The financial inclusion–economic growth nexus: what is new now?

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Abstract

Purpose – This paper examines the nexus between financial inclusion and the economic growth of an emerging market.

Design/methodology/approach – We use dataset from the World Bank and Heritage Foundations over the period 2005–2016 and fully modified least squares (FMOLS) and dynamic OLS (DOLS) to examine the financial inclusion–economic growth nexus in Ghana.

Findings – We document a negative relationship between financial inclusion and economic growth, and the causal nexus is unidirectional from financial access to GDP. Financial penetration, however, causes GDP growth, and GDP growth also causes financial penetration. We also document that IT infrastructure, the depth of financial services, employment and inflation drive economic growth in an emerging market.

Practical implications – The findings support international calls to prioritize financial penetration policies geared toward greater economic growth.

Originality/value – The paper adds to extant literature by highlighting new empirical insights on the financial inclusion–economic growth nexus from a sub-Saharan Africa market perspective.

Keywords Financial access and penetration, Sustainable development, Africa, Macroeconomics, Emerging markets

1. Introduction

Financial inclusion has continuously attained global attention among policymakers and researchers due to its potential value in leading to rapid economic growth for most developing countries (Nsiah et al., 2021; Nizam et al., 2020). For instance, financial inclusion helps to eradicate poverty, increase wealth distribution and support inclusive and sustainable development (Petkovski and Kjosevski, 2014). Notwithstanding the significant role of financial inclusion, emerging markets, especially the African regions, have low financial inclusion than developed nations (Adeola and Evans, 2017; Appiah et al., 2023; Zins and Weill, 2016). For instance, over 2.7 billion adults in Africa cannot access proper financial services (Demirgüç-Kunt and Levine, 2009), and 48% of sub-Saharan Africans live on less than $1.25 per day (World Bank, 2015). To reverse that trend, financial inclusion, which is all-inclusive, plays a vital role in sustainable development, economic growth and poverty

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reduction (Achugamonu et al., 2020; Magazzino et al., 2021; Kim et al., 2018; Nsiah et al., 2021; Ozili, 2022; Zins and Weill, 2016).

An important question upstretched in the existing literature is: does financial inclusion affect economic growth? However, prior studies’ findings on the financial inclusion–economic growth nexus are uncertain (Nizam et al., 2020). For instance, while Gul et al. (2018), Raza et al. (2019) and Kim et al. (2018) report a positive relationship between financial inclusion and economic growth; Nkewede (2015) reports an inverse nexus between financial inclusion and economic growth. Also, most prior studies focus on financial inclusion drivers, neglecting some key macroeconomic variables that can be considered control variables (Magazzino and Santeramo, 2023). Thus, we investigate whether financial inclusion (access, usage and penetration or depth) affects economic growth (GDP growth) while controlling for inflation, employment, rural population, business freedom, financial freedom, foreign direct investments, exports of goods and services and the level of IT infrastructure in an African region.

Using available secondary data from the World Bank and the Heritage Foundations for 12 years (2005–2016), we find a negative relationship between financial access and GDP growth, and the causal nexus is unidirectional from financial access to GDP. Additionally, we find that causality runs from the usage of financial services to GDP growth, but GDP growth does not Granger cause. Our result reveals that the level of financial penetration causes GDP growth, and GDP growth also causes financial penetration. IT infrastructure, the depth of financial services, employment and inflation are the key determinants of economic growth concerning financial inclusion.

Our study’s contributions are fourfold. First, we examine whether financial inclusion affects economic growth from an emerging market perspective. There is no empirical study on the financial inclusion–economic growth nexus while controlling macroeconomic indicators in Ghana. Henceforth, existing literature may be inapplicable in Ghana due to different economic and financial inclusion indicators. For instance, Ghana recorded annual economic growth of 2.9% in 2023 against 3.8% in 2022, with less than 50% of the over 33 mn population having an account with formal financial institutions. For this reason, the study’s findings are significant for policymakers and regulators in making more inclusive policies for economic growth and development. Policymakers or governments in developing countries have a significant role in strategically creating environments for improved access and unlocking the population’s economic potential. Put differently, the study can provide the government with an understanding of the financial inclusion dimensions of the economic growth of the country. Three regulatory institutions, commercial banks and other microfinance institutions, and educational institutions will find this study useful in the expedition to understand financial inclusion and economic growth. Finally, the study extends the extant literature on the financial inclusion–economic growth nexus by examining a dataset of emerging market contexts.

The structure of the study continues as follows: Section 2 presents literature reviews. Sections 3 and 4 present the methods and results, respectively. Section 5 provides the concluding remarks of the study.

2. Literature reviews
Financial inclusion has become a worldwide challenge, especially in the sub-Saharan African regions (Grohmann et al., 2018; Nsiah et al., 2021). African regions are historically lagging in terms of financial systems as compared to developed countries. The Standard Chartered Bank (2014) indicates that Ghana, Nigeria and Uganda are among the countries that are least financially inclusive globally, while Egypt is the least on the bottom, with 5% of the population above 18 years owning a debit or credit card, while less than 1% had access to...
savings as of 2013. More must be done to bridge the financial exclusion gap since Africa’s financial system lags than other economies.

Researchers have overlooked prior studies on the financial inclusion–growth (or development) nexus, and existing findings on financial inclusion determinants are inconclusive and contradictory (Khatun and Bist, 2019; Migap et al., 2015; Nizam et al., 2020). For instance, Cyn-Young and Rogelio’s (2015) study finds that financial inclusion is significantly affected by demographic and per capita income factors, and income inequality and poverty are reduced by financial inclusion. Joseph and Varghese’s (2014) study, however, found in a developing economy report that drivers of financial inclusion include onsite and offsite ATM usage, the number of bank branches, credit cards and debit cards per usage. Allen et al. (2014) also report that financial inclusion and development depend on African population density and that financial innovations and mobile banking usage can reduce financial exclusiveness. A recent paper by Ozili (2020) also provided different financial inclusion drivers across every country. According to Ozili (2020), financial literacy, a stable economy, poverty levels, regulatory structures, a stable financial sector and financial innovation are the determinants of financial inclusion.

Regarding the relationship between financial inclusion and economic growth, a Gul et al. (2018) international study reports a positive nexus between financial inclusion and economic growth among 185 countries worldwide. Likewise, Raza et al.’s (2019) empirical results show that financial inclusion increases economic development in an emerging market. However, Nkwede (2015) finds that financial inclusion decreases economic growth in an emerging market and concludes that a negative relationship exists between financial inclusion and economic growth due to the high levels of financial exclusion of adults from financial services. Demirguc-Kunt and Klapper (2012) examined an overview of financial inclusion in Africa using descriptive statistics, and it was established that less than a quarter of African adults have accounts with formal financial institutions, but a significant number save and borrow from informal institutions. It was found that 23% of adult Africans have accounts at a formal financial institution, and about 77% remain unbanked (do not have a bank account at a formal financial institution).

Per the extant literature, it can be concluded that financial inclusion is of great importance for the economic growth of a country (Achugamou et al., 2020; Nsiah et al., 2021; Nizam et al., 2020). However, the arguments for financial inclusion and its relationship with economic growth, both theoretical and empirical, are relatively contemporary and weak (Nsiah et al., 2021). Indeed, there is a worthy reason to examine the financial inclusion–economic growth nexus, particularly in emerging markets. This study, therefore, seeks to fill the eminent knowledge gap in the relationship between financial inclusion and economic growth in an emerging country, Ghana.

3. Methods
3.1 Design and sample
The study quantitatively examines and validates the relationship between financial inclusion and economic growth in Ghana. Time series data for Ghana is already accessible when collecting data from the World Bank and Heritage Foundation databases. We find that the majority of the data after 2016 is missing after screening the data. We remove the missing years and focus on complete time series data for the variable. Thus, our final usable data includes 12-year data from 2005 to 2016 for discussion.

3.2 Variables and measures
We use GDP growth as the dependent variable to represent economic growth (David and Grobler, 2020; De La Fuente-Mella et al., 2020; Sbia et al., 2017). Three dimensions of financial
inclusion, access, usage and penetration/depth are used as the independent variables. The specific independent variables are the number of bank branches (per 100,000 adults) as a proxy for the access dimension, the number of deposit accounts with commercial banks (per 1,000 adult population) as a proxy for the usage dimension and the amount of domestic credit to the private sector as a percentage of GDP as a proxy for the penetration/depth dimension (Ozili, 2022). We also control for inflation, employment (as a percentage of the total population), rural population (as a percentage of the total population), business freedom, financial freedom, foreign direct investments, exports of goods and services and the level of IT infrastructure (Korsah et al., 2022).

3.3 Estimation and data analysis techniques
Since ordinary least squares (OLS) estimators do not have asymptotic t-distributions (Enders, 1995; Wooldridge, 2003; Korsah and Gyimah, 2019), we adopt the fully modified least squares (FMOLS) developed by Phillips and Hansen (1990) and dynamic OLS, ahead of other popular approaches to cointegration method to derive the long-run equilibrium implied by (1). The FMOLS employs a semi-parametric correction to remove the problems triggered by the long-run correlation between the cointegrating equation and stochastic regressors innovations.

Phillips (1995) proves that the FMOLS procedure is reliable in the case of full rank or cointegrated I(1) regressors as well as with I(0) regressors. In such cases, the limit theory of the fully modified (FM) estimates of the stationary components of the regressors is equivalent to that of OLS, while the FM estimates of the non-stationary components retain their optimality properties (that is, they are asymptotically equivalent to the maximum likelihood estimates of the cointegrating matrix). Additionally, the finite sample performance of the FMOLS is reliable in many simulation studies, and the estimates are consistent even in the absence of cointegration and hence do not require predetermination of the cointegration rank.

3.4 Data analysis technique
We use Eviews 12.0 to analyze annual growth reports and information from 2005 to 2016. The econometric model is as follows:

\[
GDP_{t} = \beta_0 + \beta_1 X_i + \beta_2 AD + \beta_3 UD + \beta_4 PD + \varepsilon_t \quad (1)
\]

\(X_i = \text{measure control variables}\)
\(\beta_2 > 0\)
\(\beta_3 > 0\)
\(\beta_4 > 0\)
\(\varepsilon_t = \text{error term}\)
\(\beta_0 = \text{Constant term}\)

We use descriptive statistics to assess the trend relationship between financial inclusion and economic growth in Ghana for the study period. We also use the augmented Dickey–Fuller or ADF (\(p\)) test (Dickey and Fuller, 1979, 1981) and Philips–Perron, PP test (Phillips and Perron, 1988) to test for a unit root in the variables. An ADF test here consists of estimating the following regression:
\[ \Delta Z_t = \beta_1 + \beta_2 t + \delta Z_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Z_{t-i} + \epsilon_t \]  

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where \( Z_t \) is the time series under consideration, \( \epsilon_t \) is white noise error, \( t \) is the trend, \( \beta_1 \) is drift and \( \delta = \rho - 1 \). The number of lagged difference terms to include is determined empirically, which is to include enough terms so that the error term is serially uncorrelated. If the null hypothesis that \( \delta = 0 \) is rejected, the series is stationary. Unfortunately, under the null hypothesis that \( \delta = 0 \) (\( \rho = 1 \)), the \( t \) value of the estimated \( Z_{t-1} \) does not follow the \( t \) distribution even in large samples; it does not have an asymptotic normal distribution. Dickey and Fuller (1981) show that under the null hypothesis that \( \delta = 0 \), the estimated \( t \) value of the coefficient of \( Z_{t-1} \) follows the \( \tau \) (tau) statistic. These authors have computed the critical values of the \( \tau \) statistic based on Monte Carlo simulation.

3.4.1 Cointegration and Granger causality tests. Advances in econometrics have resulted in several techniques for estimating the cointegration equation (Engle and Granger, 1987; Johansen, 1991; Pesaran et al., 2001). The study employs Pesaran et al. (2001) to investigate the relationships among the indicators. To analyze the causal relationship between financial inclusion and economic development, we focus on causality among the indicators of financial inclusion and economic growth using the method developed by Granger (1969). The Granger causality test is one of the most stimulating and extensively used VAR applications. The understanding behind the Granger causality test is that if preceding values of a variable \( X \) significantly influence the current values of another variable \( Y \), then it can be inferred that \( X \) Granger causes \( Y \), which implies that \( X \) is instrumental in predicting \( Y \). A general specification of the Granger causality test in a bivariate (\( X, Y \)) context can be expressed as:

\[ Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \cdots + \alpha_i Y_{t-i} + \beta_1 X_{t-1} + \cdots + \beta_i X_{t-i} + \epsilon_t \]  

(3)

\[ X_t = \alpha_0 + \alpha_1 X_{t-1} + \cdots + \alpha_i X_{t-i} + \beta_1 Y_{t-1} + \cdots + \beta_i Y_{t-i} + \epsilon_t \]  

(4)

Since the independent variables are identical for each equation, this specification guarantees that the error term is not correlated between the two equations and gives room to use OLS. In the model specified, the subscripts denote periods and \( \epsilon_t \) is the error term or white noise error. The constant parameter denotes the constant growth rate of \( X \) in equation (4) and \( Y \) in equation (3), and thus, the pattern in these variables can be inferred as general movements of these time series in reaction to a change in economic growth. Consequently, this test involves the examination of the statistical significance of the parameters of \( X \) in Equation (4) and those of \( Y \) in Equation (3). For example, the null hypothesis of \( X \), not Granger-causing \( Y \), is tested using the joint parameter restrictions \( \beta_1 = \beta_2 = \ldots \beta_i = 0 \). Acceptance of this restriction raises evidence for the above null of non-causality.

4. Results
4.1 Trend analysis of financial inclusion and economic growth

We present the trend analysis of the financial inclusion–economic growth nexus from 2005 to 2016. The variables we considered are GDP growth, the number of bank branches (per 100,000 adults), the number of deposit accounts with commercial banks (per 1,000 adult populations) and the amount of domestic credit to the private sector as a percentage of GDP. Other indicators are the employment of population ratio, inflation (consumer price index–annual percentage), mobile cellular subscriptions (IT infrastructure), rural population (percentage of the total population), business freedom and financial freedom. Figures 1–7 show the trend analysis.
Figure 1.
GDP growth from 2005 to 2016

Source(s): World Development Indicators

Figure 2.
The number of commercial bank branches per 100,000 adults

Source(s): World Development Indicators

Figure 3.
The number of deposit accounts with commercial banks per 1,000 adults

Source(s): World Development Indicators
Figure 4. The amount of domestic credit to the private sector as a Percentage

Source(s): World Development Indicators

Figure 5. Business freedom

Source(s): World Development Indicators

Figure 6. Financial freedom

Source(s): World Development Indicators
Figure 1 shows that there is a decline in GDP growth in the periods’ understudy. Figure 2 also shows an increase in the number of commercial bank branches per 100,000 adults from 2005 to 2016. This shows that, over the 12 years, access to financial services has increased. In terms of the number of deposit accounts with commercial banks per 1,000 adults, Figure 3 shows a “U-shape” between 2005 and 2012, indicating that the number of deposit accounts with commercial banks per 1,000 adults decreases, reaches a minimum, and starts increasing again in the 2005 fiscal year. Figure 4 provides an upward increase in the amount of domestic credit to the private sector as a percentage of GDP between 2005 and 2009; however, there is a decrease between 2010 and 2012. The business freedom trend shown in Figure 5 indicates a constant mean from 2008 to 2016, where the series is between 64.64 (minimum recorded financial freedom) and 65.82 in 2015 (maximum recorded financial freedom). The indicator decreased steeply in 2005, from 65.38 to 62.15. In 2007, it increased from 62.15 to 65.18 and from then on, the series continued to experience ups and downs up to 2016. The financial freedom trend in Figure 6 shows a constant trend from 2005 to 2015, and finally, Figure 7 shows the trend of the control variables, namely, inflation, employment and IT infrastructure. IT infrastructure shows an upward trend from 2005 to 2016, but inflation shows a decreasing trend. The employment trend had a quadratic characteristic; between 2005 and 2009, there was an inverse “U-shape”, and “U-shape” between 2009 and 2013, there was an upward trend from 2013 to 2016.

4.2 Preliminary test results
We use multiple models to estimate the relationship between financial inclusion and economic growth from 2005 to 2016. We use econometric methods such as random effects, fully modified OLS (FMOLS) and dynamic OLS (DOLS) in the analysis. Since there is existing literature and arguments that OLS results might be biased due to the failure to control time-invariant heterogeneity (see Bevan and Danbolt, 2004), we, therefore, use an estimation of panel data analysis in our study. The decision to use random is confirmed based on the fixed
effects estimate. It shows that one can reject the null hypothesis of no unobservable time-invariant country-specific effects (i.e. $\mu_i = 0$) in the sample for Models 1, 2 and 3, respectively. This indicates that bias and inefficacy may appear in the reported OLS estimates simultaneously, implying that its estimation is no longer the best linear unbiased estimator (BLUE). Hence, the result of panel data analysis is adopted for our study. The number of observations and the model specification produced insufficient data, and therefore, cointegration would not be a problem due to the sample size. Fully modified OLS and dynamic OLS are used to establish the nexus between GDP growth and financial inclusion because of the distribution of the series.

4.2.1 Diagnostic and robustness tests. We use a three-stage procedure in testing for the direction of causality. The first stage involves testing the order of integration using ADF and Phillips–Perron (PP) unit root tests. Typically, the unit root is a phenomenon of time series, but testing for stationarity for a panel might aid in avoiding unrelated regression estimation. We employ the ADF to test the stationarity of variables. Choi (2001) argues that the inverse Chi-square test is most appropriate and efficient when testing for the panel dataset.

To preclude spurious results, it is necessary to carry out a unit root test to confirm the order of integration of each series. At the 5% significance level, the ADF test statistics for the panel data for access, usage, penetration, employment rate, business freedom, financial freedom and export variables, we could not reject the null of a unit root at a level, meaning that the variables are nonstationary at the level. Nevertheless, in the first differences, the ADF and Phillips–Perron test statistics automatically reject the null of a unit root at the 5% significance level. Therefore, the unit root test results suggest that the variables follow the I(1) process. However, the GDP growth rate, inflation rate and IT infrastructure are stationary at this level.

The second stage is to establish the direction of causality, which involves constructing Granger causality tests to determine the link between financial inclusion, economic growth and the sectors of the economy. Following the Granger causality test (see Tables 1 and 2), the direction of causality is determined as it contains both short- and long-run causality information. The result in Table 1 shows bidirectional causality between penetration and economic output. This is consistent with the vast empirical literature which emphasizes the nexus between finance and growth as well as the view that the development of the financial system fosters growth via either a supply-leading (financial development encourages growth) or a demand-following (growth leads to demand for financial products) channel (Dinga et al., 2023; King and Levine, 1993; Rajan and Zingales, 2003).

The third and final stage is to choose between fixed and random effects for the regression analysis. We use the Hausman test to determine whether the data fit into a fixed or random-
effects model. We operate on the null hypothesis that the data follows the random-effects model. The null hypothesis is rejected, and we used the fixed-effect model. Following the sensitivity tests conducted, it is evident that system FMOLS and DOLS estimation would provide reliable and consistent estimates for the study models.

4.3 Discussion of results

4.3.1 Financial access and GDP growth. Table 3 reports the econometric results of the models used for the study. We report a negative relationship between financial access and economic growth. The models do not support the view that a more inclusive financial system (defined by the availability of more bank branches) propels growth. This disagrees with previous findings that generally held the view that financial access promotes economic growth.

The fully modified OLS produced significant negative relationships, whereas the random effect and dynamic OLS show an insignificant negative relationship between the number of bank branches in the economies and GDP growth from 2005 to 2016. The study supports the findings of Joseph and Varghese (2014) that many people are still excluded from financial services, although inclusive banking initiatives have been introduced in some countries. Some countries saw significant improvement and financial stability due to financial inclusion.

Country-wise OLS regression using stationary series reveals Ghana’s results have a negative relationship between the number of bank branches (per 100,000 adults) and GDP growth; however, this relationship is insignificant. According to Seman (2018), the indicator of access to financial services varies across regions of the developing world and therefore, the results might be different for different regions and economies. Our study supports the view that the influences of some of the indicators of access are geographically determined and

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<td>-ve</td>
</tr>
<tr>
<td>Exports</td>
<td>0.417</td>
<td>0.000</td>
<td>+ve</td>
<td>0.2089</td>
<td>0.0425</td>
<td>+ve</td>
<td>0.3456</td>
<td>0.0000</td>
<td>+ve</td>
</tr>
<tr>
<td>Foreign</td>
<td>1.056</td>
<td>0.000</td>
<td>+ve</td>
<td>0.7299</td>
<td>0.0236</td>
<td>+ve</td>
<td>1.3161</td>
<td>0.0000</td>
<td>+ve</td>
</tr>
<tr>
<td>Employ</td>
<td>-0.966</td>
<td>0.005</td>
<td>-ve</td>
<td>0.2588</td>
<td>0.0364</td>
<td>+ve</td>
<td>-0.7713</td>
<td>0.0072</td>
<td>-ve</td>
</tr>
<tr>
<td>Inflation</td>
<td>-0.539</td>
<td>0.000</td>
<td>-ve</td>
<td>-0.5497</td>
<td>0.0005</td>
<td>+ve</td>
<td>-0.3730</td>
<td>0.0008</td>
<td>-ve</td>
</tr>
<tr>
<td>_cons</td>
<td>124.493</td>
<td>0.000</td>
<td></td>
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</tbody>
</table>

Model strength: \( R^2 = 0.779 \), \( P \)-value of Chi-square = 0.000

Source(s): Table by authors

Table 3. Estimation results for random effect, DOLS and FMOLS.
hence shows that the processes of geographically uneven capitalist economic development shape and mediate access. In this regard, the region could be a plausible factor in shaping financial inclusion.

Again, the finding in this study raises many questions about access to financial services and economic growth since, according to the World Bank (2015), access to financial services will enable individuals, households and businesses to effectively balance income and expenses over the long term, manage shocks and invest in developing human and physical capital. Most importantly, efficient intermediation encourages savers, facilitates access to credit for borrowers and lowers interest rates and credit costs, reducing the overall transaction costs for enterprises and making them more competitive. The end product of the situation is to increase national income. However, the findings in this study show a negative relationship, implying that GDP growth reduces as more people access financial services.

Also, the findings of Demetriades and Hussein (1996), after examining various causality tests between financial development and economic growth for 16 developing countries, reveal “considerable evidence of bi-directionality and some evidence of reverse causation.” Demetriades and Hussein (1996), therefore, caution against accepting the generalization of finance leading growth and caution of the significance of such predisposed findings in economic policy, especially for developing countries. In another breadth, such criticism has also been advanced by Neusser and Kugler (1998). Also, Nkwede (2015) found a negative relationship between financial inclusion and growth due to adults’ high financial exclusion from financial services. However, Onaolapo and Odetayo (2012) found a positive relationship between financial inclusion and economic growth.

The test of the endogeneity of dynamic terms, where the null hypothesis is that access does not Granger cause GDP, was done. Two alternative lag lengths are used to determine the sensitivity of causality tests to the desired lag length. Access causes GDP at the 5% significant level for the different lag lengths, but not vice versa. The causal nexus is unidirectional, from access to GDP. So, the level of access to financial inclusion leading to GDP growth is empirically proven in this study.

4.3.2 Usage of financial services and GDP growth. We report a positive relationship between the number of deposit accounts with commercial banks (per 1,000 adult populations) and GDP growth in Models 2 and 3 (dynamic OLS and fully modified OLS) but show a different sign for the random effect. This relationship is statistically significant at 1%, indicating that increasing the number of deposit accounts with commercial banks significantly increases GDP growth. The country-wise model reveals that usage of financial services has a positive relationship with GDP growth but is insignificant statistically. The relationship between the usage of financial services and GDP growth in developed countries is negative and insignificant (p-value = 0.949).

We expect the relationship between depositors’ funds and commercial banks (financial services usage) to reduce poverty and positively impact GDP growth. Our result supports this claim that $f^1 (DACB) > 0$; thus, increasing depositors’ funds with commercial banks can reduce poverty and positively impact GDP growth. Regarding the causal relationship, the usage of financial service Granger causes GDP growth in the first lag. Since the $p$-value (0.0029) is less than 0.05 in the first lag, it can be concluded that causality runs from the usage of financial services to GDP growth, but GDP does not Granger cause. This means the direction of causality from GDP to usage of financial services is not significant (see Table 2).

4.3.3 Penetration/depth of financial services and GDP growth. The amount of account penetration is associated with income levels, with middle-income countries recording twice as high a penetration ratio as low-income countries. Existing literature suggests that the difference in account penetration rate is positively related to income equality. East Asia and the Pacific countries stand out as the only regions that register an account penetration rate exceeding the global average. Sub-Saharan Africa, the Middle and North Africa lag behind
the global average. Berkes et al. (2012) assert that a well-synchronized financial system is significantly connected to lesser growth volatility. However, the relationship appears to be nonlinear. In this case, as the financial sector becomes larger relative to GDP, systematic risk becomes relatively more important and acts to reduce stability. In other words, when an economy has excess credit, financial penetration can have a “vanishing effect” on economic growth. The threshold above which this “vanishing effect” occurs is estimated to be when private credit goes beyond 110–120% of the gross domestic product (GDP).

The amount of domestic credit to the private sector as a percentage of GDP, and GDP growth shows a negative relationship, with a significant (p-value <0.05) effect under random effects and fully modified OLS models. Ghana’s results show a negative relationship between domestic credit to the private sector per GDP, and the GDP growth ratio. However, none of the relationships is statistically significant (p-values >0.05) in the OLS model, suggesting that an increase in the private sector borrowers of commercial banks has an insignificant negative effect on GDP growth. Anand and Chhikara (2013) found that the penetration rate is a significant contributor to the value of the financial inclusion index among all the other variables across the world, including Indian states, through a log-linear regression model. This finding is not different from what is found in this study. Again, according to Anand and Chhikara (2013), a 1% increase in financial inclusion increases an average 0.142% increase in the value of the human development index (cross-country data). In the case of Ghana, we report an average 0.2% increase in GDP growth in all three (3) models. We find an inverse relationship between the depth, access and usage ratios and GDP growth, consistent with Anand and Chhikara’s (2013) findings.

4.3.4 Employment, inflation and IT infrastructure and GDP growth. We report a negative relationship between employment and GDP growth within the study’s periods (2005–2016). We expect an increase in employment would reduce poverty and positively impact GDP growth; however, we find an inverse relationship. This agrees with Ehrbeck (2013), who found that many households worldwide do not even profit from temporary employment. We also report a significant inverse relationship between inflation and GDP growth. Our result agrees with Lenka and Bairwa’s (2016) findings that report similar results.

Moreover, the three models (1, 2 and 3) show a significant negative relationship between IT infrastructure and GDP growth from 2005 to 2016. Our result disagrees with the assertion that increasing mobile cellular subscriptions would positively impact GDP growth. We report an insignificant negative relationship between IT infrastructure and GDP growth for all the countries’ OLS models.

From the test of the heterogeneity of dynamics, we find that employment causes GDP growth at the 5% significant level for the different lag lengths. However, GDP growth causes employment at the first lag but not at the second lag. The causal nexus is, therefore, not unidirectional, but the level of employment leading to GDP growth has been empirically proven in this study. The Granger causality test shows that inflation causes GDP growth at both lags at a 10% significance level, which conforms with the relationship between inflation and economic growth. The case is, however, different for the causality flow from GDP growth to inflation. The test shows causal in the first lag and non-causality in the second lag. The level of IT infrastructure does not Granger cause GDP growth, and GDP growth does not Granger cause the level of IT infrastructure, which showed a non-unidirectional.

4.3.5 Business freedom and GDP growth. We report an insignificant negative relation between business freedom and GDP growth from 2005 to 2016, using random effect, dynamic OLS and fully modified OLS models. The partial model coefficients (p-values) for a random effect, dynamic OLS and fully modified OLS models are −0.126 (p = 0.126), −0.035 (p = 0.684) and −0.020 (p = 0.879), respectively. Our results suggest that business freedom negatively affects GDP growth, contradicting our study’s prior expectations.
4.3.6 Financial freedom and GDP growth. We also report an insignificant negative relationship between financial freedom and GDP growth from 2005 to 2016. Ghana's OLS model results show a negative relationship between financial freedom and GDP growth between 2005 and 2016.

5. Conclusion and policy recommendations
The study attempts to identify the relationship between financial inclusion and economic growth. Our results confirm that changes in financial inclusion indicators and some macroeconomic variables across Ghana lend to differences in economic growth. We also establish that the country’s IT infrastructure, depth of financial service, employment and inflation are key determinants of economic growth concerning financial inclusion. In the study, we observe a possible model misspecification problem. We expected that since economic growth is the dependent variable, there is a possibility of causality (or reverse causality) that runs from financial development to economic growth. Our study shows a negative relationship between economic growth and financial inclusion. However, the dynamic panel estimation results show that banking sectors have no positive impact on the economy in developing markets regarding financial inclusion.

We recommend that there is a need to expand access to financial services in Ghana, especially in rural areas. This study’s findings raise questions about financial inclusion’s capability to spur economic growth. Even though we have seen rural banks sending their mobile staff to individuals’ doorsteps, expanding access using different attractive products is necessary. Also, developing countries like Ghana, aiming for a financially inclusive society, should focus on institutional contexts with more emphasis on technological infrastructure. Technology should be used to reduce the bottleneck for access to financial services. There should be a critical solution to resolve the current trend of network breakdowns that prevent some people from accessing funds. Banks in developing countries must invest in technology. Policy attention needs to center on small business attributes that are susceptible to exclusion from the formal financial sector, while consolidating policies for those that are inclusive-inducing. Policy and capacity building on enterprise growth and sustainability will strategically target inclusion-inhibiting factors. Finally, the government must ensure efficiency in all financial institutions’ regulatory and supervisory functions. This can enable financial institutions to widen the financial market to accelerate financial development and improve the financial structure, increasing economic growth.

Like all other studies, this study also has some limitations. For instance, the study neglects other countries in Africa, suggesting that generalizing the outcomes in Africa and other emerging countries may be problematic. Further studies should consider studies across emerging countries for comparative discussions to know the new drivers of financial inclusion toward sustainable development. Moreover, future studies should investigate other financial inclusion mechanisms that can drive economic development in Africa. Additionally, future studies can also consider qualitative studies to triangulate existing findings. Our concluding word is that the financial inclusion–economic growth nexus is a significant and unsettled topic in finance; further research is welcome.

References


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