REM WORKING PAPER SERIES

Does financial integration contribute to economic growth? A global analysis using panel data

Cândida Ferreira

REM Working Paper 0399-2025

December 2025

REM – Research in Economics and Mathematics
Rua Miguel Lúpi 20,
1249-078 Lisboa,
Portugal

ISSN 2184-108X

Fundação para a Ciência e a Tecnologia
U LISBOA | UNIVERSIDADE DE LISBOA
ISEG Lisbon School of Economics & Management Universidade de Lisboa
REM RESEARCH IN ECONOMICS AND MATHEMATICS

REM – Research in Economics and Mathematics

Rua Miguel Lupi, 20
1249-078 LISBOA
Portugal

Telephone: +351 - 213 925 912
E-mail: rem@iseg.ulisboa.pt

https://rem.rc.iseg.ulisboa.pt/

https://twitter.com/ResearchRem

https://www.linkedin.com/company/researchrem/

https://www.facebook.com/researchrem/

Does financial integration contribute to economic growth? A global analysis using panel data

Cândida Ferreira

ISEG, UL – Lisbon School of Economics and Management of the Universidade de Lisboa
UECE - Research Unit in Complexity and Economics
REM – Research in Economics and Mathematics
R. Miguel Lupi, 20, 1249-078 - LISBOA, PORTUGAL
e-mail: candidaf@iseg.ulisboa.pt

Abstract

This study advances the discussion on the impact of financial integration on economic growth by analysing an unbalanced panel dataset covering 193 countries from 1960 to 2021. Financial integration data were obtained from the Global Financial Development Database, while macroeconomic control variables came from the World Development Indicators. Fixed effects and dynamic Generalised Method of Moments (GMM) panel estimations highlight the critical influence of macroeconomic conditions. The analysis reveals that financial integration significantly fosters economic growth, though the magnitude and direction of the effect depend on how financial integration is measured. In particular, indicators reflecting greater access to and depth of financial institutions and markets are positively associated with per capita Gross Domestic Product (GDP) growth. Conversely, higher bank concentration and increased bank efficiency—as measured by the bank lending-deposit spread and the bank cost-to-income ratio—show negative relationships with economic growth. The study also finds mixed evidence regarding financial stability indicators: a rise in liquid assets relative to deposits and short-term funding corresponds with slower economic growth, while improvements in financial stability—as measured by the bank Z-score and the ratio of bank credit to bank deposits—are linked to stronger per capita GDP growth. Drawing on these findings, the paper offers policy implications and recommendations concerning financial integration.

Keywords: financial integration, economic growth, global markets, panel estimations.

JEL codes: F36; F65; G15; G21.

This work was supported by FCT, I.P., the Portuguese national funding agency for science, research and technology, under the Projects UID/06522/2023

1. Introduction

Globalisation, particularly as it pertains to trade liberalisation and international economic integration, is frequently characterised as a pivotal contributor to economic growth (Chang & Lee, 2010; Ghosh, 2017; Athalage et al., 2025). Central to this view is the concept of financial integration, which encapsulates a specific dimension of the broader globalisation phenomenon. This concept is inherently linked to financial liberalisation and financial openness, as it entails an analytical exploration of the extent to which domestic financial systems are interconnected with global financial markets (De Nicolò and Juvenal, 2014; Nasreen et al., 2020; Nardo et al., 2022).

Theoretically, and following the principles of the law of one price, markets can be considered perfectly integrated if financial assets with identical risk profiles yield the same expected returns, regardless of the market in which they are traded (Baele et al., 2004; Akbari and Ng, 2020). Additionally, economic theory has identified several direct and indirect channels through which financial integration can potentially influence economic growth (Kose et al., 2003, 2009; Caporale et al., 2025).

However, there is no universally accepted definition of financial integration, and the literature presents various frameworks for identifying and measuring it. Furthermore, research examining the effect of financial integration on economic growth remains inconclusive, highlighting the need for continued investigation into this timely and pertinent issue.

This paper contributes to the literature by empirically examining the potential impact of various aspects of financial integration - specifically, access to and depth of financial institutions, the efficiency of banking institutions, and the concentration of the banking market - on economic growth. Using financial integration measures from the Global

Financial Development Database and macroeconomic indicators from the World Development Indicators, the paper employs panel estimations on an unbalanced dataset that includes 193 countries from 1960 to 2021.

Other studies have also used panel data estimations to analyse the relationship between financial integration and economic growth. For example, De Nicolò and Juvenal (2014) have used data for 48 advanced and emerging market economies during 1985–2008 and found that advancements in financial integration and globalisation are both associated with higher growth. Caporale et al. (2025), considering yearly data for 40 European countries from 1996 to 2021, concluded that financial integration becomes beneficial only above a given threshold for country-specific variables such as trade openness and macroeconomic policies.

However, to our knowledge, there are not many studies that have explored the indicators used in this paper to represent financial integration and their relevance to economic growth on a global scale, particularly across 193 countries over the extended period from 1960 to 2021.

Specifically, this paper aims to address the following questions: Is financial integration relevant to economic growth? Can we conclude that financial integration promotes economic growth? Do the results obtained depend on the considered macroeconomic conditions?

The remainder of this paper is organized as follows: Section 2 offers a brief literature review. Section 3 outlines the methodology and data employed for the empirical estimations. Section 4 presents the findings of the study. Finally, Section 5 summarizes the main conclusions and provides policy recommendations.

2. Brief literature review

A relevant strand of literature analyses the global trend toward reducing barriers to free international trade, increasing direct foreign investment, and fostering international financial liberalisation. Authors such as Dooley (1996), Maggi (1999), Bekaert et al. (2007), Yaprak and Karademir (2010), and Akbari and Ng (2020) argue that market integration plays a crucial role in economic development and globalisation. This integration not only promotes innovation but also enhances transparency and instils confidence in investing and implementing new technologies, strategies, and policies.

Globalisation increases financial openness, and financial integration is a crucial element of the financial globalization process. However, it is important to distinguish between financial integration and globalisation. While globalisation can be considered a necessary condition for financial integration, it may not be sufficient to ensure that a country's financial system is effectively connected to world markets in ways that promote efficient capital allocation (Mendoza et al., 2009; De Nicolò and Juvenal, 2014).

Overall, financial integration reflects a country's level of openness to global markets and the various ways in which domestic financial systems are linked to international market participants (Prasad et al., 2005; Claessens and Schmukler, 2007). Despite the substantial evidence indicating that financial markets are integrated, measuring this integration is a challenging task, as there is no consensus on methodology to assess the degree of financial integration or a universally accepted measure of integration.

Financial integration is usually defined from an institutional and legal point of view (*de jure*) or on a factual basis (*de facto*).

According to Baele et al. (2004), a financial market is considered integrated *de jure* if market participants with similar characteristics have equal access to the market, are subject to the same rules, and are treated equally, regardless of their location. However,

a country may implement legal measures to promote financial integration, but this does not necessarily guarantee that capital will flow in and out of the country, nor does it indicate the extent to which that integration will actually take place. Thus, while *de jure* integration can be considered as a necessary condition for financial integration, it is not sufficient on its own for achieving *de facto* integration (de Sola Perea and Van Nieuwenhuyse, 2014).

De facto financial integration is assessed using various indicators, which are commonly categorised into quantity-based measures and price-based measures (see, for example, Hoffmann et al., 2020). A significant body of literature suggests that financial integration can be evaluated by examining the savings and investment decisions of firms and households. This approach primarily focuses on the "quantities" of savings, investments, and cross-border connections (Feldstein, 1983; Darvas et al., 2015).

Multiple studies have shown that market integration refers to the convergence of asset prices and a strong co-movement of returns across different countries. For instance, Bekaert and Harvey (1995) argue that markets are considered fully integrated when assets with identical risk levels yield the same expected returns, indicating their exposure to global influences. Furthermore, Bekaert et al. (2005) clarify that market integration can occur on either a regional or a global scale. Pukthuanthong and Roll (2009) introduce a straightforward and intuitive measure of integration, which is based on the R-squared value of a multi-factor regression model. They conclude that markets are globally integrated when their assets experience similar exposure to the same global shocks.

The literature on international asset pricing explores the extent to which international financial markets are genuinely integrated or remain segmented due to various barriers and local influences. Researchers such as Bekaert et al. (2009), Karolyi and Wu (2012), and Beaulieu et al. (2016) have developed specific models to explain how the degree of

global financial market integration affects asset prices and returns. Another area of research suggests that financial integration is primarily influenced by factors such as market capitalisation, the level of financial market development, technological advancements, and macroeconomic variables like GDP growth, inflation, and political uncertainty (Nardo et al., 2022).

Countries typically pursue financial integration not as an ultimate goal, but for the expected benefits it brings to social welfare. Therefore, the assessment of financial integration should focus on the costs and benefits it generates, or may have generated, in relation to social welfare. From a theoretical standpoint, financial integration can positively influence economic growth through various direct and indirect channels. It may lead to better cross-border capital allocation, asset diversification, improved risk sharing, and ultimately, higher economic growth (Bekaert et al., 2002; Kose et al., 2009; Ibrahim et al., 2016).

However, the empirical evidence regarding the impact of financial integration on economic growth is mixed, inconclusive, and still a subject of debate. For instance, studies by Henry (2000), Giannetti et al. (2002), Klein and Olivei (2008), Vithessonthi and Tongurai (2012), De Nicolo and Juvenal (2014), and Gehringer (2015) have concluded that financial integration has a positive effect on economic growth. On the other hand, authors such as Fecht et al. (2012), Gourinchas and Jeanne (2013), and Ahmed (2016) found that financial integration can be detrimental to economic growth, as increased integration can facilitate contagion during times of crisis.

Additionally, some studies indicate that there may not be a significant relationship between financial integration and economic growth in certain countries (for example, Edison et al., 2002; Ahmed, 2011). Recent research also suggests that the effect of financial integration on economic growth depends on various factors, including the level

of financial development, trade openness, institutional quality, political and economic stability, initial income levels, and financial openness (Caporale et al., 2025).

3. Methodology and Data

This study investigates the relationship between financial integration and economic growth through the application of a panel data approach. The use of panel data enhances the analysis by increasing the number of observations, contributing to more robust and efficient results, driven by heightened variability and diminished collinearity among variables.

The potential impact of financial integration on economic growth is tested considering the following regression:

$$y_{i,t} = \alpha + \beta_1 FI_{i,t} + \beta_{2,k} X_{i,t}^{k} + \varepsilon_{i,t} \qquad (1)$$

Where: $y_{i,t}$ is the dependent variable, i.e. the per capita Gross Domestic Product (GDP) in country *i* in year *t*; $FI_{i,t}$ is the chosen indicator for financial integration; and $X_{i,t}^{k}$ are the *k* control variables, representing the macroeconomic conditions of country *i* in year *t*, and $\varepsilon_{i,t}$ is the error term.

For the estimation of this basic model the paper first applies fixed and random effects estimations, followed by dynamic two-step system GMM (Generalised Method of Moments) estimations.

Fixed and random effects estimations are overall suitable for analysing panel data. The primary difference between these two methods lies in their assumptions regarding the origin and nature of unobserved effects or group-specific parameters. In fixed effects models, the effects are treated as fixed, albeit unknown parameters. This means that each

group has a unique intercept. On the other hand, in random effects models, these effects are treated as random variables drawn from a specific distribution, such as a normal distribution with a mean of zero.

Both fixed and random effect estimations effectively manage unobserved heterogeneity. The fixed effects approach controls for time-invariant characteristics by eliminating time-invariant variables. This allows for correlation between these characteristics and the predictors, making it useful for achieving consistent estimates when omitted variables are correlated with the regressors. Random effects models, meanwhile, assume that the unobserved effects are uncorrelated with the predictors, which allows for the estimation of time-invariant variables.

The Hausman test is employed to determine which method is more appropriate by assessing this correlation and the choice between fixed and random effects estimations depends on the p-value obtained from this test. The null hypothesis tested is that the estimates produced by the fixed and random effects models do not differ significantly. A small p-value leads to the rejection of the null hypothesis, indicating that there are systematic differences. In this case, the fixed effects model is preferred because the estimates from the random effects model would be inconsistent.

However, both fixed and random effects estimations may not be entirely suitable for the model in question because they cannot address the issue of endogenous regressors, which may be a significant concern. To overcome this challenge, the basic model represented by equation (1) is also estimated using the GMM (Generalised Method of Moments) two-step system estimations, following the methodologies established by Arellano and Bond (1991) and Blundell and Bond (1998).

GMM estimations not only address issues of endogeneity but also help reduce potential bias in the estimated coefficients. This is particularly beneficial for data that exhibit

persistence over time and in cases involving measurement errors. System GMM estimations make use of internal instruments, such as lagged levels and differences. By incorporating both levels and differences in the estimation process, these methods can effectively identify the effects of time-invariant variables.

The two-step system option is generally regarded as more efficient and robust against heteroscedasticity and autocorrelation compared to the one-step system. The key distinction is that the two-step estimator utilizes an estimate of the optimal weighting matrix derived from the one-step estimator, whereas the one-step estimator uses a simplified or the same weighting matrix. Although the results from both methods are often similar, the two-step estimator provides more statistically powerful tests and is preferred for its superior asymptotic properties.

The validity of the GMM estimations is assessed using the tests proposed by Arellano and Bond (1991). These tests evaluate autocorrelation, specifically the assumption that the error term is not serially correlated by examining the differenced error term. By design, the first-order autocorrelation, AR(1), is expected to be validated, while the second-order autocorrelation, AR(2), and any higher-order autocorrelation should not be validated. Additionally, the validity of the instruments is evaluated using the Hansen statistic, which is robust to both heteroskedasticity and autocorrelation.

The macroeconomic variables used in this paper are annual frequency data obtained from the World Development Indicators. (WDI)[1].

The dependent variable is GDP per capita (Current US$). As control variables the estimated model includes: Public expenditure (General government final consumption expenditure, Current US$); Inflation (Inflation | GDP deflator, annual %); Interest rate

[1] World Development Indicators (WDI) is the primary World Bank collection of development indicators, compiled from officially recognized international sources. They are available at World Development Indicators | DataBank and were sourced in September 2025.

(Real interest rate, %); and Foreign investment (Foreign direct investment | net inflows (BoP), Current US$).

The selected variables for financial integration are annual frequency data, sourced from the Global Financial Development Database[2]. The choice of the indicators was based not only on the availability of data but also on the various aspects of financial institutions and markets represented in the database, including access, depth, efficiency, and concentration. Table 1 presents the selected indicators, and more detailed information can be found in Annex I.

TABLE 1 – Selected financial integration indicators

Financial Indicator	Short Description
ai01-Access	Bank accounts per 1000 adults
di02-Depth 1	Deposit money banks' assets to GDP (%)
dm15-Depth 2	Corporate bond average maturity (years)
ei02-Efficiency 1	Bank lending-deposit spread
ei07-Efficiency 2	Bank cost to income ratio (%)
si01-Stability 1	Bank Z-score
si04-Stability 2	Bank credit to bank deposits (%)
si06-Stability 3	Liquid assets to deposits and short term funding
oi06-Concentration	5-bank asset concentration

Source: The Global Financial Development Database

To account for potential autocorrelation and heteroscedasticity issues, all variables included in the estimations are transformed using their natural logarithmic values (and the first differences of their natural logarithmic values). Annex II presents the descriptive statistics and Annexes III and IV provide the correlation matrices.

The collected data includes information from 193 countries (see Annex V) spanning the years 1960 to 2021. However, the availability of time-variant variables differs across various periods and countries. As a result, the study employs an unbalanced panel, where

[2] The Global Financial Development Database (available at Global Financial Development Database (GFDD) contains annual data, starting from 1960, measuring the access, depth, efficiency, and stability of the financial systems of 214 countries, It has been last updated in September 2022 and contains data through 2021. The indicators used in this paper were sourced in September 2025.

the number of observations ranges from a maximum of 9,687 for per capita GDP to a minimum of 1,317 for the dm15-Depth 2 indicator, which reflects the average maturity of corporate bonds (in years).

The stationarity of the variables was confirmed using Fisher-type tests, specifically the ADF-Fisher and PP-Fisher tests; the results are not included in the paper but can be provided upon request.

4. Empirical results

Table 2 displays the results obtained from fixed and random effects estimations used to analyse the basic model (1). The dependent variable in these equations is per capita GDP, and all models include four control variables: public expenditure, inflation, interest rate, and foreign investment. To assess and compare the impact of financial integration on GDP, separate equations were estimated, each incorporating one of the nine financial integration indicators listed in Table 1. Additionally, one equation was estimated using only the control variables to test their relevance to per capita GDP.

The robustness of the estimations presented in Table 2 is demonstrated by the R-squared values and the results of the F (or Wald) test. In nearly all cases, the Hausman test indicates that fixed effects are more suitable, suggesting that each group (i.e., each country) has its own intercept and that the estimations remain consistent even when omitted variables are correlated with the regressors.

Table 2 – Results obtained with panel fixed or random effects estimations

	Access	Depth 1	Depth 2	Efficiency 1	Efficiency 2	Stability 1	Stability 2	Stability 3	Concentration	Control variables (only)
	RE	**FE**	**FE**	**FE**	**FE**	**FE**	**FE**	**FE**	**FE**	**FE**
Access	0.271*** (12.50)									
Depth 1		0.284*** (14.10)								
Depth 2			0.104*** (4.29)							
Efficiency 1				-0.102*** (-5.53)						
Efficiency 2					-0.211*** (-4.79)					
Stability 1						0.104*** (3.33)				
Stability 2							0.274*** (10.16)			
Stability 3								-0.135*** (-6.49)		
Concentration									-0.415*** (-6.64)	
Public expenditure	0.148*** (5.88)	0.309*** (26.99)	0.395*** (15.96)	0.434*** (31.10)	0.458*** (26.97)	0.458*** (26.94)	0.352*** (31.05)	0.448*** (26.41)	0.450*** (25.89)	0.351*** (30.65)
Inflation	-0.059*** (-4.76)	-0.089*** (-10.32)	-0.059*** (-3.15)	-0.080*** (-8.23)	-0.074*** (-6.56)	-0.076*** (-6.62)	-0.098*** (-11.12)	-0.075*** (-6.70)	-0.071*** (-5.83)	-0.108*** (-12.17)
Interest rate	-0.020 (-1.54)	-0.079*** (-8.66)	0.0002 (0.01)	-0.056*** (-4.96)	-0.078*** (-6.95)	-0.078*** (-6.82)	-0.086*** (-9.22)	-0.088*** (-7.71)	-0.074*** (-6.18)	-0.090*** (-9.62)
Foreign investment	0.092*** (8.81)	0.151*** (25.07)	0.158*** (10.81)	0.166*** (23.85)	0.132*** (15.17)	0.139*** (15.87)	0.166*** (27.53)	0.134*** (15.64)	0.144*** (15.01)	0.171*** (28.46)
Const	1.433*** (2.58)	-2.680*** (-12.00)	-3.554*** (-6.35)	-4.594*** (-16.42)	-3.875*** (-8.93)	-5.141*** (-13.79)	-4.109*** (-16.19)	-4.059*** (-10.37)	-2.959*** (-6.16)	-2.928*** (-12.74)
Hausman test (Prob > chi2)	1.84 (0.8707)	205.35 (0.0000)	102.24 (0.0000)	473.82 (0.0000)	532.18 (0.0000)	388.13 (0.0000)	278.82 (0.0000)	377.47 (0.0000)	540.90 (0.0000)	282.34 (0.0000)
F or Wald test (Prob > F) or (Prob > chi2)	562.25 (0.000)	1153.26 (0.000)	156.96 (0.000)	967.03 (0.000)	443.39 (0.000)	441.83 (0.000)	1069.55 (0.000)	456.33 (0.000)	401.02 (0.000)	1329.13 (0.000)
R-squared Within	0.4833	0.7315	0.6408	0.7277	0.6509	0.6448	0.7190	0.6536	0.6644	0.7086
N. Observations	642	2249	505	1929	1305	1334	2221	1327	1121	2317
N. Groups (countries)	71	127	60	115	111	112	126	113	103	127

This table outlines the results of the author's estimations, utilising fixed and random effects estimations on the natural logarithm of all variables. The dependent variable is per capita GDP, with separate equations estimated for each proxy of financial integration. All equations incorporate four control variables. Significance levels are indicated as follows: *** for 1% level, ** for 5% level, and * for 10% level.

The results presented in Table 2 confirm that all control variables have a significant impact on per capita GDP. Notably, both public expenditure (measured by general government final consumption expenditure) and foreign investment (represented by net inflows of foreign direct investment) have statistically significant positive effects on GDP. In contrast, inflation, as measured by the GDP deflator, consistently exerts a significant negative influence on GDP. Furthermore, in nearly all instances—except for the case examining financial integration indicated by the average maturity of corporate bonds—the real interest rate also has a statistically significant negative impact on GDP.

Table 2 also highlights the importance of the selected financial integration indicators in relation to per capita GDP.

There is strong evidence that access to financial services—reflected by the number of bank accounts per 1,000 adults—positively impacts GDP. Additionally, the depth of financial services, measured by the assets of deposit money banks relative to GDP and the average maturity of corporate bonds, also contributes positively to per capita GDP. Two measures of stability - the bank Z-score and the ratio of bank credit to deposits – also demonstrate a positive relationship with per capita GDP.

In contrast, the other indicator of stability - the ratio of liquid assets to deposits and short-term funding - along with selected measures of bank efficiency (namely the bank lending-deposit spread and the bank cost-to-income ratio), as well as the concentration proxy (the 5-bank asset concentration), exhibit statistically significant negative impacts on per capita GDP.

To assess the robustness of the previous results and address the potential endogeneity of the regressors, the basic model was estimated using two-step system GMM estimations. The results, presented in Table 3, demonstrate overall statistical robustness, as indicated namely by the Hansen statistics and the autocorrelation tests proposed by Arellano and Bond (1991).

In all cases, the statistical validity of the impact of control variables on GDP is clearly confirmed. Furthermore, the influence of the chosen variables representing financial integration on GDP is supported, and the findings align with those obtained from fixed (or random) effects estimations.

The results provided in both Tables 2 and 3 were derived using the natural logarithms of the considered series. These findings can be interpreted as elasticities or long-run effects of the control variables and the selected indicators of financial integration on per capita GDP.

Table 3 – Results obtained with two-step system GMM estimations

	Access	Depth 1	Depth 2	Efficiency 1	Efficiency 2	Stability 1	Stability 2	Stability 3	Concentration	Control variables (only)
Access	0.410*** (6.95)									
Depth 1		0.841*** (23.07)								
Depth 2			0.179*** (3.29)							
Efficiency 1				-0.440*** (-13.74)						
Efficiency 2					-0.313*** (-16.71)					
Stability 1						0.418** (2.22)				
Stability 2							0.558*** (10.00)			
Stability 3								-0.284** (-2.02)		
Concentration									-0.136** (-2.04)	
Public expenditure	0.253*** (4.53)	0.061*** (4.88)	0.028 (1.17)	0.054*** (3.83)	0.146*** (10.32)	.0.189*** (3.17)	0.133*** (9.90)	0.160** (2.40)	0.015** (2.08)	0.062*** (6.99)
Inflation	-0.093* (-1.74)	-0.131*** (-17.42)	-0.323*** (-10.61)	-0.206*** (-17.88)	-0.350*** (-37.38)	-0.307*** (-5.96)	-0.403*** (-34.50)	-0.328*** (-7.33)	-0.370** (-111.89)	-0.337*** (-40.76)
Interest rate	-0.170*** (-3.67)	-0.082*** (-24.46)	-0.039 (-1.36)	-0.125*** (-11.33)	-0.312*** (-38.04)	-0.274*** (-5.72)	-0.183*** (-34.37)	-0.245*** (-5.63)	-0.208*** (-68.94)	-0.175*** (-43.06)
Foreign investment	0.172*** (4.45)	0.213*** (35.92)	0.183*** (11.87)	0.218*** (22.08)	0.244*** (25.89)	0.298*** (7.44)	0.227*** (36.54)	0.291*** (7.14)	0.440*** (79.91)	0.239*** (31.66)
Const	-3.221*** (-3.44)	-0.417*** (-2.60)	4.416*** (6.68)	-3.875*** (-12.89)	2.027*** (10.14)	-0.038** (-3.04)	-1.100*** (-2.69)	0.437 (0.28)	0.010 (0.04)	2.673*** (8.52)
Wald test (Prob > chi2)	22820.84 (0.000)	1.09e+06 (0.000)	84125.82 (0.000)	93233.42 (0.000)	1.21e+06 (0.000)	11940.73 (0.000)	383743.61 (0.000)	13774.01 (0.000)	6.85e+06 (0.000)	107867.54 (0.000)
AB AR(1) z (Pr > z)	-2.99 (0.003)	-4.92 (0.000)	-2.85 (0.004)	-4.662 (0.000)	-4.99 (0.000)	-4.12 (0.000)	-5.43 (0.000)	-4.40 (0.000)	-3.82 (0.000)	-6.03 (0.000)
AB AR(2) z (Pr > z)	-0.37 (0. 711)	-1.43 (0. 153)	-0.99 (0.323)	-2.55 (0.011)	-1.76 (0.079)	-1.40 (0. 162)	-2.07 (0. 039)	-1.76 (0. 079)	-0.56 (0.577)	-1.68 (0.094)
Hansen test (Prob > chi2)	27.23 (0.611)	89.25 (0.532)	41.15 (0.334)	85.88 (0.205)	104.55 (0.385)	40.17 (0.374)	87.31 (0.590)	40.97 (0.342)	92.89 (0.705)	91.91 (0.483)
N. Observations	642	2249	505	1929	1305	1334	2221	1327	1121	2317
N. Groups (countries)	71	127	60	115	111	112	126	113	103	127

This table outlines the results of the author's estimations, utilising dynamic two-step system GMM estimations on the natural logarithm of all variables. The dependent variable is per capita GDP, with separate equations estimated for each proxy of financial integration. All equations incorporate four control variables. Significance levels are indicated as follows: *** for 1% level, ** for 5% level, and * for 10% level.

Additionally, Table 4 presents the outcomes from applying two-step GMM estimations to the first differences of the natural logarithms of the series. This methodological approach facilitates the interpretation of the relationships between the growth rates of the considered variables.

The statistical robustness of the results presented in Table 4 is clearly demonstrated, particularly through the values of the autocorrelation tests and the Hansen statistics. Additionally, there is strong confirmation of the relevant relationship between the growth of control variables as well as of the financial integration indicators, and economic growth.

Specifically, economic growth is positively related to increased access to financial services and the depth of these services, which is represented by the assets of deposit money banks relative to GDP and the average maturity of corporate bonds. Furthermore, economic growth is positively associated with the growth of the bank Z-score and the ratio of bank credit to deposits, both of which are measures of stability.

Conversely, economic growth is negatively impacted by increases in the other measure of stability: the ratio of liquid assets to deposits and short-term funding. Economic growth is also adversely affected by the growth of the bank lending-deposit spread and the bank cost-to-income ratio, which are indicators of bank efficiency, as well as by the growth of concentration, indicated by the 5-bank asset concentration ratio.

Table 4 – Results obtained with two-step system GMM estimations (variables in first differences)

	Access	Depth 1	Depth 2	Efficiency 1	Efficiency 2	Stability 1	Stability 2	Stability 3	Concentration	Control variables (only)
Access	0.064*** (5.62)									
Depth 1		0.044** (2.37)								
Depth 2			0.077*** (4.96)							
Efficiency 1				-0.147*** (-18.04)						
Efficiency 2					-0.045** (-2.28)					
Stability 1						0.079*** (37.34)				
Stability 2							0.124*** (6.81)			
Stability 3								-0.102*** (-22.16)		
Concentration									-0.089*** (-7.23)	
Public expenditure	0.817*** (53.25)	0.269*** (22.44)	0.350*** (14.36)	0.656*** (43.30)	0.586*** (24.27)	0.669*** (104.91)	0.236*** (27.89)	0.661*** (59.32)	0.639*** (68.52)	0.271*** (314.99)
Inflation	-0.016*** (-9.24)	-0.019*** (-4.88)	-0.010** (-2.24)	0.042*** (13.59)	0.010*** (2.54)	-0.002*** (-2.54)	-0.003 (-1.17)	0.006*** (4.82)	-0.008*** (-10.35)	-0.014 *** (-71.92)
Interest rate	-0.039*** (-19.29)	-0.030*** (-12.16)	-0.058*** (-9.27)	-0.007*** (-3.09)	-0.030*** (-5.86)	-0.027*** (-20.65)	-0.070*** (-47.25)	-0.019*** (-21.89)	-0.039*** (-29.29)	-0.056*** (-677.18)
Foreign investment	0.028*** (10.59)	0.070*** (21.60)	0.092*** (27.69)	0.099*** (19.49)	0.057*** (11.84)	0.076*** (73.47)	0.086*** (26.95)	0.085*** (112.95)	0.098*** (88.63)	0.087*** (1617.76)
Const	-0.009*** (-10.35)	0.021*** (11.95)	0.008*** (3.75)	0.002 (1.27)	0.003 (1.36)	-0.0009 (-1.50)	0.022*** (23.11)	-0.0001 (-0.15)	0.001 (1.38)	0.019*** (77.66)
Wald test (Prob > chi2)	234561.34 (0.000)	289606.61 (0.000)	17803.70 (0.000)	1.22e+06 (0.000)	1811.99 (0.000)	708454.22 (0.000)	4.56e+06 (0.000)	2.30e+06 (0.000)	141137.52 (0.000)	12467.65 (0.000)
AB AR(1) z (Pr > z)	-3.89 (0.000)	-4.41 (0.000)	-2.27 (0.023)	-5.38 (0.000)	-3.30 (0.001)	-3.39 (0.001)	-4.93 (0.000)	-3.53 (0.000)	-3.39 (0.001)	-4.74 (0.000)
AB AR(2) z (Pr > z)	-1.93 (0.053)	-1.42 (0.155)	1.39 (0.166)	0.57 (0.571)	-0.03 (0.976)	0.42 (0. 672)	-0.33 (0.745)	0.25 (0. 804)	1.13 (0.257)	-0.31 (0. 760)
Hansen test (Prob > chi2)	58.33 (0.934)	94.89 (0.196)	37.18 (0.414)	78.12 (0.349)	81.68 (0.307)	97.26 (0.896)	89.02 (0.361)	92.94 (0.570)	86.23 (0.752)	116.82 (0.751)
N. Observations	484	1787	342	1532	1010	1034	1762	1029	860	1845
N. Groups (countries)	61	120	44	105	105	105	119	105	92	121

This table outlines the results of the author's estimations, utilising dynamic two-step system GMM estimations on the first differences of the natural logarithm of all variables. The dependent variable is per capita GDP, with separate equations estimated for each proxy of financial integration. All equations incorporate four control variables. Significance levels are indicated as follows: *** for 1% level, ** for 5% level, and * for 10% level.

Table 5 presents a comprehensive summary of the results derived from the conducted estimations, underscoring the consistent findings that demonstrate the significant influence of the selected financial intermediation measures on GDP per capita and on its growth.

Table 5 – Summary of the results obtained from panel fixed (or random) effects estimations and with dynamic two-step system GMM estimations

	ai01-Access	di02-Depth 1	dm15-Depth 2	ei02-Efficiency 1	ei07-Efficiency 2	si01-ln Stability 1	si04-lStability 2	si06-Stability 3	oi06-Concentration
FE/RE (Ln)	+***	+***	+***	-***	-***	+***	+***	-***	-***
GMM (Ln)	+***	+***	+***	-***	-***	+**	+***	-**	-**
GMM (D1.Ln)	+***	+**	+***	-***	-**	+***	+***	-***	-***

FE/RE: Results obtained using panel fixed or random effects estimations; GMM; Results obtained using panel dynamic two-step system GMM estimations. Ln: using the natural logarithms of the series; D1.Ln: using the first differences of these logarithms

+ Positive effect; - negative effect; * Statistically significant at 10%; ** statistically significant at 5%; *** statistically significant at 1%.

Source: Estimation results previously reported in Tables 2, 3 and 4.

Specifically, the results provided in Table 5 indicate that increased access to financial services, particularly through a rise in the number of bank accounts, is associated with higher economic growth. Supporting this conclusion, there is strong evidence of the positive effects of the financial depth on GDP, from both an increase in the ratio of total assets held by deposit money banks to GDP, as well as from a rise in the volume-weighted average maturity of new corporate bonds issued by private entities (excluding finance, holding companies, and insurance) over the years.

On the other hand, the findings indicate that the efficiency of banking institutions -here measured by the difference between bank lending rates and deposit rates, as well as the bank cost-to-income ratio - is negatively related to GDP. This suggests that the

intermediation role of banks, especially in relation to their financing activities, may not be sufficiently focused on productive investments that are crucial for stimulating economic growth. Additionally, there is strong evidence that the concentration of the banking market – measured by the assets of the five largest banks as a share of the total commercial banking assets in each country - often associated with reduced competition within the banking sector, does not contribute to economic growth.

The findings regarding the influence of the considered aspects of bank stability are not entirely unanimous. On one hand, an increase in stability, as measured by the bank Z-score (which represents the probability of default for a country's commercial banking system) and the ratio of bank credit to bank deposits (specifically, the financial resources provided to the private sector by domestic money banks as a share of total deposits), is positively related to GDP and contributes to economic growth.

On the other hand, stability measured by the percentage of banks' liquid assets to their deposits and short-term funding tends to have a negative impact on GDP and its growth. More specifically, economic growth is not enhanced by increased stability in banking institutions when represented by the ratio of liquid assets (which include cash, amounts due from banks, trading securities, loans and advances to banks, reverse repos, and cash collaterals) to banks' deposits and short-term funding (which include total customer deposits, such as current, savings, and term deposits, as well as short-term borrowing through instruments like money market instruments, certificates of deposit, and other deposits).

5. Summary conclusions and policy recommendations

This paper contributes to the literature on the effect of financial integration on economic growth by employing panel estimations based on an unbalanced dataset that includes 193 countries from 1960 to 2021. As control variables, the estimations consider public expenditure, inflation, interest rates, and foreign investment. These macroeconomic variables are represented as annual frequency data sourced from the World Development Indicators. Financial integration is measured using nine indicators, also with annual frequency, obtained from the Global Financial Development Database. The selected indicators of financial integration were chosen not only based on data availability but also on various aspects of financial institutions and markets represented in the database, such as access to financial services, depth of financial institutions, bank efficiency, and concentration within the banking sector.

The empirical findings, derived from fixed and random effects as well as dynamic GMM two-step panel estimations, address the specific questions posed in this paper. All estimated equations provide statistically robust evidence that financial integration significantly impacts economic growth. Overall, some results suggest that financial integration may yield beneficial effects arising from more efficient resource allocation, as predicted by theory.

However, the findings also indicate that the positive or negative effects of financial integration on per capita GDP and its growth depend on the chosen indicators. Therefore, it cannot be concluded that financial integration always promotes economic growth.

Specifically, the results indicate that five of the considered indicators positively affect economic growth: access to financial services (represented by the number of bank accounts per 1,000 adults), depth of financial institutions (measured through deposit

money banks' assets to GDP and corporate bond average maturity), and stability (proxied by the bank Z-score and the ratio of bank credit to deposits). Conversely, four indicators appear to negatively affect economic growth, namely bank efficiency (measured by both the bank lending-deposit spread and the bank cost-to-income ratio), bank stability (represented by the ratio of liquid assets to deposits and short-term funding), and bank market concentration (proxied by the share of total commercial banking assets held by the five largest banks).

Moreover, there is clear evidence that the results depend on prevailing macroeconomic conditions, represented by the control variables included in the estimations. Specifically, the findings demonstrate that, in all estimated equations, the evolution of GDP per capita and its growth are positively associated with both public expenditure and foreign investment, while inflation and interest rates exert negative impacts on GDP.

This paper's findings confirm the relevance of financial integration for economic growth and highlight the importance of policymakers' roles, allowing for several recommendations to be made. Policies aimed at promoting financial inclusion - specifically in terms of access to and depth of financial institutions and services - are likely to benefit GDP growth. Furthermore, enacted laws and regulations should avoid promoting bank market concentration and should aim to ensure banking stability (measured by the Z-score) while providing the necessary support for productive investments and contributing to economic growth, such as increasing the bank credit to deposits ratio. However, banking stability should not overly rely on the ratio of liquid assets to deposits and short-term funding, as increases in this ratio appear to negatively impact GDP. This suggests that investments in liquid assets might not translate into financing that promotes economic growth.

Moreover, the efficiency of banking institutions should be improved, particularly through lowering cost-to-income ratios and reducing the bank lending-deposit spread.

Finally, the findings clearly indicate that while financial integration may be relevant and even necessary for promoting economic growth, it is not sufficient on its own. Therefore, policymakers should pay attention to macroeconomic conditions and establish a policy framework conducive to enhancing economic growth, particularly regarding general government final consumption expenditure and foreign investment, while managing levels of inflation and interest rates.

Further research is still needed in this field, especially concerning the distinct measures of financial integration and the different consequences this integration may have in developed versus emerging countries. Specific attention should be given to the factors that hinder the potential benefits of financial integration and the investment opportunities among various groups of countries. It is also important to analyse the potential negative consequences of financial integration within these groups. Additional research should also be focused on designing an appropriate policy and regulatory framework and strengthening institutional quality to promote sustainable growth through financial integration.

References

Ahmed, A. D. (2011) "International Financial Integration, Investment and Economic Performance in Sub-Saharan African Countries," *Global Economy Journal*, Vol. 11(4), pp. 1-28. https://doi.org/10.2202/1524-5861.1712

Ahmed, A. D. (2016) "Integration of financial markets, financial development and growth: Is Africa different?", *Journal of International Financial Markets, Institutions and Money*, Vol. 42, pp. 43–59. https://doi.org/10.1016/j.intfin.2016.01.003

Akbari, A. and Ng, L. (2020) "International Market Integration: A Survey", *Asia-Pacific Journal of Financial Studies*, Vol. 49 (2), pp. 161-185. https://doi.org/10.1111/ajfs.12297

Arellano, M., and Bond, S. (1991) "Some Tests of Specification for Panel Data: Monte Carlo Evidence and an Application to Employment Equations", *Review of Economic Studies*, Vol. 58 (2), pp. 277-297. https://www.jstor.org/stable/pdf/2297968.pdf

Athalage, D., Wijesuriya, P., Sandanayaka, I., Rathnayake, D., and Jayathilaka, R. (2025) "The interplay between globalisation and economic growth: a multi-regional analysis", *Discover Sustainability*, Vol. 6:525. https://doi.org/10.1007/s43621-025-01403-6

Beaulieu, M.-C, Gagnon, M.-H., Khalaf, L. (2016) "Less is more: Testing financial integration using identification-robust asset pricing models", *Journal of International Financial Markets, Institutions and Money*, Vol. 45, pp. 171-190, ISSN 1042-4431, https://doi.org/10.1016/j.intfin.2016.07.00

Baele, L., Ferrando, A., Hördahl, P., Krylova, E., and Monnet, C. (2004) "Measuring financial integration in the Euro area", *Oxford Review of Economic Policy*, Vol. 20 (4), pp. 509-530.

Bekaert, G., Harvey, C.R., Ng, A., (2005) "Market Integration and Contagion", *Journal of Business*, Vol. 78(1), pp. 39-69. https://doi.org/10.1086/426519

Bekaert, G., Harvey, C.R., Lundblad, C.T., and Siegel, S. (2007) "Global growth opportunities and market integration", *The Journal of Finance*, Vol. 62 (3), pp. 1081-137. https://doi.org/10.1111/j.1540-6261.2007.01231.x

Bekaert, G., Engstrom, E., Xing, Y. (2009) "Risk, uncertainty, and asset prices", *Journal of Financial Economics*, Vol. 91 (1), pp. 59-82. https://doi.org/10.1016/j.jfineco.2008.01.005

Blundell, R., and Bond, S. (1998) "Initial conditions and moment restrictions in dynamic panel data models", *Journal of Econometrics*, Vol. 87 (1), pp. 115–143. https://doi.org/10.1016/S0304-4076(98)00009-8

Caporale, G. M., Sova, A.D. and Sova, R. (2025) "International Financial Integration, Economic Growth and Threshold Effects: Some Panel Evidence for Europe", *Journal of International Money and Finance*, Vol. 158:103407. https://doi.org/10.1016/j.jimonfin.2025.103407

Chang C.P. and Lee C.C. (2010) "Globalization and economic growth: a political economy analysis for OECD countries", *Global Economic Review*, Vol. 39 (2). Pp. 151–73. https://doi.org/10.1080/1226508X.2010.483835.

Claessens, S. and Schmukler, S. L. (2007) *International financial integration through equity markets which firms from which countries go global?*, Policy Research working paper No. 4146, World Bank. http://documents.worldbank.org/curated/en/659611468337830051

DarvasZ., Hüttl, P., Merler, S,. De Sousa, C,. and Walsh, T. (2015) "Analysis of developments in EU capital flows in the global context", *Study for the DG MARKT*

of the European Commission, https://scholar.google.com/scholar_lookup?title=Analysis%20of%20the%20Developments%20in%20EU%20Capital%20Flows%20in%20the%20Global%20Context&author=J.%20Darvas&publication_year

De Nicolò, G. and Juvenal, L. (2014) "Financial integration, globalization, and real activity", *Journal of Financial Stability*, Vol. 10, pp. 65-75, ISSN 1572-3089, https://doi.org/10.1016/j.jfs.2013.04.004.

de Sola Perea, M, and Van Nieuwenhuyze, Ch. (2014) "Financial integration and fragmentation in the euro area", *Economic Review*, National Bank of Belgium, issue i, pp. 99-125. https://doi.org/10.1016/j.econmod.2022.105902

Dooley, M. P. (1996) "A Survey of Literature on Controls over International Capital Transactions," *IMF Staff Papers*, Vol. 43 (4), pp. 639- 687. https://doi.org/10.5089/9781451930931.024

Edison, H. J., Levine, R., Ricci, L. and Slok, T. (2002) "International financial integration and economic growth", *Journal of International Money and Finance*, Vol. 21(6), pp. 749–776. https://doi.org/10.1016/S0261-5606(02)00021-9

Fecht, F., Gruner, H. P. and Hartmann, P. (2012) "Financial Integration, Specialization, and Systemic Risk", *Journal of International Economics*, Vol. 88 (1), pp. 150-161. https://doi.org/10.1016/j.jinteco.2012.01.012

Feldstein, M. (1983) "Domestic saving and international capital movements in the long run and the short run", *European Economic Review*, Vol. 21(1-2), pp. 129-151. https://doi.org/10.1016/S0014-2921(83)80012-9

Gehringer, A. (2015) "Uneven effects of financial liberalization on productivity growth in the EU: evidence from a dynamic panel investigation", *International Journal of Production Economics*, Vol. 159, pp. 334-346. https://doi.org/10.1016/j.ijpe.2014.05.003

Ghosh A. (2027) "How does banking sector globalization affect economic growth?", *International Review of Economics and Finance*, Vol. 48, pp. 83–97. https://doi.org/ 10. 1016/j.iref.2016.11. 011.

Giannetti, M., Guiso, L., Jappelli, T., Padula, M. and Pagano, M. (2002) *Financial market integration, corporate financing and economic growth*, European Commission, Economic Papers, no. 179, https://econpapers.repec.org/paper/eufecopap/0179.htm

Gourinchas, P. O. and Jeanne, O. (2013) "Capital flows to developing countries: the allocation puzzle", *The Review of Economic Studies*, Vol. 80(4), pp. 1484–1515. https://doi.org/10.1093/restud/rdt004

Henry, P. B. (2000) "Do stock market liberalizations cause investment booms?", *Journal of Financial economics*, Vol. 58(1–2), pp. 301–334. https://doi.org/10.1016/S0304-405X(00)00073-8

Hoffmann, P., Kremer, M., and Zaharia, S. (2020) "Financial integration in Europe through the lens of composite indicators", *Economics Letters*, 194, 109344. https://doi.org/10.1016/j.econlet.2020.109344

Ibrahim, S., Mazlina A. R., Azman–Saini W.N.W., and Zakaria, M. F. M. (2016) "Financial integration growth nexus: A quantile regression analysis", *Journal of Economic Integration*, Vol. 31(3), pp. 531–546. http://dx.doi.org/10.11130/jei.2016.31.3.531

Karolyi, G. A. and Wu, Y. (2012) *The Role of Investability Restrictions on Size, Value, and Momentum in International Stock Returns*, Johnson School Research Paper Series No. 12-2012, Available at SSRN: https://ssrn.com/abstract=2043156 or http://dx.doi.org/10.2139/ssrn.2043156

Klein, M. W. and Olivei, G. P. (2008) "Capital account liberalization, financial depth, and economic growth", *Journal of International Money and Finance*, Vol. 27(6), pp. 861–875. https://doi.org/10.1016/j.jimonfin.2008.05.002

Kose, M.A., Prasad, E. S., and M.E. Terrones (2003) "Financial integration and macroeconomic volatility" *IMF Staff Papers*, Vol. 50(1), pp. 119–142. https://doi.org/10.5089/9781451846997.001

Kose, M. A., Prasad, E., Rogoff, K., and Wei, S.-J. (2009) "Financial Globalization: A Reappraisal", *IMF Staff Papers*, Vol. 56(1), pp. 8-62. https://doi.org/10.5089/9781451864496.001

Maggi, G. (1999) "The Role of Multilateral Institutions in International Trade Cooperation", *The American Economic Review*, Vol. 89 (1), pp. 190-214. *DOI: 10.1257/aer.89.1.190*

Mendoza, E., Quadrini, V. and Ríos-Rull, J.-V. (2009) "Financial Integration, Financial Development and Global Imbalances", *Journal of Political Economy*, Vol. 117(3), pp. 371-416. https://doi.org/10.1086/599706

Nardo, M., Ossola, E., Papanagiotou, E. (2022) "Financial integration in the EU28 equity markets: Measures and drivers", *Journal of Financial Markets*, 57, 100633. https://doi.org/10.1016/j.finmar.2021.100633

Nasreen, S., Mahalik, M. K., Shahbaz, M., and Abbas, Q. (2020) "How do financial globalization, institutions and economic growth impact financial sector development in European countries?", *Research in International Business and Finance*, 54, 101247. https://doi.org/10.1016/j.ribaf.2020.101247

Prasad, E., Rogoff, K., Wei, S. J., and Kose, M.A. (2005) "Effects of Financial Globalization on Developing Countries: Some Empirical Evidence", In: Tseng, W., Cowen, D. (eds) *India's and China's Recent Experience with Reform and Growth. Procyclicality of Financial Systems in Asia*. Palgrave Macmillan, London.

Rahman, M. R., Misra, A. K., Lucey, B. M., Mohapatra, s., and Kumar, S. (2023) "Network structure and risk-adjusted return approach to stock indices integration: A study on Asia-Pacific countries.", *Journal of International Financial Markets, Institutions and Money*, Vol. 87: 101819 https://doi.org/10.1016/j.intfin.2023.101819

Vithessonthi, C. and Tongurai, J. (2012) "The impact of capital account liberalization measures", *Journal of International Financial Markets, Institutions and Money*, Vol. 22(1), pp. 16–34. https://doi.org/10.1016/j.intfin.2011.07.003

Yaprak, A., and Karademir, B. (2010) "The internationalization of emerging market business groups: An integrated literature review", *International Marketing Review*, Vol. 27 (2), pp. 245-262. https://doi.org/10.1108/02651331011037548

Annex I – Financial integration indicators

Topic	Indicator Code	Indicator Name	Short Definition	Long Definition	Coverage
Access	GFDD.AI.01	Bank accounts per 1,000 adults	Number of depositors with commercial banks per 1,000 adults.	For each country calculated as: 1,000*reported number of depositors/adult population in the reporting country.	2004-2019
Depth	GFDD.DI.02	Deposit money banks' assets to GDP (%)	Total assets held by deposit money banks as a share of GDP. Assets include claims on domestic real nonfinancial sector which includes central, state and local governments, nonfinancial public enterprises and private sector. Deposit money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits.	Claims on domestic real nonfinancial sector by deposit money banks as a share of GDP. Raw data are from the electronic version of the IMF's International Financial Statistics. Deposit money bank assets (IFS lines 22, a-d, FOSAG, FOSAOG, FOSAON and FOSAOP); GDP in local currency (IFS line NGDP).	1960-2020
Depth	GFDD.DM.15	Corporate bond average maturity (years)	Volume weighted average maturity of new corporate bond issuance by private entities in industries other than finance, holding companies and insurance in years.	Duration of bonds weighted by deal volume. Average maturities are constructed in two steps: i) the maturity of each tranche is weighted by the value of the tranche to estimate the deal level weighted-average maturity, ii) deal-level weighted average maturities are weighted again by the total value of the bond to aggregate to the country-year level.	2000-2020
Efficiency	GFDD.EI.02	Bank lending-deposit spread	Difference between lending rate and deposit rate. Lending rate is the rate charged by banks on loans to the private sector and deposit interest rate is the rate offered by commercial banks on three-month deposits.	Raw data are from the electronic version of the IMF's International Financial Statistics. Difference between lending rate and deposit rate. Lending rate is the rate charged by banks on loans to the private sector and deposit interest rate is the rate offered by commercial banks on three-month deposits. IFS line 60P - line 60L.	1980-2020
Efficiency	GFDD.EI.07	Bank cost to income ratio (%)	Operating expenses of a bank as a share of sum of net-interest revenue and other operating income.	Operating expenses of a bank as a share of sum of net-interest revenue and other operating income. Raw data are from Bankscope and Orbis. The formula applied to Bankscope is data2090 / (data2080 + data2085) and a comparable approach is applied to Orbis. All Numerator and denominator are first aggregated on the country level before division. Note that banks used in the calculation might differ between indicators. Calculated from underlying bank-by-bank unconsolidated data from Bankscope and Orbis. The result is not reported if a country-year has less than 3 bank-level observations.	2000-2021
Stability	GFDD.SI.01	Bank Z-score	It captures the probability of default of a country's commercial banking system. Z-score compares the buffer of a country's commercial banking system (capitalization and returns) with the volatility of those returns.	It captures the probability of default of a country's banking system. Z-score compares the buffer of a country's banking system (capitalization and returns) with the volatility of those returns. It is estimated as (ROA+(equity/assets))/sd(ROA); sd(ROA) is the standard deviation of ROA, calculated for country-years with no less than 5 bank-level observations. ROA, equity, and assets are country-level aggregate figures. Calculated from underlying bank-by-bank	2000-2020

				unconsolidated data from Bankscope and Orbis. The result is not reported if a country-year has less than 3 bank-level observations.	
Stability	GFDD.SI.04	Bank credit to bank deposits (%)	The financial resources provided to the private sector by domestic money banks as a share of total deposits. Domestic money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits. Total deposits include demand, time and saving deposits in deposit money banks.	Raw data are from the electronic version of the IMF's International Financial Statistics. Private credit by deposit money banks (IFS line 22d and FOSAOP); bank deposits (IFS lines 24, 25, FOST and FOSD).	1960-2020
Stability	GFDD.SI.06	Liquid assets to deposits and short term funding (%)	The ratio of the value of liquid assets (easily converted to cash) to short-term funding plus total deposits. Liquid assets include cash and due from banks, trading securities and at fair value through income, loans and advances to banks, reverse repos and cash collaterals. Deposits and short term funding includes total customer deposits (current, savings and term) and short term borrowing (money market instruments, CDs and other deposits).	The ratio of the value of liquid assets (easily converted to cash) to short-term funding plus total deposits. Liquid assets include cash and due from banks, trading securities and at fair value through income, loans and advances to banks, reverse repos and cash collaterals. Deposits and short term funding includes total customer deposits (current, savings and term) and short term borrowing (money market instruments, CDs and other deposits). Raw data are from Bankscope and Orbis. The formula applied to Bankscope is data2075 / data2030 and a comparable approach is applied to Orbis. Numerator and denominator are first aggregated on the country level before division. Calculated from underlying bank-by-bank unconsolidated data from Bankscope and Orbis. The result is not reported if a country-year has less than 3 bank-level observations.	2000-2020
Other	GFDD.OI.06	5-bank asset concentration	Assets of five largest banks as a share of total commercial banking assets. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax, discontinued operations and other assets.	Assets of five largest banks as a share of total commercial banking assets. Total assets include total earning assets, cash and due from banks, foreclosed real estate, fixed assets, goodwill, other intangibles, current tax assets, deferred tax, discontinued operations and other assets. Raw data are from Bankscope and Orbis. The formula applied to Bankscope is (sum(data2025) for the five largest banks in Bankscope) / (sum(data2025) for all banks) and a comparable approach is applied to Orbis. Calculated from underlying bank-by-bank unconsolidated data from Bankscope and Orbis.	2000-2020

Source: The Global Financial Development Database, Metadata-2021, available at https://www.worldbank.org/en/publication/gfdr/gfdr-2016/data/global-financial-development-database

Annex II - Descriptive statistics

Variables	Mean	Std. Dev.	Min	Max	N. Observatio
ln GDP	7.60	1.73	2.56	12.36	9687
D1. ln GDP	0.05	0.16	-6.10	1.60	9482
ln Access	5.92	1.45	-0.76	12.52	1385
D1. ln Access	0.07	0.18	-1.00	2.07	1275
ln Depth 1	3.43	0.98	-4.61	5.72	8572
D1. ln Depth 1	0.03	0.18	-2.80	2.19	8356
ln Depth 2	2.12	0.59	0.00	4.60	1317
D1. ln Depth 2	0.05	0.45	-1.67	2.49	1055
ln Efficiency 1	1.79	0. 79	-3.51	4.48	3392
D1. ln Efficiency 1	-0.006	0.31	-5.65	3.50	3236
ln Efficiency 2	4.00	0.28	1.62	5.47	3133
D1. ln Efficiency 2	-0.002	0.18	-2.39	2.36	2905
ln Stability 1	2.61	0.65	-3.91	4.96	3210
D1. ln Stability 1	0.005	0.28	-5.19	5.58	2994
ln Stability 2	4.46	0.53	1.79	7.96	8471
D1. ln Stability 2	-.003	0.16	-1.79	2.18	8252
ln Stability 3	3.45	0.53	-0.97	5.05	3146
D1. ln Stability 3	-0.001	0.21	-1.60	1.24	2926
ln Concentration	4.37	0.23	3.22	4.61	2731
D1. ln Concentration	-0.001	0.07	-0.98	0.52	2514
ln Public expenditure	21.78	2.53	15.26	29.41	7907
D1. ln Public expenditure	0.07	0.19	-5.68	2.31	7715
ln Inflation	1.81	1.35	- 4.61	10.19	8293
D.1 ln Inflation	-0.004	1.04	-6.83	7.79	7507
ln Interest rate	1.81	0.97	- 4.61	6.44	3471
D.1 ln Interest rate	-0.03	0.87	-6.62	5.81	3045
ln Foreign investment	19.06	3.08	2.30	27.32	7636
D1. ln Foreign investment	0.12	1.09	-10.31	15.88	7002

Source: Author's calculations, using data sourced from the Global Financial Development Database (WFDD), available at Global Financial Development Database (GFDD) and the World Development Indicators (WDI), available at World Development Indicators | DataBank. All indicators used in this paper were sourced in September 2025.

Annex III - Pairwise correlations between the natural logarithms of the variables

Variables	ln GDP	ln Access	ln Depth 1	ln Depth 2	ln Efficiency 1	ln Efficiency 2	ln Stability 1	ln Stability 2	ln Stability 3	ln Concentration	ln Public expenditure	ln Inflation	ln Interest rate	ln Foreign investment
ln GDP	1.00													
ln Access	0.3563	1.00												
ln Depth 1	0.4761	0.0999	1.00											
ln Depth 2	0.2519	0.1312	0.2554	1.00										
ln Efficiency 1	-0.1283	-0.0657	-0.3468	-0.0463	1.00									
ln Efficiency 2	-0.2719	0.0971	-0.4415	-0.0968	0.3633	1.00								
ln Stability 1	0.4006	-0.1601	0.1190	0.1698	0.0570	-0.1213	1.00							
ln Stability 2	0.0651	-0.1578	0.2392	0.1352	-0.0165	-0.2162	-0.1756	1.00						
ln Stability 3	0.1537	-0.0013	-0.1142	-0.0789	0.5259	0.1744	0.1307	-0.3644	1.00					
ln Concentration	0.3780	0.1176	0.0551	0.0418	0.0721	-0.1424	0.2128	0.1817	-0.0585	1.00				
ln Public expenditure	0.3425	-0.0153	0.0689	0.0540	-0.0081	-0.0881	0.1988	0.1080	-0.1150	0.5493	1.00			
ln Inflation	-0.3700	-0.0709	-0.4002	-0.1929	0.4026	0.3120	-0.2418	-0.0900	0.2780	-0.0926	-0.1657	1.00		
ln Interest rate	-0.0981	-0.1117	-0.2090	-0.0046	0.7669	0.2838	0.1026	0.0402	0.4071	-0.0074	-0.0234	0.0487	1.00	
ln Foreign investment	0.3609	-0.2339	0.5176	0.1885	0.1371	-0.2146	0.2488	0.2464	0.1690	0.0790	0.0988	-0.1385	0.0845	1.00

Source: Author's calculations, using data sourced from the Global Financial Development Database (WFDD), available at Global Financial Development Database (GFDD) and the World Development Indicators (WDI), available at World Development Indicators | DataBank. All indicators used in this paper were sourced in September 2025.

Annex IV - Pairwise correlations between the first differences of the natural logarithms of the variables

Variables	D1.ln GDP	D1.ln Access	D1.ln Depth 1	D1.ln Depth 2	D1.ln Efficiency 1	D1.ln Efficiency 2	D1.ln Stability 1	D1.ln Stability 2	D1.ln Stability 3	D1.ln Concentration	D1.ln Public expenditure	D1.ln Inflation	D1.ln Interest rate	D1.ln Foreign investment
D1.ln GDP	1.00													
D1.ln Access	0.4434	1.00												
D1.ln Depth 1	-0.1543	0.2638	1.00											
D1.ln Depth 2	-0.0188	-0.1238	-0.1257	1.00										
D1.ln Efficiency 1	-0.1709	-0.0980	-0.0855	0.0632	1.00									
D1.ln Efficiency 2	-0.1066	0.0200	0.0398	0.1299	-0.0046	1.00								
D1.ln Stability 1	0.0791	-0.2770	-0.4136	0.1282	-0.1175	-0.0424	1.00							
D1.ln Stability 2	0.2418	0.1972	0.2816	0.0534	-0.2140	-0.0269	-0.1201	1.00						
D1.ln Stability 3	-0.0420	-0.0135	0.0054	-0.0606	0.0545	-0.0698	-0.2130	-0.2307	1.00					
D1.ln Concentration	-0.1048	-0.1819	-0.0115	0.1421	0.1433	0.1816	-0.0477	-0.0755	0.0063	1.00				
D1.ln Public expenditure	0.3995	0.1508	-0.1309	-0.1059	-0.0957	-0.0523	0.0965	-0.0855	-0.0076	-0.0675	1.00			
D1.ln Inflation	0.0549	-0.0028	-0.1215	0.0639	-0.1651	-0.0065	-0.0230	0.0645	-0.0612	0.1034	-0.0963	1.00		
D1.ln Interest rate	-0.0513	0.0865	0.2080	-0.1136	0.2863	0.0807	-0.1309	0.0000	0.0897	-0.0572	0.0488	-0.7426	1.00	
D1.ln Foreign investment	0.3009	0.0675	-0.2586	0.0331	0.0752	-0.0322	0.1094	-0.0246	0.0560	-0.0404	0.0558	-0.0051	-0.0571	1.00

Source: Author's calculations, using data sourced from the Global Financial Development Database (WFDD), available at Global Financial Development Database (GFDD) and the World Development Indicators (WDI), available at World Development Indicators | DataBank. All indicators used in this paper were sourced in September 2025.

Annex V – Countries included in the estimations

1	Afghanistan	66	Germany	131	Palau
2	Albania	67	Ghana	132	Panama
3	Algeria	68	Greece	133	Papua New Guinea
4	Andorra	69	Grenada	134	Paraguay
5	Angola	70	Guatemala	135	Peru
6	Antigua and Barbuda	71	Guinea	136	Philippines
7	Argentina	72	Guinea-Bissau	137	Poland
8	Armenia	73	Guyana	138	Portugal
9	Australia	74	Haiti	139	Qatar
10	Austria	75	Honduras	140	Rep. Korea
11	Azerbaijan	76	Hungary	141	Rep. Moldova
12	Bahamas	77	Iceland	142	Romania
13	Bahrain	78	India	143	Russian Fed.
14	Bangladesh	79	Indonesia	144	Rwanda
15	Barbados	80	Iran	145	Saint Kitts and Nevis
16	Belarus	81	Iraq	146	Saint Lucia
17	Belgium	82	Ireland	147	Saint Vincent and the Grenadines
18	Belize	83	Israel	148	Samoa
19	Benin	84	Italy	149	San Marino
20	Bhutan	85	Jamaica	150	São Tomé and Principe
21	Bolivia	86	Japan	151	Saudi Arabia
22	Bosnia and Herzegovina	87	Jordan	152	Senegal
23	Botswana	88	Kazakhstan	153	Serbia
24	Brazil	89	Kenya	154	Seychelles
25	Brunei Darus.	90	Kiribati	155	Sierra Leone
26	Bulgaria	91	Kuwait	156	Singapore
27	Burkina Faso	92	Kyrgyzstan	157	Slovak Rep.
28	Burundi	93	Lao PDR	158	Slovenia
29	Cabo Verde	94	Latvia	159	Solomon Islands
30	Cambodia	95	Lebanon	160	Somalia
31	Cameroon	96	Lesotho	161	South Africa
32	Canada	97	Liberia	162	South Sudan
33	Central African Rep.	98	Libya	163	Spain
34	Chad	99	Liechtenstein	164	Sri Lanka
35	Chile	100	Lithuania	165	Sudan
36	China	101	Luxembourg	166	Suriname
37	Colombia	102	Madagascar	167	Sweden
38	Comoros	103	Malawi	168	Switzerland
39	Congo	104	Malaysia	169	Syrian Arab Rep.
40	Costa Rica	105	Maldives	170	Tajikistan
41	Croatia	106	Mali	171	Thailand
42	Cuba	107	Malta	172	Timor-Leste
43	Cyprus	108	Marshall Islands	173	Togo
44	Czechia	109	Mauritania	174	Tonga
45	Côte d'Ivoire	110	Mauritius	175	Trinidad and Tobago
46	DPR Korea	111	Mexico	176	Tunisia
47	DR Congo	112	Micronesia	177	Turkmenistan
48	Denmark	113	Monaco	178	Tuvalu
49	Djibouti	114	Mongolia	179	Türkiye
50	Dominica	115	Montenegro	180	Uganda
51	Dominican Rep.	116	Morocco	181	Ukraine
52	Ecuador	117	Mozambique	182	United Arab Emirates
53	Egypt	118	Myanmar	183	United Kingdom
54	El Salvador	119	Namibia	184	United Rep. of Tanzania
55	Equatorial Guinea	120	Nauru	185	United States
56	Eritrea	121	Nepal	186	Uruguay
57	Estonia	122	Netherlands	187	Uzbekistan
58	Eswatini	123	New Zealand	188	Vanuatu
59	Ethiopia	124	Nicaragua	189	Venezuela
60	Fiji	125	Niger	190	Vietnam
61	Finland	126	Nigeria	191	Yemen
62	France	127	North Macedonia	192	Zambia
63	Gabon	128	Norway	193	Zimbabwe
64	Gambia	129	Oman		
65	Georgia	130	Pakistan		