Index; X'_2 represents a vector of control variables, namely, industry value added, GDP growth, total debt, import of goods and services, inward remittances, net foreign direct investment, gross fixed capital formation, political stability, regulation quality, the interaction between AfDB's disbursements in the financial sector and GDP growth, and the interaction between EBID's disbursements in the industrial sector and GDP growth. Appendix 2 reports the calculation method and sources for all the variables.

3.2.2. Estimation Technique

The models are estimated using Instrumental Variables estimations in the context of the Generalized Method of Moments (IV-GMM) developed by Baum et al. (2003, 2007). The IV-GMM technique makes it possible to deal with the three sources of endogeneity: omitted variables, simultaneity, and measurement error (Baum 2007; Wooldridge 2010). In addition, this instrumental variable technique, with the Generalised Method of Moments as an option, makes it possible to deal with endogeneity by providing efficient estimators even when the error terms exhibit heteroscedasticity or autocorrelation (Arellano and Bond 1991; Baum 2007), which the traditional instrumental variable technique is unable to address (Baum 2007; Wooldridge 2010). It is also adapted to situations in which the use of several instrumental variables and multiple moment conditions become necessary, thus providing flexibility in the model specification and allowing the study to estimate complex models. The technique also provides asymptotically unbiased and efficient estimators under appropriate conditions, ensuring that estimators converge at the true value of the parameter as the sample size increases.

4. Result and Discussion

All the regressions presented in Tables 2–4 show that the various R-squared values lie between 60.8% and 85.8%, indicating the independent variables' power to explain variations in the dependent variables in the models. The different P-values of the various under-identification tests are below the 5% threshold, which means that none of the regressions suffers from the problem of under-identification. The Sargan tests performed on all the regressions show that the various P-values are greater than the 5% threshold, which means that none of the regressions suffers from the problem of over-identification. The Arellano-Bond tests for error autocorrelation show that there is no second-order error autocorrelation. As a result, all the coefficients estimated by the IV-GMM suffer from no major statistical problems and are, therefore, interpretable.

Table 2 summarises the analyses carried out in an environment of certainty. The regressions presented in this table do not control for the existence of world trade uncertainty. The coefficients

[2] The ECOWAS Bank for Investment and Development operates in the 15 ECOWAS member states. The African Development Bank operates in all African countries, including the 15 ECOWAS countries.

on central bank international reserves for the previous year are all positive and significant at the 1% threshold (Table 2). Therefore, an increase in the international reserves of central banks in the previous year positively influences the level of reserves in the current year and vice versa. Given that that the study deals with the accumulation of reserves expressed in months of imports over several years, it is normal for the previous level of reserves to be positively linked to the level of reserves in the current year.

Total exports of goods and services explain positively the accumulation of international reserves at the 5% threshold (column 1, Table 2). The study decomposed total exports to investigate the specific products whose exports contribute to this result. This breakdown shows that exports of medium- and high-tech products also contribute to the increase in international reserves (column 3, Table 2). These two results can be explained, on the one hand, by the theory of export-led growth and, on the other hand, by the mercantilist motivation according to which promoting exports by any means ends up having a positive impact on international reserves accumulation. This result validates the first hypothesis that international reserve accumulation in ECOWAS central banks is supported by export promotion in an environment of certainty. Moreover, this result corroborates the results of Choi and Taylor (2022) who found that reserve accumulation is associated with a larger trade surplus and higher GDP growth in countries with high capital controls. The result is also consistent with those obtained by Abuh-Amasi et al. (2022), who found that, in Nigeria, international reserve accumulation is significantly influenced by exports and trade openness.

The significance of the positive coefficient between the exchange rate and the reserves accumulation (column 1, Table 2) at the 1% threshold shows that a depreciation of local currencies against the dollar has a positive influence on reserves accumulation. This result can be explained by the fact that a depreciation of local currencies in reasonable proportions is favourable to an increase in exports, which are known to positively impact international reserves accumulation. It corroborates the result of Jiang and Yoon (2024), who found that, between 2009 and 2011, a depreciation of the nominal effective exchange rate caused an increase in reserves, supporting the mercantilist motive of maintaining export competitiveness.

The study finds a negative relationship between imports and international reserve accumulation. This means that an increase in imports leads to a decrease in external reserves, all else being equal. Imports require the use of foreign currency to make purchases on international markets. Therefore, all other things being equal, an increase in imports leads to a decrease in international reserves. Moreover, one of the reasons that central banks hold international reserves is to be able to finance imports in all circumstances. This result is consistent with that of Nteegah and Okpoi (2017), who showed that the importation of petroleum and non-oil products has a negative impact on Nigeria's international reserves.

Diaspora remittances to residents of ECOWAS member states play a very important role in the international reserves buildup. This study reveals a positive and significant relationship between remittances received by residents of ECOWAS member states and the international reserve buildup in the subregion. The receipt of funds from the diaspora implies an inflow of foreign exchange through the current account of the balance of payments. Given that these funds are typically used in the national territory where the receiver resides, the receiver will require only the local currency to satisfy the need or the transaction for which the funds were sent. It is through this mechanism

that the received funds become a significant determinant of the international reserves buildup in ECOWAS.

This study shows that net foreign direct investment positively explains international reserves accumulation at the 1% level (column 3, Table 2). Investment funds not immediately used for imports help shore up central banks' reserve position. Moreover, this result can be obtained in a situation in which investments contribute to export-led growth, with less capital flight than capital generation by foreign direct investment. This result corroborates that of Sreeram and Sayed (2023), who find that, in India, an increase in foreign direct investment inflows has a positive impact on international reserves accumulation in the long term.

Domestic credit to the private sector (columns 2 and 3, Table 2) positively explains the accumulation of international reserves at the 5% and 10% significance levels, respectively. The direct implication of this result is that an increase in credit allocated to the private sector contributes to an expansion of international reserves and vice versa. This result can only be achieved if the private sector uses these resources to produce goods and services with high export potential. The result allows better understanding of the positive and significant impact, at the 10% level of GDP growth (column 2, Table 2) on international reserves. Moreover, GDP growth can only have a positive and significant impact on the accumulation of international reserves if this growth is export-led.

The study finds that debt is positively related to international reserves at the 5% level of significance (column 3, Table 2). This means that an increase in debt leads to an increase in international reserves and vice versa. This dynamic works in two ways. First, an increase in external debt leads to a direct increase in forex inflows, which shores up the reserve position of the central bank. Second, to avoid a default on debt servicing, central banks, as a precautionary measure, are constrained to increase their international reserves as much as possible, as the level of debt increases. This phenomenon is amplified when external debt, whether short term or long term, increases faster than domestic debt.

Contrary to theory, the study finds a negative and significant relationship at the 5% level between the value added by industry and international reserves. This negative relationship means that an increase in the value added by the industrial sector leads to a reduction in international reserves. This result is largely explained by the capital flight caused by foreign extractive companies operating in the subregion as well as by the weak domestic fundamentals, according to (Kapur and Patel 2003). Because the subregion's industrial sector is dominated by mining companies that are largely owned by foreign companies, an increase in the value added by the industrial sector results in an increase in transfers of funds to the countries of origin of the majority shareholders in the extractive industries or to countries where these majority shareholders have a particular interest. This phenomenon depletes the stock of foreign reserves held by central banks.

Table 2. Impact of exports on international reserves accumulation, disregarding world trade uncertainty

Variable	(1).	(2)	(3)
	Central bank international reserves		
Central bank international reserves (-1)	0.539***	0.804***	0.709***
	(0.0958)	(0.0989)	(0.112)
Total exports of goods and services	0.0577**		
	(0.0257)		
Industry value added	-0.0505**	-0.0294	-0.0553
	(0.0254)	(0.0273)	(0.0375)
GDP growth	-0.0253	0.179*	0.0296
	(0.0377)	(0.101)	(0.0380)
Debt	0.00664	0.00320	0.0147**
	(0.00544)	(0.00766)	(0.00714)
Exchange rate	0.000181***	3.56e-05	-0.00111
	(6.96e-05)	(0.000142)	(0.000970)
Imports of goods and services	-0.0681***	-0.0618***	-0.0911***
	(0.0203)	(0.0207)	(0.0205)
Domestic credit to the private sector	-0.00267	0.0332**	0.0358*
	(0.00853)	(0.0137)	(0.0186)
Foreign direct investment net inflow	0.0266	0.0537	0.164***
	(0.0247)	(0.0389)	(0.0433)
Remittances received	0.0771**	0.0863***	0.0653*
	(0.0300)	(0.0321)	(0.0379)
Political stability	-0.0732	0.121	-0.148
	(0.140)	(0.275)	(0.538)
Regulation quality	0.480	-0.387	-0.00666
	(0.359)	(0.522)	(0.761)
Agricultural raw material exports		0.00476	
		(0.00781)	
Medium- and high-tech exports			0.0508***
			(0.0152)

Variable	(1).	(2)	(3)
	Central bank international reserves		
Constant	3.401***	1.020	2.441*
	(0.933)	(1.158)	(1.309)
Observations	159	106	70
R-squared	0.682	0.608	0.858
Under-identification test: P-val.	0.0031	0.0488	0.0225
Sargan test (over-identification test of all instruments): P-val.	0.0556	0.6547	0.7286
Arellano-Bond test for AR(2): P-val.	0.6116	0.2137	0.1576

Note: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Source: Authors.

In contrast to the results presented in Table 2, the results reported in Table 3 incorporate uncertainty into the analyses. Uncertainty is captured by the World Trade Uncertainty Index variable. The results obtained on the uncertainty variable and the interactive variables involving the uncertainty variable are the additional results in Table 3 compared with the results in Table 2. Apart from these additional results, the results in Table 3 are broadly identical to those in Table 2 in terms of the significance of the variables, but two aspects are worth highlighting.

For the additional results in Table 3, the various coefficients of the World Trade Uncertainty Index are positive and significant either at the 1% or the 5% level (columns 1, 2, and 4, Table 3). These results imply that an increase in world trade uncertainty leads to an expansion in international reserves and vice versa. That reserves expansion in a situation of growing world trade uncertainty can be explained by central banks' insurance motivations. In the context of growing uncertainty, central banks anticipate their potential inability to access international financial markets (or a tightening of international financial market conditions) by increasing their international reserves. The purpose of such an insurance measure is not only to guarantee the stability of the local currency but also to be able to finance future imports if uncertainty turns into a real risk. This result corroborates that of Ubaydullah and Tulon (2023), who showed that Asian countries hold reserves as a safeguard against temporary external imbalances and uncertainty in the balance of payment.

The magnitude of the coefficient of total exports of goods and services and the sign of the coefficient of domestic credit to the private sector in Table 3 are notable. The addition of world trade uncertainty in the model reduces the marginal effect of total exports of goods and services on international reserves accumulation, although the coefficient remains positive. Thus, exports contribute less to international reserves accumulation when world trade uncertainty is considered. Regarding domestic credit to the private sector, the study similarly finds that, when the model considers uncertainty, international reserves accumulation is negatively impacted. This would mean that, in a situation of growing global trade uncertainty in ECOWAS, the effect of imports following the allocation of domestic credit to the private sector would outweigh the effect of export-led growth.

Table 3. Impact of exports on international reserve accumulation given world trade uncertainty

Variable	(1).	(2)	(3)	(4)
	Central bank international reserves			
Central bank international reserves (-1)	0.591***	0.863***	0.592***	0.863***
	(0.105)	(0.0910)	(0.105)	(0.0908)
Total exports of goods and services	0.0536**		0.0499*	
	(0.0270)		(0.0277)	
Industry value added	-0.0276	0.0245	-0.0246	0.0243
	(0.0263)	(0.0269)	(0.0266)	(0.0269)
GDP growth	0.0255	0.142*	0.0298	0.141*
	(0.0395)	(0.0796)	(0.0389)	(0.0796)
Debt	-0.000635	-0.00700	-0.000819	-0.00700
	(0.00647)	(0.00716)	(0.00645)	(0.00714)
World Trade Uncertainty Index	0.118***	0.173***	-0.103	0.166**
	(0.0452)	(0.0567)	(0.197)	(0.0695)
Exchange rate	0.000117*	4.07e-05	0.000116*	4.13e-05
	(6.96e-05)	(0.000125)	(6.95e-05)	(0.000124)
Imports of goods and services	-0.0600***	-0.0497***	-0.0618***	-0.0498***
	(0.0208)	(0.0180)	(0.0204)	(0.0179)
Domestic credit to the private sector	-0.0299**	-0.0148	-0.0308**	-0.0144
	(0.0131)	(0.0167)	(0.0130)	(0.0168)
Foreign direct investment net inflow	-0.00221	-0.00619	-0.00143	-0.00550
	(0.0270)	(0.0387)	(0.0269)	(0.0387)
Remittances received	0.101***	0.112***	0.102***	0.112***
	(0.0300)	(0.0317)	(0.0295)	(0.0316)
Political stability	-0.114	0.238	-0.103	0.239
	(0.142)	(0.265)	(0.143)	(0.264)
Regulation quality	0.262	-0.781	0.188	-0.781
	(0.357)	(0.486)	(0.362)	(0.485)

Variable	(1).	(2)	(3)	(4)
	Central bank international reserves			
Agricultural raw material exports		0.00412		0.00369
		(0.00727)		(0.00773)
(World Trade Uncertainty Index)*(total exports)			0.00948	
			(0.00818)	
(World Trade Uncertainty Index)*(agricultural exports)				0.000367
				(0.00198)
Constant	2.883***	0.557	2.931***	0.568
	(1.009)	(1.051)	(1.006)	(1.052)
Observations	146	102	146	102
R-squared	0.667	0.703	0.668	0.704
Under-identification test: P-val.	0.0001	0.0199	0.0001	0.0200
Sargan test (over-identification test of all instruments): P-val.	0.1583	0.8782	0.1725	0.8717
Arellano-Bond test for AR(2): P-val.	0.1474	0.4931	0.2120	0.5041

Note: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1
Source: Authors.

In addition to showing the importance of exports in the international reserves' buildup of ECOWAS member states, this study reveals the impact of multilateral development banks' interventions on exports. Specifically, it ascertains the potential impact of the ECOWAS Bank for Investment and Development (EBID) and the African Development Bank Group (AfDB) interventions on export promotion in West Africa. It shows that the direct (unconditional) effect of EBID disbursements to the ECOWAS industrial sector on exports is positive and significant at the 1% level (column 1, Table 4). On the other hand, these same results indicate that the indirect (conditional) effect of EBID disbursements to the ECOWAS industrial sector on exports is negative and significant at the 1% level. The conditional effect reflects the evolution of economic growth. Therefore, an increase in EBID's disbursements in the ECOWAS industrial sector would lead to an increase in exports. Given that the conditional effect of EBID disbursements in industry on exports is negative, this study uses the average economic growth of the data used—4.489—to obtain the net effect of these disbursements: 0.0184 [0.0921 + (-0.0164)*(4.489)] [3].The conditional net effect (0.0184) of EBID disbursements in the ECOWAS industrial sector is lower than the unconditional effect (0.0921), showing that the positive impact of these disbursements on exports decreases as economies grow.

[3] Net effect = [coefficient of EBID disbursement in the industrial sector + ((coefficient of the interactive variable between EBID disbursements in the industrial sector and GDP growth)*(average GDP growth)).

Similarly, the results show, on the one hand, that the direct (unconditional) effect of AfDB Group disbursements to the ECOWAS financial sector on exports is positive and significant at the 5% level (column 2, Table 4). On the other hand, these same results indicate that the indirect (conditional) effect of AfDB Group disbursements to the ECOWAS financial sector on exports is negative and significant at the 10% threshold. The conditional effect reflects GDP growth. Therefore, an increase in AfDB Group disbursements in the ECOWAS financial sector would lead to an increase in exports. Given that the conditional effect of AfDB Group disbursements in the ECOWAS financial sector on exports is negative, this study uses the average economic growth of the data used—4.489—to obtain the net effect of these disbursements: 0.0484 [0.307+ (-0.0576)*(4.489)] [4].

The conditional net effect (0.0484) of AfDB Group disbursements in the ECOWAS financial sector is lower than the unconditional effect (0.307), showing that the positive impact of these disbursements on exports decreases as economies grow.

The results (columns 1 and 2, Table 4) show that the coefficients on imports of goods and services are positive and significant at the 1% threshold, implying that an increase in imports of goods and services into the subregion leads to an increase in exports and vice versa. This result can be explained by the high level of re-exportation in the subregion. This re-exportation needs to be replaced by domestic production-based exports.

The regulation quality variable has a positive and significant impact on the subregion's exports at the 1% or 5% level (columns 1 and 2, Table 4). It can, therefore, be inferred that an increase in regulation quality has a positive impact on the subregion's exports. This result can be explained by the fact that an increase in the perception of the government's ability to formulate and implement sound policies and regulations in favour of private sector development has a positive impact on economic activity in general and commercial activities in particular. Therefore, an improvement in institutional quality would be a favourable factor for export promotion in the subregion. Finally, the results show that gross fixed capital formation in the subregion does not support exports. It may be that gross fixed capital formation has a positive effect on infrastructure, for example, but its effect on exports is negative.

[4] Net effect = [coefficient of AfDB disbursement in the financial sector + ((coefficient of the interactive variable between AfDB disbursements in the financial sector and economic growth)*(average GDP growth)).

Table 4. Impact of multilateral development bank interventions on exports

Variable	(1).	(2)
	Total exports of goods and services	
Total exports of goods and services (-1)	0.648***	0.713***
	(0.0757)	(0.0872)
Industry value added	-0.0640	-0.0532
	(0.0677)	(0.0752)
GDP growth	0.620***	0.607**
	(0.234)	(0.279)
Debt	0.0127	0.00127
	(0.0250)	(0.0297)
World Trade Uncertainty Index	0.0351	0.0203
	(0.183)	(0.204)
Imports of goods and services	0.273***	0.217***
	(0.0448)	(0.0526)
Remittances received	-0.188*	-0.117
	(0.0971)	(0.119)
Foreign direct investment net inflow	-0.141	-0.140
	(0.0946)	(0.104)
Gross fixed capital formation	-0.174***	-0.120**
	(0.0527)	(0.0561)
Political stability	-0.377	-0.556
	(0.539)	(0.597)
Regulation quality	4.556***	3.430**
	(1.286)	(1.485)
AfDB disbursement in the industrial sector		0.0624
		(0.202)
AfDB disbursement in the finance sector		0.307**
		(0.150)
(AfDB disbursement in the finance sector)*(GDP growth)		-0.0576*
		(0.0299)
EBID disbursement in the industrial sector	0.0921***	
	(0.0288)	

Variable	(1).	(2)
	Central bank international reserves	
(EBID disbursement in the industry sector)*(GDP growth)	-0.0164***	
	(0.00433)	
Constant	4.067*	2.610
	(2.329)	(2.756)
Observations	153	153
R-squared	0.801	0.758
Under-identification test: P-val.	0.0078	0.0182
Sargan test (over-identification test of all instruments): P-val.	0.4254	0.3018
Arellano-Bond test for AR(2): P-val.	0.1025	0.6750

Note: Notes: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1. AfDB = African Development Bank; EBID = ECOWAS Bank for Investment and Development.
Source: Authors.

5. Conclusion

This paper explores the role that multilateral development banks can play in the quest of ECOWAS countries to sustainably meet all the monetary unification convergence criteria for adopting a single currency, particularly given the recent decline in the international reserves of central banks within the community.

Using panel data from 2010 to 2022, the paper estimated models using the Instrumental Variables estimations in the context of the Generalized Method of Moments. The paper makes three findings. First, an increase in total exports and in exports of medium- and high-tech goods has a positive impact on the accumulation of central banks' international reserves. This result confirms that export promotion supports international reserve accumulation in ECOWAS central banks. Second, an increase in world trade uncertainty leads to an increase in international reserves for insurance purposes. That is to say, central banks build reserves in uncertain periods to guard against a run on the currency. Third, an increase in multilateral development bank disbursements in the industrial and financial sectors positively impacts exports, which in turn positively impacts central banks' reserve accumulation. This result confirms the critical role that multilateral development banks play, through export promotion, in growing central bank reserves in the ECOWAS, thereby facilitating the single-currency adoption process.

By expanding their interventions in the industrial and financial sectors, multilateral development banks can help the central banks in West Africa satisfy the international reserves convergence criterion, one of the conditions for adopting the ECOWAS single currency. Moreover, by requiring strict compliance with the rule-of-origin principle for the goods and services whose production

and export they will promote, multilateral development banks can strengthen intra-regional trade and reposition ECOWAS member states in value chains, enabling them to draw maximum benefits from the African Continental Free Trade Area, and, thus, to create jobs, a structural solution to the subregion's unemployment problem. The success of such a mechanism after the adoption of the single currency will give this currency the benefit of a real sector and a solid balance of payments, thereby preserving its value against major international currencies.

Future research should seek to overcome one limitation of the current research: the availability of data on disbursements in strategic sectors from only two multilateral development banks.

REFERENCES

Abuh–Amasi, S. A., N. J. Joshua, and M. O. Onoyom. 2022. "Determinants of International Reserves in Nigeria." *International Journal of Research and Innovation in Social Science* 6 (5): 287–297.

Adegboye, F. B., O. A. Matthew, J. Ejemeyovwi, O. S. Adesina, and R. Osabohien. 2020. "Assessing the Role of Trade Liberalization in Facilitating Trade Flows and Economic Expansion: Evidence from ECOWAS Countries." *In Fostering Trade in Africa: Trade Relations, Business Opportunities and Policy Instruments*, edited by G. O. Odularu, M. Hassan, and M. A. Babatunde, 97–109. Switzerland: Springer Nature.

Ahir, H., N. Bloom, and D. Furceri. 2022. "The World Uncertainty Index." NBER Working Paper No. w29763. National Bureau of Economic Research, Washington, DC.

Aizenman, J., and J. Lee. 2007. "International Reserves: Precautionary versus Mercantilist Views, Theory and Evidence." *Open Economies Review* 18: 191–214.

Aizenman, J., and N. Marion. 2003. "The High Demand for International Reserves in the Far East: What Is Going On?" *Journal of the Japanese and International Economies* 17 (3): 370–400.

Alfaro, L., and F. Kanczuk. 2009. "Optimal Reserve Management and Sovereign Debt." *Journal of International Economics* 77 (1): 23–36.

Amadou A., and L. Kebalo 2019. "Single currency in ECOWAS: Is the proposed fiscal convergence criterion pro-growth?." *African Development Review* 31(4): 423-433.

Anderson, T. W., and C. Hsiao. 1982. "Formulation and Estimation of Dynamic Models Using Panel Data." *Journal of Econometrics* 18 (1): 47–82.

Arellano, M., and S. Bond. 1991. "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations." *The Review of Economic Studies* 58 (2): 277–297.

Baum, C. F., M. E. Schaffer, and S. Stillman. 2003. "Instrumental Variables and GMM: Estimation and Testing." *The Stata Journal* 3 (1): 1–31.

Baum, C. F., M. E. Schaffer, and S. Stillman. 2007. "Enhanced Routines for Instrumental Variables/ Generalized Method of Moments Estimation and Testing." *The Stata Journal* 7 (4): 465–506.

Benigno, G., L. Fornaro, and M. Wolf. 2022. "Reserve Accumulation, Growth and Financial Crises." *Journal of International Economics* 139: 103660.

Blundell, R., and S. Bond. 1998. "Initial Conditions and Moment Restrictions in Dynamic Panel Data Models." *Journal of Econometrics* 87 (1): 115–143.

Cabezas, L., and J. De Gregorio. 2019. "Accumulation of Reserves in Emerging and Developing Countries: Mercantilism versus Insurance." *Review of World Economics* 155: 819–857.

Calvo, G. A. 1998. "Capital Flows and Capital–Market Crises: The Simple Economics of Sudden Stops." *Journal of Applied Economics* 1 (1): 35–54.

Céspedes, L. F., and R. Chang. 2024. “Optimal Foreign Reserves and Central Bank Policy under Financial Stress.” *American Economic Journal: Macroeconomics* 16 (3): 230–267.

Choi, W. J., and A. M. Taylor. 2022. “Precaution versus Mercantilism: Reserve Accumulation, Capital Controls, and the Real Exchange Rate.” *Journal of International Economics* 139: 103649.

Davis, J. S., M. B. Devereux, and C. Yu. 2023. “Sudden Stops and Optimal Foreign Exchange Intervention.” *Journal of International Economics* 141: 103728.

Dooley, M. P., D. Folkerts–Landau, and P. M. Garber. 2003. “An Essay on the Revived Bretton Woods System.” NBER Working Paper No. 9971. *National Bureau of Economic Research*, Washington, DC.

ECOWAS (Economic Community of West African States). 1975. *West African Countries: Treaty of the Economic Community of West African States*. ECOWAS, Lagos.

ECOWAS. 1983. “Decision Relating to the Proposal for the Creation of a Single ECOWAS Monetary Zone.” *Official Journal of the Economic Community of West African States* 5: 6.

ECOWAS. 1987. “Decision Relating to the Adoption of an ECOWAS Monetary Cooperation Programme.” *Official Journal of the Economic Community of West African States* 11: 13–14.

Edwards S. 2007. "Capital controls, sudden stops, and current account reversals." *In capital controls and capital flows in Emerging Economies: policies, practices, and consequences*, edited by S. Edwards, 73-120. University of Chicago Press.

Ghosh, A. R., J. D. Ostry, and C. G. Tsangarides. 2017. “Shifting Motives: Explaining the Buildup in Official Reserves in Emerging Markets since the 1980s.” *IMF Economic Review* 65: 308–364.

Holtz–Eakin, D., W. Newey, and H. S. Rosen. 1988. “Estimating Vector Autoregressions with Panel Data.” *Econometrica: Journal of the Econometric Society* 1371–1395.

IMF (International Monetary Fund). 2011. “Assessing Reserve Adequacy.” IMF Policy Paper. International Monetary Fund, Washington, DC.

IMF. 2013. “Assessing Reserve Adequacy – Further Considerations.” IMF Policy Paper. International Monetary Fund, Washington, DC.

Jiang, Z., and S.–M. Yoon. 2024. “Interdependence between Foreign Exchange Rate and International Reserves: Fresh Evidence from China.” *Research in International Business and Finance* 69: 102255.

Kapur, D., and U. R. Patel. 2003. “Large Foreign Currency Reserves: Insurance for Domestic Weaknesses and External Uncertainties?” *Economic and Political Weekly* 1047–1053.

Lee, Y., and S.–M. Yoon. 2020. “Relationship between International Reserves and FX Rate Movements.” *Sustainability* 12 (17): 6961.

Lutz, F., and L. Zessner–Spitzenberg. 2023. “Sudden Stops and Reserve Accumulation in the Presence of International Liquidity Risk.” *Journal of International Economics* 141: 103729.

Mati, S., I. Civcir, and H. Ozdeser. 2023. “ECOWAS common currency, a mirage or possibility?.” *Panoeconomicus* 70(2): 239-260.

Mendoza, E. G. 2006. “Endogenous Sudden Stops in a Business Cycle Model with Collateral Constraints: A Fisherian Deflation of Tobin's Q.”

Miles, W. 2024. “The West African Monetary Zone: is inflation convergence sufficient for a currency union?.” *Studies in Economics and Econometrics* 48(4): 326-346.

Ministry of Finance of the Republic of Ghana. 2023. *The Budget Statement and Economic Policy of the Government of Ghana for the 2024 Financial Year*. Accra: Ministry of Finance.

Ndiaye, A. 2021. “Exchange rates and inflation rates convergence in ECOWAS.” *Modern Economy 12(12): 1726-1747.*

Nteegah, A., and G. E. Okpoi. 2017. “External Trade and Its Implications on Foreign Exchange Reserves in Nigeria.” *West African Journal of Industrial and Academic Research* 17 (1): 108–119.

Olayiwola, W., E. Osabuohien, H. Okodua, and O. Ola–David. 2015. “Economic Integration, Trade Facilitation and Agricultural Exports Performance in ECOWAS Sub–Region.” In *Regional Integration and Trade in Africa*, edited by M. Ncube, I. Faye, and A. Verdier–Chouchane, 31–46. London: Palgrave Macmillan UK.

Pontines, V., and R. S. Rajan. 2011. “Foreign Exchange Market Intervention and Reserve Accumulation in Emerging Asia: Is There Evidence of Fear of Appreciation?” *Economics Letters* 111 (3): 252–255.

Ramachandran, M. 2023. “Official Intervention, Reserve Accumulation and Exchange Rate Volatility.” *Journal of Quantitative Economics* 21 (2): 269–287.

Roodman, D. 2009. “How to Do xtabond2: An Introduction to Difference and System GMM in Stata.” *The Stata Journal* 9 (1): 86–136.

Schröder, M. 2017. “Mercantilism and China's Hunger for International Reserves.” *China Economic Review* 42: 15–33.

Sebastian, E. 2007. “Capital Controls, Sudden Stops, and Current Account Reversals.” In *Capital Controls and Capital Flows in Emerging Economies: Policies, Practices, and Consequences*, edited by S. Edwards and J. A. Frankel, 73–120. University of Chicago Press.

Silva Jr., A. F. 2016. “The Self–Insurance Role of International Reserves and the 2008–2010 Crisis.” *Journal of Insurance and Financial Management* 1 (3).

Sreeram, L., and S. A. Sayed. 2023. “Factors Associated with Growth in India’s International Reserves: VECM Analysis.” *Foreign Trade Review* 58 (3): 386–400.

Steiner, A. 2013. “How Central Banks Prepare for Financial Crises: An Empirical Analysis of the Effects of Crises and Globalisation on International Reserves.” *Journal of International Money and Finance* 33: 208–234.

Ubaydullah, M., and K. N. Tulon. 2023. “What Drives Asian International Reserves Accumulation in the Post–Financial Crisis of 1997–98.” *Social Science Review* 40 (1): 203–221.

WAMA (West African Monetary Agency). 2024. *ECOWAS Macroeconomic Convergence Report for End Year 2023*. Freetown: WAMA.

Wooldridge, J. M. 2010. *Econometric Analysis of Cross Section and Panel Data*. Cambridge: MIT Press.

Appendixes

Appendix 1. The Convergence Criteria of the New Macroeconomic Convergence and Stability Pact

Primary Criteria	***Target***
Budget deficit (including grants and on a commitment basis)	≤ 3% of GDP
Average annual inflation (rate)	≤ 5%
Central bank financing of the budget deficit	≤ 10% of previous year's tax revenue
Gross external reserves	≥ 3 months of imports of goods and services
Secondary Criteria	***Target***
Total public debt	≤ 70% of nominal GDP
Nominal exchange rate variation	± 10% vis-a-vis the West African Unit of Account (WAUA)

Source: Authors.

Appendix 2. Variables Summary

Variable	Variable description	Source
Central bank international reserves	Expressed in terms of the number of months of imports of goods and services they could pay for [Reserves/(Imports/12)]. Total reserves comprise holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities. The gold component of these reserves is valued at year-end (December 31) London prices.	World Development Indicators / International Financial Statistics
Total exports of goods and services	Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income and transfer payments.	World Development Indicators
Medium- and high-tech exports	Calculated as a percentage of manufactured exports, medium- and high-tech exports represent the share of medium- and high-tech manufactured exports in total manufactured exports.	World Development Indicators
Agricultural raw material exports	Calculated as a percentage of merchandise exported, agricultural raw materials comprise SITC section 2 (crude materials except fuels), excluding divisions 22–27 (crude fertilizers and minerals, excluding coal, petroleum, and precious stones), and division 28 (metalliferous ores and scrap).	World Development Indicators
AfDB disbursement in the finance sector	Represents the AfDB Group's disbursements to the financial sector expressed as a percentage of total disbursements in all sectors.	AfDB Group Operations database
AfDB disbursement in the industrial sector	Represents the AfDB Group's disbursements to the industrial sector expressed as a percentage of total disbursements in all sectors.	AfDB Group Operations database
EBID disbursement in the industrial sector	Calculated as a percentage of EBID's total disbursements in all the bank's areas of intervention, EBID's disbursements in the industrial sector represent the total disbursements in industrial projects. This variable is used to capture EBID's intervention in the industrial sector.	EBID's West African Development Outlook
EBID disbursement in the private sector	Calculated as a percentage of total EBID disbursements in all the bank's areas of intervention, EBID disbursements to the private sector represent all disbursements to projects initiated by private sector promoters. This variable is used to capture EBID's contribution to the promotion and development of the private sector.	EBID's West African Development Outlook
Domestic credit to the private sector	Calculated as a percentage of GDP, domestic credit to private sector refers to financial resources provided to the private sector by financial corporations, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment. This variable is often used as a proxy for financial development.	World Development Indicators
World Trade Uncertainty Index	This index measures trade uncertainty across the world. The index is constructed by counting the number of times uncertainty is mentioned within proximity to a word related to trade in Economist Intelligence Unit country reports. The index is an equally weighted average and is scaled by total number of words in the reports multiplied by 100,000.	Ahir et al. (2022)
Industry value added	Calculated as a percentage of GDP, the industry sector's added value (including the added value of mining, manufacturing, construction, electricity, water, and gas) is the net output of the industry sector after adding up all outputs and subtracting intermediate inputs. It is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources.	World Development Indicators
GDP growth	GDP growth is measured as the year-on-year change in GDP at constant prices, with a base year specific to each country. Expenditure-based GDP is calculated as total final expenditure at purchaser prices (including the free-on-board value of exports of goods and services) minus the free-on-board value of imports of goods and services.	World Economic Outlook database
Debt	Represents the government's gross debt as a percentage of GDP.	World Economic Outlook database
Exchange rate	Represents the average annual direct exchange rate, which expresses one U.S. dollar unit in local currency.	International Financial Statistics
	Imports of goods and services represent the value of all goods and other market services received from the rest of the world. They include the value of	

Imports of goods and services	merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments.	World Development Indicators
Gross fixed capital formation	Calculated as a percentage of GDP, gross fixed capital formation includes land improvements; purchases of plant, machinery and equipment; the construction of roads, railways, and other infrastructure, including schools, offices, hospitals, private residential accommodations, and commercial and industrial buildings.	AfDB Socio-Economic Database
Foreign direct investment net inflow	Foreign direct investments are the net inflows of investment to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments. This variable is often used as a proxy for financial development and is measured as a percentage of GDP.	World Development Indicators
Remittance received	Remittances received comprise personal transfers and compensation of employees. Personal transfers consist of all current transfers in cash or in kind made or received by resident households to or from nonresident households. Personal transfers thus include all current transfers between resident and nonresident individuals. Compensation of employees refers to the income of border, seasonal, and other short-term workers who are employed in an economy where they are not resident and of residents employed by nonresident entities. Data are the sum of two items defined in the sixth edition of the IMF's *Balance of Payments Manual*: personal transfers and compensation of employees.	World Development Indicators
Political stability	Political stability and absence of violence/terrorism measures perceptions of the likelihood of political instability, politically motivated violence, or both, including terrorism. This indicator varies from -2.5 (weak political stability and presence of violence) to 2.5 (strong political stability and absence of violence) and is used as a proxy for a country's institutional quality.	Worldwide Governance Indicators
Regulation quality	Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development. This indicator varies from -2.5 (low regulation quality) to 2.5 (strong regulation quality) and is also used as a proxy for a country's institutional quality.	Worldwide Governance Indicators

Note: IMF = International Monetary Fund; SITC = Standard International Trade Classification; AfDB = African Development Bank; EBID = ECOWAS Bank for Investment and Development.
Source: Authors.

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