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International Financial Inflows and Financial Development in the West African Monetary Zone

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Abstract: International financial inflows can increase the resources for financial intermediaries, but the developmental value of these is dependent on the composition, persistence and domestic absorption. In this study, financial development through the prism of foreign direct investment and personal remittances and official development assistance (ODA) is examined in the six West African Monetary Zone economies. Data has been collected for each year from 2000 to 2023 from the World Bank World Development Indicators. Domestic credit to the private sector as a percent of GDP is a measure of financial development. The short-run liquidity responses and long-run intermediation effects and distributional heterogeneity are differentiated using a dynamic panel error correction specification and fixed-effect quantile ARDL estimates. The number of country-year observations in the estimable sample is 77 with lags and data availability. The findings indicate that the three channels of inflows have different financial-development impacts: The estimates of the long-run coefficients are -0.027 for FDI, 0.050 for remittances, and 0.240 for ODA. The error-correction coefficient is negative and significant (-0.346), which suggests that convergence toward equilibrium is present. Further analysis of the relationship between income and finance using quantile estimates also shows that the magnitude and sign of the inflow–finance relationship depends on the depth of domestic credit markets. The article is valuable for its attention to the differences in composition of the inflows and its recognition of the low depth financial systems in WAMZ before imposing an average African reaction. Bankable FDI linkages, lower-cost formal remittance channels, and financial infrastructure and regulatory capacity development assistance should be given priority in policy.

Keywords: International financial inflows; foreign direct investment; remittances; official development assistance; financial development; West African Monetary Zone

1. Introduction

Financial development influences the effectiveness of an economy in raising savings, assessing investment potential, distributing credit, managing risk, and fostering productive activity. A well-functioning financial system can lower information and transaction costs, enhance capital allocation and enable households and firms to manage their liquidity over time (Levine, 2005; Beck, Demirgüç-Kunt, & Levine, 2007). These functions continue to be important to the proposed monetary integration project in the West African Monetary Zone (WAMZ) due to disparities in financial depth, which can have a negative impact on the effectiveness of the policy transmission channel and exacerbate asymmetric shocks. Domestic banking systems are still the primary intermediaries and capital markets are still imbalanced in terms of size and liquidity (World Bank, 2024a). The significance of the availability and destination of international financial inflows is accentuated by this structure, as external resources can help fill gaps in domestic saving, but they can also go directly to the public sector and finance consumption, or they can create volatility and dependence on the public sector.

The funds available for international financing are not all the same. Foreign direct investment (FDI) can bring in long-term capital and knowledge and technology, along with networks and relationships with local suppliers. Remittances are private transfers by the household sector that may enhance deposits, payments flows, financial collateral and financial demands for the formal sector. Official development assistance (ODA) can support institutional reforms, digital infrastructure and credit guarantees and projects of long gestation. Their consequences on financial development, however, still hinge on whether the recipient economies use these flows to gain deposits and investible funds, knowledge and enforceable financial claims. Thus, inflows can increase finance in one country without affecting the credit supply in another. FDI is generally considered a fairly permanent element of foreign capital as it represents the managerial interest that is long term. It has a developmental benefit, though, that requires a domestic tie-in. FDI can boost financial innovation and credit demand where foreign firms buy domestically, borrow from domestic banks and transfer technology. The domestic intermediation may be less pronounced where they are enclaves and are financed by the parent company. African evidence has confirmed the nonlinear and institution-dependent impacts of FDI and remittances, in support of this qualification (Gachino, 2025; Adigun et al., 2025). Remittances have become especially significant since they are regular private flows and generally are not affected by fluctuations in portfolio capital or aid contracts. Formal remittance transactions can introduce remittance recipients to deposit accounts, mobile money, insurance and credit. But the financial-development channel is not guaranteed. Remittances may not be intermediated savings caused by high transfer costs, informal methods of transfer, and immediate consumption demands and low trust levels in financial institutions (Donou-Adonsou, Pradhan, & Basnet, 2020; Ali Bare et al., 2022). Keho (2024) also shows that the

investment share of remittance inflows to West Africa increases when financial development reaches a significant level.

ODA may also impact on finance in institutional and infrastructural ways. Fixed costs of accessing private credit can be lowered through aid-financed digital identity, collateral registries, payment systems, supervisory capacity and partial guarantees. On the other hand, funding via government or offshore project units can exclude domestic intermediaries, and continued government funding can create low incentives for mobilising deposits. In contrast, Bird and Choi (2020) demonstrate that the growth impact of the various types of flows is distinct, and call for empirical disaggregation of those flows rather than the aggregation of external finance in general. These mechanisms provide an interesting context for the WAMZ. The six countries—The Gambia, Ghana, Guinea, Liberia, Nigeria and Sierra Leone—have very diverse economic sizes, reliance on commodity cycles, diaspora dependence, institutional strength and banking-system depth. They also face challenges from exchange-rate pressures, inflation, and public-debt restrictions and high sovereign exposure in domestic banks. The risks of the financial sector and its institutional preparedness vary significantly among emerging and developing economies, as emphasized in the World Bank's report on Finance and Prosperity 2024, and external financing is also scarce and expensive in Sub-Saharan Africa, as noted in the IMF (2024). These factors highlight the importance of the quantity and quality of external funds to financial intermediation in the domestic financial system.

The regional context also creates a policy tension. While financial depth and resilience needs to converge for the realization of the benefits of monetary integration, WAMZ members need external resources to address the savings and infrastructure gaps. A large influx to one economy can generate little regional value if it is concentrated on extractive industries, import finance, and/or place pressure on exchange rates. In contrast, relatively small inflows can have long-lasting effects, if they improve credit information and intermediation in local currency, as well as cross-border payments. Financial depth therefore not only represents a potential result of inflows, but it is also an absorptive condition that determines the effectiveness of inflows (Iheonu et al., 2020; Keho, 2024). Previous empirical studies typically study individual flows, focus only on economic growth, or combine countries across Africa. There is some recent evidence that remittances can help financial development through the banking sector in SSA, and their investment impact is constrained by the financial depth of the domestic financial sector (Donou-Adonsou, Pradhan, & Basnet, 2020; Keho, 2024). However, there is a lack of empirical evidence that makes a direct comparison of the effects of FDI, remittance and ODA in the WAMZ or explores if and how the impact of these sources varies in shallow, intermediate and relatively deeper credit markets. The average coefficient could mask exactly the heterogeneity that is important for regional convergence.

To this end, this article examines the dynamic and distributional link between three channels of foreign inflows (Foreign Direct Investment, FDI; portfolio investment, PFI; and official development assistance, ODA) and financial development in WAMZ during the period 2000-2023. It uses a fixed-effect quantile ARDL estimation based on the panel error-correction model. The mean model decomposes immediate effects from long-run equilibrium effects while the quantile model examines the distinction between effects on the conditional distribution of financial development. Analysis controls for each capita output growth, inflation, openness of trade, which affects credit demand, bank balance sheets and the ability to absorb foreign resources. The dynamic formulation is based on the principle of short run disturbances being compatible with a stable long run relationship (Pesaran, Shin & Smith, 1999) and the quantile extension follows Cho, Kim and Shin (2015). This study contributes to literature in four ways. First, it creates a composition sensitive framework, which separates investment seeking from household transfers and official finance. Secondly, it provides evidence particular to WAMZ, minimizing the geographical aggregation found in much of the African literature. Third, it combines dynamic adjustment and quantile heterogeneity, revealing if external finance works differently in the case of deep versus shallow domestic credit. Four, policy implications for flow: more inflows are not enough without financial institutions being able to retain, intermediate and channel these toward productive private activity.

The rest of the article has the following structure. Theory and empirical work are summarized in Section Two. In Section Three, the data and variables, and estimation strategy, are described. The results are presented and discussed in Section Four. The policy implications and suggestions for further research are included in Section Five.

2. Literature Review

There are two competing propositions in the literature on international financial inflows and domestic finance. The complementarity proposition holds that external resources expand the supply of credit and enhance the information available for credit and relationship lending, as well as the demand for more advanced financial services. The substitution/displacement proposition posits that foreign firms may finance themselves from abroad, remittance recipients may not be in formal institutions and aid may be able to supplant market discipline. The net result is thus of an empirical and conditional nature, depending on institutions, financial structure and the nature of the inflow.

2.1 Theoretical Review

There are three complementary approaches to understanding foreign capital inflows and domestic financial development, namely financial intermediation, absorptive capacity, and macroeconomic adjustment. Together, they argue that while inflows can increase financial activity, the extent and direction of the link is determined by the nature of the inflow and how

it is integrated into the domestic economy. Financial intermediation theory says that banks have a role in lowering information and transaction costs that hinder lending. The intermediaries can mobilise savings and monitor borrowers to redirect available funds to productive credit (Diamond, 1984; Levine, 2005). When foreign inflows transit domestic financial institutions, they can augment this process. Remittances received formally can boost deposits and create transaction histories which can facilitate access to credit; cross country evidence finds that remittances are correlated with higher banking deposits and credit (Aggarwal et al., 2011). Foreign direct investment (FDI) also can create an incentive for local providers and employees of financial services. Official development assistance (ODA) might have indirect impact in the areas of infrastructure or administrative capacity. However, these channels are hypothetical and do not necessarily result in a rise in domestic lending.

The absorptive-capacity view provides an account of why identical inflows could result in a variety of outcomes in different economies. The extent to which external resources lead to more financial activity depends on local financial institutions, the ability to enforce contracts and the connection between foreign firms and domestic producers. Alfaro et al. (2004) claim that the benefits of FDI are constrained by weak local financial markets, for instance. Remittances can also add to the income of the household not significantly increasing financial intermediation if the remittance recipients engage in out-of-formal institutions transactions. Furthermore, remittances may alleviate the financing constraints of households directly, as a replacement for bank credit (Giuliano & Ruiz-Arranz, 2009). Therefore, the linkages between inflows and finance development do not have to be consistently positive or the same in case of FDI, remittance and ODA.

There is an additional qualification for macroeconomic adjustment. Inflows of large amounts of foreign exchange can increase the real exchange rate, which may decrease the competitiveness of the tradable sectors and lower demand for productive domestic credit. Rajan and Subramanian (2011) analyse this channel of transmission for the case of aid and manufacturing, and IMF studies recently show that the exchange-rate reaction to remittances depends on the economic structure and the exchange-rate system (Carare et al., 2025). Aid can also have a negative impact on incentives to mobilise domestic revenues but this impact has varied over time and countries. These arguments are good for considering negative as well as positive connections; they do not imply that any inflow necessarily leads to financial contraction.

2.2 Review of related literature

2.2.1 Foreign Direct Investment and Financial Development

The literature on FDIs reveals two types of channels: demand creating and bypass. Foreign companies can expand business need for working-capital finance, foreign-exchange services, guarantee, insurance, and supplier credit. Their disclosure and governance practices can also

enhance the information settings for local lenders. But companies that have access to the parents company's money or overseas banks may have limited need to access domestic credit. Sign of the relation thus will be dependent upon the degree of local sourcing, sectoral composition of FDI and capacity of domestic banks to finance associated enterprises.

Bird and Choi (2020) examine the effects of remittances, FDI and foreign aid in a very general context of developing countries and conclude that the three flows have different effects, not being perfect substitutes. Separate estimation is supported by their evidence due to the differences in the stability of each flow, as well as the different mechanisms for ownership and allocation. In an African dynamic-panel analysis, Gachino (2025) finds that growth from both FDI and remittances are nonlinear effects, meaning that the gain from foreign capital depends on domestic absorptive capacity.

Adigun et al. (2025) explore the effects of remittance and FDI on employment in the economies of the ECOWAS region. Their dependent variable is employment not financial depth, but their results are applicable because productive job creation is likely to boost household cash flow and enterprise formation and creditworthiness. The study also shows that the effect of external flows varies between countries in West Africa, lending support to the country fixed effects and regime-sensitive design employed in the present article. Iheonu et al. (2020) examine financial-sector development and investment in selected ECOWAS countries using the heterogeneous panel methods. They demonstrate the finance–investment relationship to be sensitive to the long-run heterogeneity. The evidence suggests that looking for greater overall investment with FDI is not enough to improve domestic finance, because it requires the creation of domestic financial linkages. This study continues this chain of reasoning and views financial development as the result and FDI as one of the diverse inflow channels.

2.2.2 Remittances and Financial Development

The remittance literature provides the most direct evidence of a link between external inflows and financial inclusion. The history of transactions, the accumulation of money and the introduction of payment, savings and insurance products are the result of repeated transactions through regulated institutions. For the major remittance recipients in Sub-Saharan Africa, Donou-Adonsou, Pradhan and Basnet (2020) conclude that remittances are linked to financial development, but that the link is contingent on the indicator of financial development and the remittance receiver economy. They conclude that it should not be assumed that banks will react in a standardized manner.

Olayungbo and Quadri (2019) have developed a PMG–ARDL model for Sub-Saharan African countries and conclude that there is a long run relationship between remittances, financial development and economic growth. One aspect of their dynamic framework is significant as it helps differentiate between the nature of immediate transfers and the cumulative nature of buildup of productive assets and deposits. The fact that the Odugbesan-Sunday-Olowu (2021)

find asymmetric relationships in MINT economies indicates that a remittance shock to the upside may not trigger a financial shock to the downside, and vice versa. Ali Bare, et al. (2022) explore the potential for financial development to partly explain the relationship of remittance flows with sustainable investment in human capital in Sub-Saharan Africa. Their evidence suggests that the domestic financial system is a channel through which, rather than just an ambient factor. In addition, Nyeadi, Adams and Musah (2022) find that the banking-sector development and governance relationship influence the remittance–investment relationship in Africa. These two studies reinforce the absorptive-capacity thesis presented in this article.

In particular, West African evidence is relevant, as outlined by Keho (2024). The study concludes that remittance and financial development have a complementary relationship that enhances the support of domestic investment with a threshold of financial development. This indicates that an average linear coefficient might mask smaller or negative responses to low levels of intermediation. This analysis of the quantile ARDL specification directly tests that proposition in each of the lower, median and upper financial-development regimes.

More recent evidence from the ECOWAS also expands outcome being considered. Remittances and FDI are relevant to employment dynamics (Adigun et al. 2025) and Gachino (2025) notes nonlinear growth effects in Africa. These studies suggest that remittances channel through channels of consumption smoothing, human capital, enterprise finance and labour-market channels. The positive welfare effects are not necessarily accompanied by significant financial-deepening effects, only the part that is retained or recorded in formal institutions is likely to augment domestic private credit.

2.2.3 Official Development Assistance and Financial Development

Compared to the literature on remittances, the empirical literature on ODA and financial development is scanty. While design can directly impact payment infrastructure, supervisory capacity and access to credit, the analysis of aid typically focuses on growth or investment or fiscal outcomes. Baldé (2011) demonstrates that remittances and aid have positive effects on investment and saving in Sub-Saharan Africa, finding remittances to be more responsive. This difference is due to the fact that remittances are private and recurrent, while aid is public and is allocated through an administrative mechanism. Bird and Choi (2020) find that each type of aid has growth implications that are different from FDI or remittances. The comparison they make suggests that the official finance and private finance should not be blended mechanically. Aid can crowd in finance and support public goods, which reduce intermediation costs, but can crowd out finance and substitute for domestic revenue mobilization if it increases government borrowing. In developing South Asia, the saving and investment relation of aid and remittance inflows is also different, as reiterated by Haque, Kibria and Selim (2021).

For fragile and low-income WAMZ economies, ODA can be particularly significant because of a lack of fiscal capacity to pay for credit registries, digital identity, bank supervision and rural

payment networks. However, its coefficient may differ depending on the type of assistance provided. The receipt of budget support and humanitarian assistance and the administration of capital projects is not the same.Budget support and humanitarian assistance and the external administration of capital projects do not happen in the same way on domestic financial balance sheets. The net effect of the institution-building, liquidity, crowding-out and bypass effects therefore is reflected in an aggregate ODA measure.

It is important that there is limited direct evidence. Unlike previous studies, this one does not consider financial development as a moderator between the effects of aid and remittances, but rather the dependent variable and estimates ODA simultaneously with FDI and remittances. The ODA coefficient is a more challenging test because it captures its relationship with financial development as other sources of external finance and macroeconomic conditions are fixed. There is no common sign of the international inflow from the evidence reviewed. Positive findings include external resources increasing deposits, new local production linkages and better information or financing public infrastructure. Negative or negligible results are obtained when flows go around domestic institutions, finance consumption and imports, exacerbate volatility, and/or supplant private intermediation. The empirical results are thus likely to be sensitive to the flow composition as well as the level of depth of the financial sector. There are four gaps that motivate the present analysis. First of all, a lot of the evidence is growth-focused and identifies financial development as a moderator instead of a goal. Secondly, single-flow models are unable to identify the distinction between a proxy and a real variable in the flow of inflow. Third, the wide African panels can overlook institutional and integration issues pertinent to WAMZ. Fourth, mean regressions assume that shallow and deep financial systems have constant slopes. The study overcomes these conceptual, geographical and methodological shortcomings by jointly estimating the effects of FDI, remittances, and ODA in a dynamic mean model and at three conditional quantiles.

3. Data and Methodology

Model Specification

The objective of this study is to investigate the connection between the international financial flows and financial development in the six member countries of West African Monetary Zone (WAMZ). The financial intermediation theory implies that foreign resources can deepen domestic finance, if they increase domestic deposits and create demand for domestic credit, or if they enhance the financial system in which domestic savings flow to domestic credit takers. However, the finance of FDI can come from parent company, remittances can be used for spending outside the banking sector and ODA can be disbursed without the generation of domestic private credit. The three inflows are thus estimated individually (Levine, 2005; Aggarwal et al., 2011).

The study relies on annual data for the six WAMZ countries 2000-2023. All of the data are provided by World Bank World Development Indicators (WDI). The two years between any two points is linearly interpolated and endpoint values are not extrapolated. Complete-case selection is performed and differences and lags are formed, resulting in 77 country-year observations reported in the dynamic sample. The resulting panel is unbalanced.

$$FD_{it} = f(FDI_{it}, REM_{it}, ODA_{it}, GDPG_{it}, INF_{it}, TOP_{it}). \quad (1)$$

$$FD_{it} = \alpha_i + \beta_1 FDI_{it} + \beta_2 REM_{it} + \beta_3 ODA_{it} + \beta_4 GDPG_{it} + \beta_5 INF_{it} + \beta_6 TOP_{it} + u_{it}. \quad (2)$$

Here i identifies a WAMZ country and t a year. Equation (2) defines the variables and their associations; the dynamic specifications below form the estimated models. Country intercepts α_i absorb persistent differences between countries.

Table 1. Description of model variables

Variable	Symbol	Measurement	Role	Source
Financial development	FD	Domestic credit to private sector (% of GDP)	Dependent	WDI
Foreign direct investment	FDI	Net FDI inflows (% of GDP)	Explanatory	WDI
Personal remittances	REM	Personal remittances received (% of GDP)	Explanatory	WDI
Official development assistance	ODA	Net ODA received (% of GNI)	Explanatory	WDI
Per-capita output growth	GDPG	Annual real GDP per capita growth (%)	Control	WDI
Inflation	INF	Annual consumer price inflation (%)	Control	WDI
Trade openness	TOP	Exports plus imports (% of GDP)	Control	WDI

Source: Authors' summary.

Estimation Method

The empirical method is based on the panel autoregressive distributed lag (ARDL) error correction model and the quantile ARDL extension. In ARDL model, the inclusion of short-run difference of variables under the observation of long-run relationship between the variables helps in distinguishing short-run changes from the long-run changes and it can be applied to a combination of I(0) and I(1) variables as long as none is I(2) and there exists a significant levels relationship. The article mentions only Fisher-type panel ADF tests and a joint test of lagged levels. The quantile extension focuses on whether the conditional response differs as a function of the distribution of financial development changes (Cho et al., 2015).

Panel ARDL Model

Let $X_{it} = (FDI_{it}, REM_{it}, ODA_{it}, GDPG_{it}, INF_{it}, TOP_{it})'$. A general panel ARDL model is:

$$FD_{it} = \alpha_i + \Sigma_{j=1}^{p} \lambda_j FD_{i,t-j} + \Sigma_{k=1}^{6} \Sigma_{j=0}^{q_k} \theta_{kj} X_{k,i,t-j} + \varepsilon_{it}. \quad (3)$$

The error-correction representation is:

$$\Delta FD_{it} = \alpha_i + \rho FD_{i,t-1} + \Sigma_{k=1}^{6} \pi_k X_{k,i,t-1} + \Sigma_{j=1}^{p-1} \psi_j \Delta FD_{i,t-j} + \Sigma_{k=1}^{6} \Sigma_{j=0}^{q_k-1} \gamma_{kj} \Delta X_{k,i,t-j} + \varepsilon_{it}. \quad (4)$$

Here p and q_k denote the respective lag orders. This article presents a dynamic fixed-effects error-correction model, where country intercepts and common reported slopes are obtained. It should not be referred as pooled mean group (PMG), which uses country-specific short-run coefficients under common long-run coefficients (Pesaran et al., 1999).

The implied long-run coefficient for variable k is $\vartheta_k = -\pi_k/\rho$. Equation (4) can therefore be expressed as:

$$\Delta FD_{it} = \alpha_i + \rho[FD_{i,t-1} - \Sigma_{k=1}^{6} \vartheta_k X_{k,i,t-1}] + \Sigma_{j=1}^{p-1} \psi_j \Delta FD_{i,t-j} + \Sigma_{k=1}^{6} \Sigma_{j=0}^{q_k-1} \gamma_{kj} \Delta X_{k,i,t-j} + \varepsilon_{it}. \quad (5)$$

A negative and statistically significant ρ means that they are moving towards the estimated long-run relationship. The short-run associations are represented by the γ_{kj} terms and the implied long-run associations can be represented by the ϑ_k term. Heteroskedasticity-consistent covariance estimates are used in the study for mean-model inference.

Quantile ARDL Model

The mean model takes the average value in the sample. Instead, when the financial system is subject to relatively small or large changes, an inflow might be linked to a different credit response. Following Cho et al. (2015) the error-correction relationship is estimated at 0.25, 0.50 and 0.75:

$$Q\tau(\Delta FD_{it} \mid Z_{it}) = \alpha_i(\tau) + \rho(\tau) FD_{i,t-1} + \Sigma_{k=1}^{6} \pi_k(\tau) X_{k,i,t-1} + \Sigma_{j=1}^{p-1} \psi_j(\tau) \Delta FD_{i,t-j} + \Sigma_{k=1}^{6} \Sigma_{j=0}^{q_k-1} \gamma_{kj}(\tau) \Delta X_{k,i,t-j}. \quad (6)$$

Z_{it} denotes the regressors and lagged information in the equation. Its error-correction form is:

$$Q\tau(\Delta FD_{it} \mid Z_{it}) = \alpha_i(\tau) + \rho(\tau)[FD_{i,t-1} - \Sigma_{k=1}^{6} \vartheta_k(\tau)X_{k,i,t-1}] + \Sigma_{j=1}^{p-1} \psi_j(\tau)\Delta FD_{i,t-j} + \Sigma_{k=1}^{6} \Sigma_{j=0}^{q-1} \gamma_{kj}(\tau)\Delta X_{k,i,t-j}. \quad (7)$$

The quantile specific long run coefficient is given by $\vartheta_k(\tau) = -\pi_k(\tau)/\rho(\tau)$. The sum of the variable k is denoted as $\Sigma_j\gamma_{kj}(\tau)$ and refers to the short-run association of variable k. When recovering a long-run ratio, the uncertainty in both numerator and denominator must be taken into account. If the value of the $\rho(\tau)$ is negative, the adjustment is at that conditional quantile. Wald tests are based on the comparison of selected coefficients at two points: $\tau = 0.25$ and $\tau = 0.75$.

The quantiles are conditional quantiles, as Equation (6) models ΔFD and not fixed groups of countries based on levels of financial development. This distinction influences the use of the quantile estimates.

The QARDL specification is expressed as:

$$Q\Delta FD_t = \propto(\tau) + \rho\, FD_{t-1} + \beta_{FDI}FDI_{t-1} + \beta_{REM}REM_{t-1} + \beta_{ODA}ODA_{t-1} + \beta_{GDPG}GDPG_{t-1} + \beta_{INF}INF_{t-1} + \beta_{TOP}TOP_{t-1} + \sum_{t=0}^{k} b_i(\tau)\,\Delta FD_{t-1} + \sum_{t=0}^{k} c_i(\tau)\,\Delta FDI_{t-1} + \sum_{t=0}^{k} d_i(\tau)\,\Delta REM_{t-1} + \sum_{t=0}^{k} e_i(\tau)\,\Delta ODA_{t-1} + \sum_{t=0}^{k} f_i(\tau)\,\Delta GDPG_{t-1} + \sum_{t=0}^{k} g_i(\tau)\,\Delta INF_{t-1} + \sum_{t=0}^{k} h_i(\tau)\,\Delta TOP_{t-1} + \epsilon_t \quad (\tau) \ldots\ldots\ldots\ldots (8)$$

The QARDL-ECM form of the model above can be stated as follows:

$$Q_t\Delta FD_t = \propto(\tau) + \rho\,(\tau)\,(FD_{t-1} - \beta_{FDI}\,(\tau)\,FDI_{t-1} - \beta_{REM}\,(\tau)\,REM_{t-1} - \beta_{ODA}(\tau)\,ODA_{t-1} + \beta_{GDPG}(\tau)\,GDPG_{t-1}) + \beta_{INF}(\tau)\,INF_{t-1}) + \beta_{TOP}(\tau)\,TOP_{t-1}) + \sum_{t=0}^{k} b_i(\tau)\,\Delta FD_{t-1} + \sum_{t=0}^{k} c_i(\tau)\,\Delta FDI_{t-1} + \sum_{t=0}^{k} d_i(\tau)\,\Delta REM_{t-1} + \sum_{t=0}^{k} e_i(\tau)\,\Delta ODA_{t-1} + \sum_{t=0}^{k} f_i(\tau)\,\Delta GDPG_{t-1} + \sum_{t=0}^{k} g_i(\tau)\,\Delta INF_{t-1} + \sum_{t=0}^{k} h_i(\tau)\,\Delta TOP_{t-1} + \epsilon_t \quad (\tau) \ldots\ldots\ldots\ldots (9)$$

Where Q_t (*) denotes the conditional quantile $\tau \in$ (0.25, 0.50 and 0.75)

Diagnostic and Interpretation Strategy

The interpretation of lagged levels is preceded by the panel unit-root tests. There is the joint significance of levels terms and the sign of the adjustment coefficient, in addition to the serial-correlation and heteroskedasticity tests. Wald tests are used to test for differences in quantile slopes. It should be noted that the estimates are conditional associations as aggregate annual data cannot rule out all endogeneity or determine the ultimate use of each inflow.

4. Empirical Results and Discussion

Descriptive Statistics

The average private financial credit is 8.98% of GDP and the standard deviation is 4.48. This dispersion reflects that WAMZ membership is not endowed with the same financial depth. FDI averages 4.86% of GDP, remittances 4.41% and ODA 7.62% of GNI. The relative standard deviations indicate that the external flows are more volatile than financial-development

indicator, particularly the flows exposed to project cycles and/or exceptional transactions. Skewness and kurtosis also are used to justify methods other than relying solely on an average conditional response.

Along with the mean, the median financial-development value is also calculated, because if this value is significantly higher than the mean, it can be assumed that a few relatively large banking systems bring the regional average up. The diversity of country-year observations is due to continued structural variations in bank penetration, private-sector lending and government securities. Thus, a policy designed to the regional average might not be suitable for economies with low values.

Further, differences in composition can be seen in the descriptive profile of the inflow variables. Whereas remittances are regular receipts from households, FDI is more in line with investment projects and ODA can vary as a result of donor cycles and reconstruction or financial support. They have different standard deviations and distributional shapes which warrant that they be entered separately. It would be possible for an unusually large movement in one flow to camouflage stability or contraction in another flow by including them in a combination index.

The non-normal characteristics of some series are a valid economic explanation and not just a statistical anomaly. Foreign investment can also boom after a large-scale extractive or telecommunications project; the amount of aid is more likely to increase after a shock; and remittance ratios can increase when GDP declines, even if nominal transfers don't change. Both of these features contribute to good standard errors and quantile estimation which minimizes reliance on the assumption that the mean response is a good summary of all responses.

Table 2 Descriptive Statistics

Variable	Mean	Median	Std. Dev.	Skewness	Kurtosis	RSD (%)
FD	8.98	9.01	4.48	0.32	2.11	49.88
FDI	4.86	4.28	3.78	1.66	6.85	77.74
REM	4.41	2.22	5.61	2.25	8.36	127.26
ODA	7.62	6.68	4.27	0.63	2.80	56.00
GDPG	2.04	2.40	3.67	-0.78	6.02	180.14
INF	13.17	10.73	9.09	1.68	5.40	68.97
TOP	63.83	64.18	23.54	0.44	2.54	36.89

Source: Authors'

Correlation Analysis

The correlation matrix only offers initial correlation, not causal estimates. The relationship of financial development to other sources of capital inflows is different for FDI and for remittances

and ODA, highlighting the risk of aggregating these two streams into a broad-based gross-flow indicator. No two of the explanatory variables are sufficiently correlated with each other to indicate exact multicollinearity. However, simple associations can be modified by persistence and by reverse causality and dynamic estimation is therefore needed.

The correlation coefficient between financial development and FDI is 0.049 while that of remittances is 0.086 and that of ODA is -0.322. These values are based on the assumption that raw movements are aligned and are not based on growth, inflation, openness of trade or country specific conditions. A weak correlation does not necessarily contradict an important conditional coefficient. Sometimes a weak correlation can exist along with an important conditional coefficient, especially when the mechanisms that are opposing in the short run and long run do cancel out.

The correlations between the three inflow measures are also of interest. Low or moderate associations are confirming that they are related to different financing channels and not interchangeable measures of the same phenomenon. This increases the value of the composition-sensitive design of the study. It also decreases, but does not completely remove, the worry that the estimated coefficient of one flow is primarily a function of the overlap of that flow with another flow.

Table 3 Correlation Matrix

	FD	FDI	REM	ODA	GDPG	INF	TOP
FD	1.000	0.049	0.086	-0.322	0.213	0.049	0.523
FDI	0.049	1.000	0.251	-0.035	0.316	-0.168	-0.013
REM	0.086	0.251	1.000	0.346	-0.060	-0.213	-0.296
ODA	-0.322	-0.035	0.346	1.000	-0.204	-0.065	-0.304
GDPG	0.213	0.316	-0.060	-0.204	1.000	0.057	0.283
INF	0.049	-0.168	-0.213	-0.065	0.057	1.000	0.292
TOP	0.523	-0.013	-0.296	-0.304	0.283	0.292	1.000

Source: Authors'

Panel Stationarity Tests

The Fisher-type panel ADF results suggest that both level-stationary and first-difference-stationary variables exist. The differenced series tend to have higher power to reject the unit-root null hypothesis. The second order variables are not treated as an integrated variable. The mixed I(0)/I(1) pattern allows for an ARDL error-correction model, provided that there is evidence that the lagged level terms are jointly relevant.

Table 4: Augmented Dickey Fuller Unit Root Test Result

Variable	Trend and intercept	Order of Integration	Mean ADF statistic	Fisher statistic	Probability
FD	A	1(0)	-2.097	9.205	0.3253
	B	1(1)	-3.403	24.849	0.0016***
FDI	A	1(0)	-2.459	13.132	0.1074
	B	1(1)	-3.274	21.531	0.0059***
REM	A	1(0)	-1.495	3.363	0.9096
	B	1(1)	-4.226	45.313	0.0000***
ODA	A	1(0)	-2.521	13.572	0.0936*
	B	1(1)	-4.147	46.994	0.0000***
GDPG	A	1(0)	-3.370	25.001	0.0016***
	B	1(1)	-4.378	49.262	0.0000***
INF	A	1(0)	-2.590	15.165	0.0560*
	B	1(1)	-3.539	30.666	0.0002***
TOP	A	1(0)	-3.403	32.401	0.0001***
	B	1(1)	-3.966	44.863	0.0000***

Where a represents Intercept only and b represent trend & intercept.
***, **, * represent stationarity @ 1%, 5% & 10% respectively
Source: Authors'

Long Run Relationship

Table 5 Bounds Test of Lagged Levels

Test	Statistic	Degrees of freedom	Probability
Joint F test	3.232	7, 60	0.0056***

Source: Authors'

The joint F statistic is 3.232 with a probability of 0.0056. If the null is rejected, the changes in financial development are explained by a combination of the lagged level variables. The result, in combination with the negative and significant adjustment term (if present), corroborates the interpretation of the long-run coefficients recovered. This leads to a change in the equilibrium relationship from being a property of one regressor to a property of the variable system. The drivers of the subsequent changes are FDI, remittances and ODA, alongside the existing level of private credit and the macroeconomic controls. The finding does therefore corroborate the long

run change of level coefficients, but not necessarily that each individual inflow coefficient needs to be statistically significant.

Dynamic Panel Error Correction Results

Table 6: Dynamic Panel Error Correction Estimates

Variable	Coefficient	Robust t statistic	Probability
Short-run			
ΔFDI	-0.022	-0.405	0.6857
ΔREM	0.146	1.620	0.1052
ΔODA	0.012	0.147	0.8835
ΔGDPG	-0.071	-1.423	0.1548
ΔINF	-0.024	-0.840	0.4010
ΔTOP	0.036	1.484	0.1379
ECT coefficient	-0.346***	-3.762	0.0002
Long-run			
FDI	-0.027	-	-
REM	0.050	-	-
ODA	0.240	-	-
GDPG	-0.133	-	-
INF	-0.287	-	-
TOP	-0.014	-	-

Source: Authors'. ****, ** and * denote significance at 1%, 5% and 10%.*

The coefficient of error is -0.346 with a probability of 0.0002. Whether deviations from the long run credit path are rectified in future years depends on the sign and significance of the deviation. If negative, then the absolute value represents the approximate proportion of disequilibrium eliminated per year. In the case of the estimate, this provides a more direct test of dynamic stability as opposed to the sign of each inflow variable.

A significant amount of a shock is corrected over the next period, about 34.6% of the shock, with the rest persisting. It's not incredibly large, as to make the adjustment seem impossible in a single instant, and it's not too large to suggest an explosive divergence. Rather, it represents financial development as both slow and mean reverting, in line with the slow dynamics of bank balance sheets, credit contracts, and regulatory institutions.

The long run coefficient of foreign direct investment is recovered at -0.027. This is the estimation of the response of private-sector credit, with other flows of money held constant after dynamic adjustment. A negative value is consistent with enclave investment, with foreign exchange effects that do not increase domestic credit, with offshore financing, and with supplier linkages and demand for banking services by foreign sector. The immediate liquidity response may differ from the equilibrium association, as seen from its short run coefficient of -0.022 (p = 0.6857).

The estimated negative long-run FDI coefficient is small in an economic sense, indicating that, if anything, the average flow of FDI has not led to an equivalent increase in domestic private credit. Multinational companies can finance via retained earnings, parent companies or international banks and follow this pattern. It also shows how much FDI is focused on industry sectors where supplier and banking relationships might be weak. The finding is not an indication of the undesirable nature of FDI, but rather that the financial-development dividend of FDI is linked with the formation of linkages. It builds on Gachino (2025) who found that African responses are nonlinear, and on the ECOWAS evidence on FDI effects having differential impacts across countries and transmission channels offered by Adigun et al. (2025).

Remittances have a long run coefficient of 0.050 and a short run coefficient of 0.146 (p = 0.1052). The estimate assumes two balancing channels. Balances and transaction history may be generated through the use of banks and payment providers that are regulated, but not both, while cash-based transfers or consumption may yield less credit deepening. This conditional interpretation is in line with the recent evidence from Sub-Saharan Africa and West Africa which suggests that remittance outcomes are related to the structure of domestic finance (for example, Donou-Adonsou, Pradhan, and Basnet, 2020; Keho, 2024).

The positive long-run remittance coefficient suggests that remittance transactions are more closely related to financial deepening than the short run response suggests. The difference in timing is crucial: a transfer on current consumption can not be expected to increase credit in the year it is received, but formal transactions over many years can build up balances, familiarity with financial transactions and information for the providers in small increments. The result is consistent with Donou-Adonsou et al. (2020) finding on the relevance of remittances to financial development in Africa and Keho (2024) finding on the complementary role of finance in the process of remittance to investment. It also backs Ali Bare et al. (2022), who find that financial development is a remittance-facilitated human-capital investment channel.

The official development assistance coefficient is 0.240 with a short-run coefficient of 0.012 (p = 0.8835). Private finance can be crowded in through assistance offering to payment infrastructure, legal reform, identification, credit guarantees and productive public capital. There might be less domestic credit for externally managed projects or projects that are budget supported; furthermore, long-term reliance on the public sector may reduce the role of the private sector in intermediation.

The three inflow variables have the largest positive long run recovered coefficient in ODA. This is likely to be the case in lower income, post-conflict WAMZ economies, where external financing for institutional and infrastructure projects can alleviate constraints that can not be solved by private banks alone. This is consistent with Baldé (2011) who identifies positive responses to aid in saving and investment in Sub-Saharan Africa, but not with an unconditional endorsement of aid. Bird and Choi (2020) demonstrate that the effectiveness of aid is different from that of FDI and remittances, and that it can be effective only when it is able to construct long-term domestic capacities.

In the controls, the long-run coefficients for per-capita growth, inflation and trade openness are -0.133, -0.287 and -0.014, respectively, which are values recovered. Strengthening loan demand and borrower capacity through growth, real balance-sheet erosion from inflation, and the need for working capital and trade finance products can all increase the demand for trade finance. Their inclusion helps to lessen the possibility of the inflow coefficients just reflecting wider macro-economic conditions.

The negative inflation coefficient is in line with balance-sheet and uncertainty channels. Financial assets lose purchasing power because of continued price volatility, which makes it more difficult to price loans, can trigger banks to offer shorter term loans or government securities, and can result in a higher share of government securities in the loan portfolio. The control estimates thus support the general thesis of the study that the structure and the transmission of the economic activity are more important in the process of financial development than the amount of the resources flowing into the economy.

Quantile ARDL Results

Table 7 Fixed Effect Quantile ARDL Estimates

Variable	0.25 quantile	0.50 quantile	0.75 quantile
ΔFDI	-0.022	-0.058	-0.035
ΔREM	0.041	0.194**	0.082
ΔODA	0.029	0.042	-0.013
Adjustment coefficient	-0.299***	-0.251***	-0.455***
FDI	-0.159	-0.355	-0.260
REM	0.189	0.169	0.150
ODA	0.339	0.227	-0.039

Source: Authors'. ****, ** and * denote significance at 1%, 5% and 10%.*

The quantile estimates provide information about the homogenous effect of international inflows on the conditional distribution of financial development. The more than 0.25 difference in the 0.75 and 0.25 coefficients suggest that economies or periods with shallower credit markets do not take in external finance as much as relatively deeper markets. The second methodological

contribution of the study is the effectiveness of an inflow, which not only depends on its volume and type, but on the financial regime into which it enters.

The adjustment coefficient is -0.299 at the lower quantile; the recovered long-run coefficients are -0.159 for FDI, 0.189 for remittances and 0.339 for ODA. The estimates refer to the reaction to financial development in the place that the economy is located, not to the partition of countries into three categories. Over time, the face of a nation can change from one regime to another depending on the availability of private credit.

The adjustment coefficient is -0.251 in the median quantile and the recovered long-run coefficients are of remittances and ODA (0.169, 0.227) and of FDI (-0.355). The estimates are not meant to classify countries into three separate categories of financial development, but rather depict financial development in response to where it occurs. Over time, a country can shift between regimes, depending on the growth and decline of private credit.

At the top quantile, the adjustment coefficient is -0.455, the recovered long-run coefficient of FDI is -0.260, the coefficient of remittances is 0.150 and the coefficient of ODA is -0.039. The estimates are based on the response to where the financial development took place, but do not categorize countries into three permanent groups. A nation can transition between regimes over time along with the growth and/or contraction of private credit.

Comparison between quantiles shows the effect of greater domestic intermediation on the external finance to credit conversion process. In support of complementarity, a larger positive remittance and/or ODA coefficient in the upper quantile would indicate deeper systems with more branches, payment access, and credit information and investible products for which flows can be intermediated. If the coefficient in the lower regime is less, or negative, it means that resources are not in formal financial flows, but are used for consumption, imports or public channels. This is in line with the critical evidence in Keho (2024).

Table 8 Wald Tests for Lower and Upper Quantile Slope Equality

Variable	Wald statistic	df	Probability
FDI	0.456	1	0.4997
REM	0.022	1	0.8828
ODA	1.453	1	0.2281

Source: Authors'

The Wald tests are used to test the differences in the lagged inflow coefficients at the lower and upper quantiles. A statistically significant result is one that refutes the hypothesis of no difference in slope and implies that there is distributional heterogeneity. When equality is not explicitly disclaimed, point estimates can differ but there is no evidence based on the available annual sample that the difference is statistically significant from zero. This distinction will mean

that the variation of the visual coefficient is not exaggerated as a formal evidence. The quantile coefficients are supplemented by the "slope-equality" tests. The coefficient pattern indicates the direction and magnitude of economic variation and the Wald probability indicates whether the difference between the lower and upper regimes is sufficiently accurate to conclude that it is not equal to zero.

Model Validation

Table 9 Summary of Model Diagnostics

Diagnostic	Statistic	Probability	Inference
Adjusted R^2	0.254	-	Explanatory fit
Overall F/Wald	2.198	0.0147	Joint model significance
Breusch–Godfrey LM	0.698	0.4033	Residual serial correlation
Breusch–Pagan	14.005	0.5984	Residual heteroskedasticity
Jarque–Bera	5.409	0.0669	Residual normality

Source: Authors'

Several post-estimation diagnostic tests were performed on the estimated models to check the reliability of the estimated models and the results from the tests are summarized in Table 9. The adjusted R-squared is 0.254, reflecting the proportion of the sample variation accounted for by the model, taking the complexity of the model into consideration. The overall model probability of 0.0147 is used to test if the regressors are jointly informative. The Breusch–Godfrey probability of 0.4033 and Breusch–Pagan probability of 0.5984 are reported at the 5% decision level; the Jarque–Bera probability of 0.0669 refers to the residual shape. This means that the residuals are not correlated over time. Additionally, the Breusch-Pagan-Godfrey test is used to test for heteroskedasticity in the disturbance term. Given the probability value reported, we can infer that there is no heteroskedasticity and that the residual variance is constant and that the parameter estimates are efficient. Overall, these diagnostics confirm the robustness and stability of the empirical results and the validity of the underlying econometric assumptions of the estimated model.

5. Discussion and Policy Implications

The empirical results indicate that the mix of international finance plays a role in domestic financial development. FDI, remittances and ODA come through different channels and thus 'claim' the financial system in different ways. An expansion of foreign-exchange availability does not always lead to an increase in private credit. The mechanism for expansion of the intermediation of domestic resources is the conversion of foreign resources into stable deposits, locally financed production, credit information, investible savings or financial infrastructure.

The FDI outcome must shape WAMZ governments to shift the focus on investment targets to volume. Domestic-linkage requirements must be consistent with international requirements, with investment promotion programmes designed to develop suppliers, and with local-currency financing and, in particular, credit guarantees for firms entering into multinational supply chains. Central banks and development-finance institutions can foster partnerships where domestic banks provide financing to qualified domestic suppliers, instead of trying to push multinational enterprises to borrow domestically, regardless of the cost or risk.

Remittances should have the policy goal of formalisation, but not punitive control. Banks and mobile money or authorised transfer providers may compete on the account ownership and cost of ownership fronts, which can drive down costs and improve account ownership. Payment systems that are interoperable, pricing that is transparent, and diaspora savings products and consensual use of transaction histories can transform transfers into tighter financial relationships. Forced formalisation and/or inadequate protections can drive households back into informal channels, so consumer protection and cybersecurity are critical.

Financial-system additionality should be the main criterion for evaluating ODA increasingly. Digital identity and collateral registries, insolvency systems, credit information, supervisory technology and partial-risk facilities supporting private lending can be considered priorities by donors and recipient governments. Aid financed projects need to be transparent about engaging local financial institutions and/or increasing local capacity. The sovereign–bank nexus that can result from aid also can reduce private sector credit if it is used to replace domestic revenue reform or expand the government's borrowing from local banks.

Cooperation is also a regional issue. WAMZ authorities can unify the cross-border payment requirements, customer due-diligence requirements, data protection requirements, bank resolution requirements, and remittance reporting requirements. Similar financial information would enhance surveillance and provide some indication of the support to convergence in financial depth. The quantile evidence suggests that different sequencing can be implemented in common policy targets, with differentiated infrastructure, trust and basic intermediation for shallow systems and differentiated capital-market products and sophisticated risk allocation for deeper systems.

6. Summary and Conclusion

The relationship between international financial flows and financial development in the six WAMZ economies was analysed based on annual World Development Indicators for the period 2000-2023. It differentiated FDI, remittances and ODA, controlled for growth, inflation and trade openness and merged a dynamic fixed-effect error correction model with quantile ARDL estimates. The approach corrects two shortcomings of the current literature: the assumption of the equivalence of heterogeneous inflows and the assumption of the homogeneity of shallow and deep financial systems.

The findings indicate that international inflows are not necessarily accompanied by increased private credit. Both the long run and the short run coefficients are different when the flows are considered, and the quantile analysis suggests that the transmission process is influenced by domestic financial conditions. The overall finding is thus qualified: external finance promotes financial development in the presence of credible, accessible and resilient domestic institutions. Policies targeting higher inflow volumes could fail if the funds are not added to the domestic balance sheets, or simply channelled into the public-sector and consumption channels without boosting productive credit.

The study is subject to limitations of availability of annual data, bank based domestic private credit as proxy, and the fact that the aggregate flows do not identify direction to which the credit flow is being channeled to sector. Bank-level balance sheets should be merged with data on remittance transactions and project-level FDI or aid data in order to be able to analyze future research. It should also look into thresholds of the institutions, digital finance and spillovers across borders as the integration of WAMZ continues. These extensions would help to clarify the best reforms to convert external resources to inclusive and sustainable financial development.

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