EI-TC Economic Insights – Trends and Challenges Vol. 12 No. 3 2023 95 - 106

The Effect of Income and Financial Integration on Consumption Smoothing in Africa. Does Income Asymmetry Matter?

Isiaq Olasunkanmi Oseni[1], **Oluwaseyi Adedayo Adelowokan**[2] and **Emeka Okoro Akpa**[3*]

[1] Department of Economics, Olabisi Onabanjo University, Ago-Iwoye, Ogun, Nigeria
https://orcid.org/0000-0002-1344-4343
e-mail: osenioou@yahoo.com
[2] Department of Economics, Olabisi Onabanjo University, Ago-Iwoye, Ogun, Nigeria
https://orcid.org/0000-0001-7825-1553
e-mail: adelowokan.oluwaseyi@oouagoiwoye.edu.ng
[3] Babcock University Centre for Open Distance and e-Learning (BUCODeL), Ogun, Nigeria
https://orcid.org/0000-0002-2566-3156
e-mail: akpaemeka@gmail.com

Original research paper

Citation:

Oseni, I.O., Adelowokan, O.A., & Akpa, E.O. (2023). The Effect of Income and Financial Integration on Consumption Smoothing in Africa. Does Income Asymmetry Matter?. *Economic Insights – Trends and Challenges, 12*(3), 95-106.
https://doi.org/10.51865/EITC.2023.03.07

JEL Classification:
E21; E64; F38.

Abstract: *In today's increasingly interconnected global economy, understanding the mechanisms that influence consumption smoothing has become crucial for policymakers and economists alike. In this study, the effect of income, income asymmetry and financial integration on consumption smoothing in Africa was estimated. The study covers the period 1985-2020 using panel data on 10 countries. Estimation is done using the Dynamic Common Correlated Effects (DCCE) estimation technique. It is shown that asymmetry existed in the short run given the significance of Wald test for asymmetry (P<0.05). Furthermore, positive income asymmetry (β= -0.7365, z= -2.47), and negative income asymmetry (β= 0.8541, z=2.66), exerts statistically significant effects on consumption smoothing. In the long run, positive income asymmetry (β=3.2595, z=2.17) has significant effect on consumption smoothing. Results from the equation with income asymmetry interacted with financial integration indicates that in the short run, positive income asymmetry (β= -3.7772, z= -2.17), and its interaction with financial integration (β= -3.8545, z= -2.06) exerts significant effects on consumption smoothing. The study recommends that governments could consider implementing regulations and controls on international financial flows to limit the impact of external shocks, howbeit with caution, given the consumption smoothing reducing effect of the interaction of positive income asymmetry and financial integration.*

Keywords: *Income Asymmetry; Consumption Smoothing; Financial Integration; DCCE.*

* Corresponding author

Introduction

Consumption is the dominant component of gross domestic product (GDP). From 1991 to 2019, consumption in sub-Saharan Africa (SSA) it was above 70 percent of GDP (World Bank, 2019). The effect of a change in consumption can be five times more than the effect of a percentage change in investment (Hall, 1986), thus making consumption of prime relevance to policymakers. In fact, shifts in consumption often precipitate shifts in the overall economy (Hall, 1986; Jappelli and Pistaferri, 2013), changing society, employment, and business models (Coventry, 2018). In other to avert adverse shifts in consumption, the goal of economic agents is to be able to smooth consumption over their lifetime. That is, being able to stay on the same consumption path over the years. However, it has been difficult for Africa to maintain the same level of consumption within the period under review, which is what consumption smoothing is about. Growth in final consumption expenditure stood at 5 percent in 1985, but fell to -1.6 percent in 1986. It experienced periods of positive and negative growth, until it surged to a height of 19.6 percent in 2001. Final household consumption expenditure has not had the level of growth recorded in 2001 (World Bank. 2021). In 2020, household final consumption expenditure stood at -1.6 percent of GDP, and this may not be unconnected to the uncertainties created as a result of the COVID-19 pandemic (World Bank, 2021). These fluctuations in consumption show that consumption smoothing objective in Africa within the period under review, may not have been achieved. These fluctuations in consumption, as earlier described, has implications for society in general, employment and general macroeconomic stability.

Meanwhile, growth in per capita income in Africa has equally experienced periods of highs and lows. It is interesting that in the period when the narrative of "Africa rising" was strong (starting from the 2000s), peak growth rate in per capita income of 3.7 percent in 2004 was not as high as the 7.4 percent recorded in 1970. From 1983 to 1999, growth in per capita income was largely negative. However, between 2000 and 2015, growth in per capita income was mostly positive (World Bank Open Data, 2022). Around this same period, consumption growth was also positive, but with more fluctuations. These changes in per capita income can lead to income asymmetry, which makes it difficult for the consumption smoothing objectives of economic agents in Africa to be met. Income asymmetry is considered to be the effect of yearly changes in income. It refers to the unequal distribution of income that arises from variations in the magnitude and direction of annual income fluctuations among individuals or groups within an economy. Positive yearly income changes, such as salary increases, bonuses, or investment gains, can exacerbate income asymmetry if they predominantly benefit a small proportion of the population, thereby widening the income gap between high-income earners and those with lower incomes. Conversely, negative yearly income changes, such as income reductions, job losses, or economic downturns, can also contribute to income asymmetry by disproportionately impacting vulnerable individuals or households who were already in lower income brackets, leading to a further concentration of income among a selected few. Income asymmetry has significant economic implications. It can impede economic growth by hindering human capital development, reducing aggregate demand, and limiting opportunities for entrepreneurship and innovation. Moreover, income asymmetry can strain social welfare systems, increase public debt, and create an environment prone to economic instability and political unrest.

This study is unique in that it is about the first paper to estimate the effect of income asymmetry on consumption smoothing in Africa, in the presence of financial integration, which ought to ease the liquidity constrain that comes with negative income asymmetry, in an environment where asymmetry in income leads to unequal income distribution.

Literature is largely silent on the connection of such income asymmetry with consumption smoothing in Africa.

The rest of the paper is structured as thus: a brief literature review is followed by the methodology adopted and the data used in the study. The results of the data analysis are

presented, followed by the discussion of findings; which is followed by conclusion and policy recommendations.

Brief Literature Review

The life cycle model, developed in the 1950s by Franco Modigliani, Albert Ando, and Richard Brumberg postulated that savings, over the lifetime of an individual, can be used to "transfer purchasing power from one phase of life to another" (Parker, 2010, p. 16-8). According to the model, consumers borrow to smooth consumption at the low-income levels; when they earn more, they repay what they have borrowed and accumulate more wealth with higher income, which they spend by dissaving when they retire.

Unlike the permanent income hypothesis that focuses on long-term, or permanent income, the life cycle hypothesis takes into account the entire life cycle of an individual. The life cycle hypothesis proposes that people save during their working years to provide for their retirement when their income is lower or nonexistent.

Additionally, the life cycle hypothesis suggests that people aim to smooth out their consumption over their lifetime, while the permanent income hypothesis assumes that people only adjust their spending and saving habits based on their anticipated long-term income.

Several empirical studies on consumption smoothing have been conducted with LCH as the basis. Such studies include Bloemen and Stancanelli (2005) where consumption smoothing effect of unemployment benefit was tested for the United Kingdom. The Life cycle hypothesis has also been used to study the bahviour of household consumption to digital finance in China (Li, *et al*, 2020)

Krueger and Perri (2005) estimated the effect of income on consumption smoothing in the United States. Using the US Consumer Expenditure Survey, and adopting both the OLS and instrumental variables estimation approaches, the study found that consumption smoothing responded asymmetrically to income shocks, and that there was a stronger response to positive shocks than negative shocks.

Furthermore, in a study on the effect of income asymmetry on consumption smoothing in 2.7 million US households from July 2010 to May 2015 using the fixed effects estimator, Baugh *et al* (2020) found consumption smoothing behavior in households with liquidity constraints and those without liquidity constraints. Specifically, the study found that income asymmetry, which is the difference between positive and negative income shocks affects the ability of households to smooth consumption. Comparing the asymmetric response of risk-sharing and consumption smoothing to income shock between the US and the euro area, Alcidi and Thirion (2016) finds that the US has more risk sharing and consumption smoothing across its states than the euro area countries due to its more advanced capital markets.

The importance of income asymmetry on consumption smoothing in Africa has not been given sufficient attention in literature. Given this dearth of empirical analysis on the relationship between income asymmetry and consumption smoothing in Africa, especially at the macroeconomic level, this study is important.

In view of the insight from the literature reviewed, the working hypotheses for this paper is stated thus:

H1: Consumption smoothing responds to income asymmetry and financial integration in Africa.

H2: Consumption smoothing responds to income asymmetry, moderated by financial integration in Africa.

Methodology and Data

Methodology

Positive and negative changes in income, which ultimately lead to income asymmetry, are not expected to have the same effect on consumption smoothing. Hence, the study hypothesizes that consumption smoothing will have an asymmetric response to income in line with Suzuki (2014), whose work was centered on OECD and non-OECD countries (Emerging Markets) and Faia (2011) whose study was on OECD countries. Before specifying the asymmetric panel ARDL model form of the dynamic common correlated effects estimator, the study decomposes income into its positive ($lpci_{i,t}^{+}$) and negative ($lpci_{i,t}^{-}$) partial sums thus:

$$lpci_{i,t}^{+} = \sum_{j=1}^{t} \Delta lpci_{i,j}^{+} = \sum_{j=1}^{t} max(\Delta lpci_{ij}, 0) \quad (1)$$

$$lpci_{i,t}^{-} = \sum_{j=1}^{t} \Delta lpci_{i,j}^{-} = \sum_{j=1}^{t} min(\Delta lpci_{ij}, 0) \quad (2)$$

Following Shin *et al* (2014), the non-linear ARDL model with the partial sums in equation (1) and (2) is specified in equation (3):

$$\Delta lcs_{i,t} = \alpha_0 + \sum_{j=1}^{p} \alpha_{ij} \Delta lcs_{i,t-j} + \left(\sum_{j=0}^{q} \beta_{ij}^{+} \Delta lpci_{i,t-j}^{+} + \beta_{ij}^{-} \Delta lpci_{i,t-j}^{-} \right)$$
$$+ \sum_{j=0}^{r} \delta_{ij} \Delta fi_{i,t-j} + \sum_{j=0}^{t} \theta_{ij} \Delta lwth_{i,t-j} + \sum_{j=0}^{u} \chi_{ij} \Delta inf_{i,t-j} + \varphi_{1i} lcs_{i,t-1} + \varphi_{2i}^{+} lpci_{i,t-1}^{+} +$$
$$\varphi_{2i}^{-} lpci_{i,t-1}^{-} + \varphi_{3i} fi_{i,t-1} + \varphi_{4i} wth_{i,t-1} + \varphi_{5i}\, inf_{i,t-1} + \varphi_{6i} gfc_{i,t-1} + \mu_i + \varepsilon_{it} \quad (3)$$

Where:

$-\frac{\alpha_0}{\varphi_{1i}}, -\frac{\varphi_{2i}}{\varphi_{1i}}, -\frac{\varphi_{3i}}{\varphi_{1i}}, -\frac{\varphi_{4i}}{\varphi_{1i}}$, $-\frac{\varphi_{5i}}{\varphi_{1i}}$, and $-\frac{\varphi_{6i}}{\varphi_{1i}}$ are the long-run coefficients for the intercept and slope respectively, while $\alpha_{ij}, \beta_{ij}, \delta_{ij}, \theta_{ij}, \; and \; \kappa_{ij}$ are short-run coefficients. $p, q, r, s, and\ t$ are the optimal lags on the first-differenced variables;

$-\frac{\varphi_{2i}^{+}}{\varphi_{1i}}$ and $-\frac{\varphi_{2i}^{-}}{\varphi_{1i}}$ are the long-run coefficients for $lpci_{i,t}^{+}$ and $lpci_{i,t}^{-}$ respectively, while β_{ij}^{+} and $\beta_{ij}^{-}$are short-run coefficients for $lpci_{i,t}^{+}$ and $lpci_{i,t}^{-}$ respectively, the short-run coefficient for the other variables remain the same;

cs; consumption smoothing;
pci; per capita income;
fi; financial integration;
wth; wealth;
inf; inflation;
gfc; global financial crisis;
pci^{+}**fi;* positive income asymmetry moderated by financial integration;
pci^{-}**fi;* negative income asymmetry moderated by financial integration;
Δ; change operator.

The error correction form of equation (3) yields the following:

$$\Delta lcs_{i,t} = \sum_{j=1}^{p} \alpha_{ij} \Delta lcs_{i,t-j} + \left(\sum_{j=0}^{q} \beta_{ij}^{+} \Delta lpci_{i,t-j}^{+} + \beta_{ij}^{-} \Delta lpci_{i,t-j}^{-} \right) + \sum_{j=0}^{r} \delta_{ij} \Delta fi_{i,t-i}$$
$$+ \sum_{j=0}^{s} \chi_{ij} \Delta lwth_{i,t-j} + \sum_{j=0}^{t} \chi_{ij} \Delta inf_{i,t-j} + ecm_{i,t-1} + \nu_{i,t} \quad (4)$$

The $ecm_{i,t-1}$is the speed of adjustment which measures how long it takes the system to converge to the long-run given a shock.

The Effect of Income Asymmetry Mediated by Financial Integration on Consumption Smoothing

The study continues by interacting income asymmetry with financial integration. By incorporating the interaction between income asymmetry and financial integration, this study examines whether the impact of financial integration on consumption smoothing varies across different income groups. This approach helps to determine whether financial integration disproportionately benefits certain segments of the population or exacerbates income disparities. It sheds light on the effectiveness and inclusiveness of financial integration policies in addressing consumption stability in Africa. The model is presented as thus:

$$\Delta lcs_{i,t} = \alpha_0 + \sum_{j=1}^{p} \alpha_{ij} \Delta lcs_{i,t-j} + \left(\sum_{j=0}^{q} \beta_{ij}^{+} \Delta lpci_{i,t-j}^{+} + \beta_{ij}^{-} \Delta lpci_{i,t-j}^{-} \right) + \sum_{j=0}^{r} \delta_{ij} \Delta fi_{i,t-j} + \sum_{j=0}^{t} \theta_{ij} \Delta lwth_{i,t-j} + \sum_{j=0}^{u} \chi_{ij} \Delta inf_{i,t-j} + \left(\sum_{j=0}^{v} \phi_{ij}^{+} \Delta lpci_{i,t-j}^{+} * fi_{i,t-i} + \phi_{ij}^{-} \Delta lpci_{i,t-j}^{-} * fi_{i,t-i} \right) + \varphi_{1i} lcs_{i,t-1} + \varphi_{2i}^{+} lpci_{i,t-1}^{+} + \varphi_{2i}^{-} lpci_{i,t-1}^{-} + \varphi_{3i} fi_{i,t-1} + \varphi_{4i} wth_{i,t-1} + \varphi_{5i} inf_{i,t-1} + \varphi_{5i} gfc_{i,t-1} + \varphi_{6i} lpci_{i,t-j}^{+} * fi_{i,t-i} + \varphi_{7i} lpci_{i,t-j}^{-} * fi_{i,t-i} + \mu_i + \varepsilon_{it} \quad (5)$$

Where:

$-\frac{\varphi_{2i}^{+}}{\varphi_{1i}}$ and $-\frac{\varphi_{2i}^{-}}{\varphi_{1i}}$ are the long-run coefficients for $lpci_{i,t}^{+}$ and $lpci_{i,t}^{-}$ respectively. The other long-run coefficients are as defined in equation (3), while β_{ij}^{+} and $\beta_{ij}^{-}$are short-run coefficients for $lpci_{i,t}^{+}$ and $lpci_{i,t}^{-}$ respectively, the short-run coefficient for the other variables remain the same. The optimal lags remain as earlier defined.

The error correction form of equation (5) yields the following:

$$\Delta lcs_{i,t} = \sum_{j=1}^{p} \alpha_{ij} \Delta lcs_{i,t-j} + \left(\sum_{j=0}^{q} \beta_{ij}^{+} \Delta lpci_{i,t-j}^{+} + \beta_{ij}^{-} \Delta lpci_{i,t-j}^{-} \right) + \sum_{j=0}^{r} \delta_{ij} \Delta fi_{i,t-i} + \sum_{j=0}^{s} \chi_{ij} \Delta wth_{i,t-j} + \sum_{j=0}^{t} \chi_{ij} \Delta inf_{i,t-j} + \left(\sum_{j=0}^{u} \phi_{i}^{+} \Delta lpci_{i,t-j}^{+} * fi_{i,t-j} + \phi_{i}^{-} \Delta lpci_{i,t-j}^{-} * fi_{i,t-j} \right) + ecm_{i,t-1} + \nu_{i,t} \quad (6)$$

The $ecm_{i,t-1}$is the speed of adjustment which measures how long it takes the system to converge to the long-run given a shock.

Data

The study adopts the measure of consumption smoothing by Skoufias (2003), where consumption smoothing is measured as the change in household final consumption. Income is proxied as per capita income, which is real gross domestic per person in each country. In line with Mishra and Daly (2006)**,** the quantity based measures of financial integration is adopted for this study and is presented thus:

The quantity-based measure:

$$IFI_{it} = \frac{FA_{it} + FL_{it}}{GDP_{it}} \quad (7)$$

Other control variables are: wealth which is measured as the index of energy prices; Inflation is measured as annual percentage change in consumer price index (CPI) in country *i* at time *t*; and the GFC which is included in the analysis as a dummy variable, taking 0 before the crisis in 2008 and 1 otherwise.

The sample period for this study runs from 1985 to 2020, while the ten largest countries by per capita income (for which data is available) were chosen for the analysis based on Statista (2022). The sample period is chosen because it helps understanding how the surge in

globalization has impacted risk sharing **(**Kose *et al*., 2006a, b). Household final consumption expenditure is used as proxy for consumption and is obtained from World Bank's World Development Indicators (WDI); data on per capita income is obtained from WDI; data on financial integration is obtained from Lane and Milessi-Feretti (2018), accessed at https://www.brookings.edu/research/the-external-wealth-of-nations-database/. Wealth is proxied as index of energy prices and is obtained at World Bank Commodity Price Data (The Pink Sheet) (the data on wealth came in monthly frequency and is converted to an annual series by summing up the wealth index observation in each month of the quarter. Data on inflation is obtained from WDI while the global financial crisis is a dummy variable that takes 0 for years before 2008, 1 otherwise.

Results

Preliminary Result

Unit root tests and structural break

In Table 1, the result of the IPS panel unit root test is presented followed by structural break test in Table 2. The structural break test is in line with Salisu and Obiora (2021). The test result shows that all the variables, apart from inflation, had a unit root at level, but after first differencing, they no longer have unit roots; that is, the variables are stationary after first differencing. Inflation however is stationary at level.

Table 1. Panel Unit Root Test

Im, Pesaran and Shin (IPS) Test			
Level			**Conclusion**
Series	**Statistic**	**p-value**	
cons	2.1118	0.9826	Not stationary
pci	2.4813	0.9935	Not stationary
wth	0.6302	0.7357	Not stationary
inf	-4.8896	0.0000	Stationary
fi	0.5143	0.6965	Not stationary
First Difference			
cons	-9.6384	0.0000	Stationary
pci	-6.4362	0.0000	Stationary
wth	-10.8896	0.0000	Stationary
inf	-	-	
fi	-8.0274	0.0000	Stationary

Source: Authors' computation (2023) using Stata 15.

Table 2. Structural Break Test

Variable	**Country/Break date**									
	Annual Series									
	Algeria	**Botswana**	**Egypt**	**Eswatini**	**Gabon**	**Morocco**	**Nigeria**	**Rep. of Congo**	**South Africa**	**Tunisia**
cons	2001	2005	2005	1994	2009	2003	2000	2004	2003	2001
pci	2001	2005	1995	2002	1998	2001	2001	2012	2003	1995
fi	2006	2002	2008	2001	2008	2002	2006	2010	2006	2001
inf	1997	2012	1991	1995	1994	1995	1995	2009	1992	1991
wth	2003	2003	2003	2003	2003	2003	2003	2003	2003	2003

Source: Authors' computation (2023) using Stata 15.

Cointegration Test

In Table 3, the results of both Kao and Pedroni tests of cointegration are presented. The results indicate that the series possess a long-run relationship, despite having different points at which they are stationary.

Table 3. Kao and Pedroni Cointegration Tests

Kao Test		
Test	**Statistic**	**p-value**
Modified Dickey-Fuller t	-1.5094	0.0656
Dickey-Fuller t	-2.0380	0.0208
Augmented Dickey-Fuller t	-0.9719	0.1656
Unadjusted modified Dickey-Fuller t	-8.3016	0.0000
Unadjusted Dickey-Fuller t	-4.9564	0.0000
Pedroni Test		
Modified Phillips-Perron t	1.8588	0.0315
Phillips-Perron t	-2.1384	0.0162
Augmented Dickey-Fuller t	-1.3025	0.0964

Source: Authors' computation (2023) using Stata 15.

Cross-sectional Dependence Test

In Table 4, the result of the cross-sectional dependence test is reported. Result shows strong cross-sectional dependence, hence the need for the *xtdce* estimator which handles panels with cross-sectional dependency.

Table 4. Cross sectional Dependence Test

Variable	**Alpha**	**Standard error**	**95% confidence interval**	
cons	0.4970	0.2350	0.0365	0.9575
pci	0.8517	0.0631	0.7282	0.9753
wth	1.0061	0.1507	0.7107	1.3016
inf	0.6595	0.8551	-1.0165	2.3355
fi	0.6271	0.0431	0.5426	0.7116

Note: 0.5 <= alpha < 1 implies strong cross-sectional dependence.

Source: Authors' computation (2023) using Stata 15.

Main Analysis

The study uses Shin et al (2014) method to find asymmetry in income, and thereafter regress consumption smoothing on income asymmetry, financial integration and control variables. Thereafter, income asymmetries are interacted with financial integration, on which consumption smoothing is regressed.

Effect on Consumption Smoothing of Income Asymmetry and Financial Integration

The result presented in Table 5 tests the first hypothesis. The estimated result shows that the lag in consumption smoothing exerts a positive effect on consumption smoothing in the current period. Furthermore, the result of the analysis presented in Table 5 shows that asymmetry exists in income only in the short run, this is due to a significant Wald test result ($P<0.01$).

Table 5. The Dynamic Common Correlated Effects Estimation of the Effect of Income Asymmetry on Consumption Smoothing

Statistics	Coefficient	Std. Err	z-stat	P-value
Short run estimates				
cons (-1)	0.1723	0.1326	1.30	0.194
pci^+	-0.7365	0.2987	-2.47	0.014
pci^-	0.8541	0.3216	2.66	0.008
wth	0.0111	0.0145	0.77	0.444
inf	-0.0043	0.0046	-0.92	0.360
fi	-0.0174	0.0979	-0.18	0.859
ect	-0.2392	0.07222	-3.31	0.001
Wald (F) Test	13.74***			
Asymmetry?	Yes			
Long run estimates				
pci^+	3.2595	1.5009	2.17	0.019
pci^-	-0.6813	1.9048	-0.36	0.721
wth	-0.0605	0.0520	-1.16	0.245
inf	0.00002	0.0093	0.00	0.998
fi	0.0619	0.2407	0.26	0.797
gfc	0.2101	0.0711	2.95	0.003
Wald (F) Test	1.86			
Asymmetry?	No			
R^2	0.30			
F-stat	3.03**			

Note: "*", "**" and "***" represent probability values are 10%, 5% and 1% respectively. Income+ and Income- refer to positive and negative income asymmetries respectively.

Source: Authors' computation (2023) using Stata 15.

In the short run, we observe that positive income asymmetry exerts a negative effect on consumption smoothing, contrary to expectations. Positive income asymmetry is associated with a decrease in consumption smoothing, where every one percent increase in positive income asymmetry leads to a 0.7 percent decrease in consumption smoothing. The relationship between positive income asymmetry and consumption smoothing is statistically significant ($P<0.05$). Additionally, we observe a positive effect of negative income asymmetry on consumption smoothing. According to the estimated results, a one percent rise in negative income asymmetry leads to an increase of approximately 0.85 percent in consumption smoothing. This effect is statistically significant ($P<0.01$). Surprisingly, financial integration is found to be negatively related to consumption smoothing, contradicting our initial expectations. The estimated results indicate that a one percent increase in financial integration results in a 0.02 percent decrease in consumption smoothing, although this effect is not statistically significant ($P>0.05$). Conversely, wealth has the expected positive effect on consumption smoothing, with a rise of approximately 0.01 percent for every one percent increase in wealth. However, this relationship is not statistically significant ($P>0.05$). Lastly, inflation negatively affects consumption smoothing, as anticipated. A one percent increase in inflation leads to a decline of around 0.004 percent in consumption smoothing, but this effect is not statistically significant ($P>0.05$). The error correction term (ect) in the estimated results is negative, less than 1, and statistically significant, as expected for establishing long-run equilibrium. According to the ect result, approximately 24 percent of the distortions to the long-run equilibrium in the system are recovered after one year. Hence, the system is projected to take approximately four years to fully recover from short-run deviations from the long-run equilibrium path.

In the long run, there is no observed income asymmetry based on the non-significant Wald test ($P>0.05$). Consequently, the long-run asymmetry will not be interpreted. However, financial integration is found to depress consumption smoothing, where a one percent rise in financial integration results in a 0.06 percent decline in consumption smoothing. Nevertheless, this effect

is not statistically significant (P>0.05). The effect of wealth on consumption smoothing is negative, with a decrease of approximately 0.06 percent in consumption smoothing for every one percent increase in wealth. However, this effect is also not statistically significant (P>0.05). On the other hand, inflation has a positive but negligible effect on consumption smoothing, which is statistically insignificant (P>0.05). During the global financial crisis, consumption smoothing experiences a 22.7 percent increase, whereas without the crisis, it declines by about 18.5 percent.

Having established the presence of income asymmetry in the short run, we proceed to examine whether their effects on consumption smoothing change when interacted with financial integration. The detailed results can be found in Table 6.

The result presented in Table 5 largely shows that the first hypothesis of this study is accepted; which states that consumption smoothing responds to income asymmetry and financial integration in Africa

Effect on Consumption Smoothing of Income Asymmetry Moderated by Financial Integration

The result presented in Table 6 tests the second hypothesis. In Table 6, the study further explores whether the interaction of positive income asymmetry with financial integration yields a positive effect on consumption smoothing. Additionally, the study investigates whether the positive effect of negative income asymmetry on consumption smoothing in the short run remains when interacted with financial integration.

In the short run, positive income asymmetry is observed to have a negative effect on consumption smoothing. Specifically, when positive income asymmetry is interacted with financial integration, it is associated with a decline in consumption smoothing. For every 1 percent increase in positive income asymmetry moderated by financial integration, consumption smoothing decreases by approximately 3.9 percent. However, the effect of positive income asymmetry moderated by financial integration is even more significant (P<0.05).

Table 6. The Dynamic Common Correlated Effects Estimate of the Effect of Income Asymmetry moderated with financial integration on consumption smoothing

Statistics	Coefficient	Std. Err	z-stat	P-value
Short run estimates				
cons (-1)	0.1895	0.1339	1.42	0.157
pci^+	-3.7772	1.7415	-2.17	0.030
pci^-	-1.7109	1.4572	-1.17	0.240
fi	0.0708	0.1042	0.68	0.497
pci^+*fi	-3.8545	1.8710	-2.06	0.039
pci^-*fi	-1.8029	1.5354	-1.17	0.240
wth	0.0166	0.0144	1.15	0.249
inf	-0.0056	0.0052	-1.08	0.279
ect	-0.2420	2.6312	-0.09	0.927
Long run estimates				
pci^+	-3.6937	113.6183	-0.03	0.974
pci^-	1.9204	161.8026	0.01	0.991
fi	0.1078	4.3555	0.02	0.980
pci^+*fi	-4.2746	122.3425	-0.03	0.972
pci^-*fi	2.0810	172.0414	0.01	0.990
wth	-0.0570	0.8167	-0.07	0.944
inf	0.0015	0.0261	0.06	0.953
gfc	0.2208	0.0649	3.40	0.001
R^2	0.20			
F-stat	2.38***			

Note: "*", "**" and "***" represent probability values are 10%, 5% and 1% respectively. Income+ and Income- refer to positive and negative income asymmetries respectively.

Source: Authors' computation (2023) using Stata 15.

In the short run, it is further observed that the interaction effect of negative income asymmetry with financial integration on consumption smoothing is negative. According to the estimated results, for every 1 percent increase in negative income asymmetry moderated by financial integration, consumption smoothing decreases by approximately 1.8 percent. However, this effect is not statistically significant (P>0.05). Financial integration on its own is found to be positively related to consumption smoothing. The estimated results indicate that for every 1 percent rise in financial integration, consumption smoothing increases by about 0.07 percent, but this relationship is not statistically significant (P>0.05). Additionally, wealth has a positive effect on consumption smoothing, where consumption smoothing increases by approximately 0.02 percent for every 1 percent rise in wealth. However, this relationship is not statistically significant (P>0.05). Moreover, inflation has a negative effect on consumption smoothing, with a decline of about 0.006 percent in consumption smoothing for every 1 percent increase in inflation. Nevertheless, this effect is not statistically significant (P>0.05). The error correction term in the estimated model is not negative and less than one, and it is not statistically significant. Hence, the estimated model does not meet the criteria for the long-run speed of adjustment.

In the long run, as mentioned earlier, there is no observed income asymmetry, as the Wald test is not statistically significant (P>0.05). Therefore, interpretation will be focused on the interaction effect of financial integration and income asymmetry on consumption smoothing. The estimated results indicate that positive income asymmetry, when interacted with financial integration, is associated with a decline in consumption smoothing. For every 1 percent increase in positive income asymmetry moderated by financial integration, consumption smoothing falls by approximately 4.3 percent. However, this relationship is not statistically significant (P>0.05). Furthermore, the effect of negative income asymmetry, when interacted with financial integration, on consumption smoothing is positive. Hence, for every 1 percent rise in negative income asymmetry moderated by financial integration, consumption smoothing increases by about 1.8 percent. Nevertheless, this effect is not statistically significant (P>0.05). Financial integration on its own is found to be positively related to consumption smoothing. The estimated results show that for every 1 percent increase in financial integration, consumption smoothing increases by about 0.1 percent, but this relationship is not statistically significant (P>0.05). Conversely, wealth has a negative effect on consumption smoothing, resulting in a decline of approximately 0.06 percent in consumption smoothing for every 1 percent increase in wealth. However, this relationship is not statistically significant (P>0.05). Additionally, inflation has a positive effect on consumption smoothing, with an increase of about 0.002 percent in consumption smoothing for every 1 percent rise in inflation. Nonetheless, this effect is not statistically significant (P>0.05)

The result presented in Table 6 largely shows that the second hypothesis of this study is rejected. The hypothesis states that consumption smoothing responds to income asymmetry, moderated by financial integration in Africa.

Discussion of Findings

This study considers that Krueger and Perri (2005) posit the importance of considering income asymmetry in the model of the income-consumption smoothing nexus. The findings in this study reveal the importance of modeling the income-consumption smoothing nexus with asymmetry in income recognized. From the results displayed in Table 5, significant asymmetry in income in the short run is found.

The results reveal that for most households in Africa, where income insurance outside their earned income is very limited, a positive income asymmetry in the short run may become an opportunity to save more as to be able to smooth consumption in the long run (which is an outcome found in the long-run effect of positive income asymmetry on consumption smoothing), leading to a decline in consumption smoothing in the short run.

Furthermore, a careful look at the results reveals that African economies reduce consumption smoothing when they experience positive income asymmetry in the short run. When households experience positive income asymmetry, there may be a greater incentive to seek investment or saving opportunities abroad using the channel of financial integration. This can happen through capital outflows, such as investing in foreign assets, opening offshore accounts, or engaging in other forms of international financial transactions.

By moving funds out of the country, these individuals or entities may divert resources that could be used for consumption smoothing within the domestic economy. Instead of saving or investing domestically, they choose to allocate their resources internationally, potentially leading to a reduction in the availability of financial resources for consumption smoothing purposes.

Whereas the findings of this study did not affirm consumption smoothing in the presence of income asymmetry, especially with financial integration, the study by Alcidi and Thirion (2016) showed that consumption smoothing in the presence of income asymmetries is better achieved with financial integration. Unlike this study, Alcidi and Thirion (2016) showed that where an economy is more financially integrated, like the US economy (and unlike the economies in the US), consumption smoothing is achieved when asymmetry in income is present.

Conclusion and Policy Recommendation

This study sheds light on the factors influencing consumption smoothing in Africa and emphasizes their significance for policymakers and economists in today's interconnected global economy. By examining the effect of income, income asymmetry, and financial integration on consumption smoothing using panel data from 10 countries over the period 1985-2020, the study reveals several important findings.

Firstly, the study identifies the presence of income asymmetry in the short run, as evidenced by the significance of the Wald test for asymmetry. Specifically, positive income asymmetry and negative income asymmetry both exert statistically significant effects on consumption smoothing, highlighting the non-linear relationship between income shocks and consumption behavior.

Moreover, in the long run, positive income asymmetry demonstrates a significant effect on consumption smoothing. This finding suggests that persistent positive income shocks can have a lasting impact on consumption patterns, indicating the importance of understanding and managing long-term income fluctuations for individuals and policymakers.

Additionally, the study explores the interaction between income asymmetry and financial integration. In the short run, the interaction of positive income asymmetry and financial integration demonstrates a significant effect on consumption smoothing. This highlights the potential vulnerability of consumption smoothing to external shocks transmitted through international financial flows.

Based on the findings of the study, it is recommended that governments could consider implementing regulations and controls on international financial flows to limit the impact of external shocks. However, implementation of capital controls should be carefully designed and balanced to avoid unintended consequences, such as inhibiting foreign direct investment or impeding economic efficiency. Additionally, other complementary policies, such as promoting

domestic productivity and diversification, improving financial regulation and supervision, and fostering inclusive growth, should also be considered to support consumption smoothing and overall economic development.

This study is by no means perfect. For example, only ten countries were sampled. Future studies may expand on this by sampling more countries across Africa, to the extent that data is available. Furthermore, future studies may consider studying individual countries in a comparative time series analysis to find out the countries that account for the income asymmetries identified in the short run, and possibly uncover countries with long run income asymmetries and their effect on consumption smoothing.

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