

Financial Development and Economic Growth: A Global Analysis (2008-2021)

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Abstract

The debate of the relationship between financial development and economic growth was started by Schumpeter in 1911, who argued that financial development spurs economic growth. Over the decades there has been a number of empirical researches in developed, developing and underdeveloped countries and have established positive, negative, and no relationship between financial development and economic growth. This study has attempted to analyze the relationship of financial development with the economic growth of 153 countries in the world from 2008 to 2021 using panel data. Growth in Gross Domestic Product (GDP) (annual%) has been taken as a proxy for economic growth and Financial Development Index as the independent variable, with Gross National Expenditure, Gross Fixed Capital Formation and Trade Openness as the control variables. The study has used pooled ordinary least squares (OLS) as a methodology and found that there is a negative relationship between financial development and economic growth in both developed and developing countries in this period. In addition, the effects are more pronounced in developed countries compared to developing countries.¹

Keywords: Financial Development; Economic Growth; Financial Development Index; Panel Data; Ordinary Least Square(OLS).

¹This paper has been prepared as a part of the probationary training for Indian Economic Services (IES). The content of this paper is based on research and analysis conducted by Pranchal Gupta in an academic or professional capacity and is intended only for information purposes. The views and opinions expressed in this paper are those of the author and do not reflect the official position or policy of the Government of India.

1 Introduction

The 2008 global financial crisis (GFC) reshaped the dynamics of financial development and the dynamics of economic growth globally. Its impact spilled over across continents regardless of the economic level of any country. GFC demonstrated that excessive financial sector expansion could lead to instability, major regulatory changes, change in capital flow trends, and prompt alteration in economic policies. Thus, 2008 is a crucial turning point that transformed the approach to financial sector growth and its role in economic development across countries. This study uses a sample of 153 countries for the period 2008-2021.

The early consensus of the empirical literature on the finance and growth nexus has, by and large, supported the positive relationship between development and growth using data from across the country, time series and panel, as well as industry- and firm-level studies[1].

Financial development is a multidimensional approach that includes both financial institutions and financial markets. IMF publishes a Financial Development Index(FD), which gives a relative ranking of countries on depth, access, and efficiency of their financial institutions and financial markets.

Economic growth is also a multidimensional approach. However, Gross Domestic Product (GDP) is the parameter most used to measure the economic growth of a country throughout the world. This study has taken annual growth in GDP as a proxy for economic growth. GDP in its expenditure method is the aggregate of private domestic consumption, government expenditure, investment, and net exports. Thus, based on this established relationship, the dependent variable is the annual % growth in GDP, the independent variable is the financial development index (FD) and other control variables are gross national expenditure (% of GDP), gross fixed capital formation (% of GDP), trade openness(aggregate of exports and imports as % of GDP).

2 Literature Review

The debate about the relationship between financial development and economic growth can be traced back to Schumpeter (1911) [3], who argued that financial development spurs economic growth. Over the decades there has been a number of empirical researches in developed, developing and underdeveloped countries to examine the relationship between the economic

growth and financial development. However, the relationship between financial development and economic growth in various countries depends on other economic factors in that time frame.

The relationship between financial development and economic growth has been controversial on theoretical grounds. Based on the existing literature on the finance-growth nexus, there are three major theories. The first set of theories suggests that financial development is positively associated with economic growth regardless of countries (Ahmed & Ansari, 1998 [4]; Chakraborty, 2010 [5]; King & Levine, 1993 [6]; Masoud & Hardaker, 2012 [7]; Sahoo, 2013 [8]; Yang, 2019 [9]). The second theory suggests that there is no causal relationship between financial development and economic growth (Nain and Kamaiah, 2014 [10]). Third, there is a debate on whether the causal relationship is unidirectional or bidirectional. Some studies argue that financial development can be interpreted as a long-term determinant of economic growth but not vice versa. Studies by Bell & Rousseau (2001) [11], Bhattacharya & Sivasubramanian (2003) [12], Lenka (2015) [13] found the relationship to be unidirectional. Moreover, other studies by Demetriades and Luintels (1997) [14] and Singh (2008) [15] posit a bidirectional relationship between both.

The global financial crisis has been a turning point and recent studies have established that there is a negative relationship between financial development and economic growth. Rousseau and Watchel (2011) found that the finance-growth relationship disappeared during the period between 1990 and 2004. They attribute the vanishing effect to financial crises related to rapid and excessive financial deepening [16]. Archand, Berkes, and Panizza (2012) also suggested that the vanishing relationship between financial development and growth could be attributed to “the fact that many countries have reached the point at which financial deepening begins to have a negative effect on growth” [17]. Beck and others (2012) have explained in their paper that the vanishing effect could be due to an increase in the share of household loans to the detriment of company loans: they find that enterprise credit is positively associated with economic growth, whereas household credit is not [18]. Naceur et al. (2017) have also argued that financial development does not appear to be a magic bullet for economic growth [1].

This paper complements the existing literature in two aspects. First, this paper has extended the data to include recent data of the post-global financial crisis period. The sample contains panel data for 153 countries

from 2008 to 2021². Second, this study takes components such as gross fixed capital formation, gross net expenditure, and trade openness as independent variables that play a crucial role in determining the economic growth of a country alongside the financial development.

3 Data

The sample panel data of 153 countries from 2008 to 2021 have been taken from world development indicators (WDI) and the international monetary fund(IMF). The key variables are the financial development index (FD), which is calculated by the IMF as a composite index that contains the aggregate of the financial institution index, and the financial market index. These two indices are further aggregates of depth, access, and efficiency index in both cases. The image in the appendix is shown in Figure 1.

Financial Institutions Index (FI) is an aggregate of three sub-indices. First, Financial Institution Depth Index (FID), which comprises data on bank credit to private sector in percentage of GDP, pension fund asset to GDP, mutual fund asset to GDP, and insurance premiums, life and non-life to GDP. Second, the Financial Institutions Access Index (FID), which includes data on bank branches and ATMs per 100,000 adults. Third, Financial Institution Efficiency Index(FIE), which comprises data on banking sector lending-deposit spread, net interest margins, return on assets and equity, overhead costs to total assets and non-interest income to total income.

Financial Market Index is again subdivided into three sub-indices. First, Financial Market Depth Index (FMD), which comprises data on stock market capitalization to GDP, total debt securities of financial and non-financial corporations to GDP, stocks traded to GDP, international debt securities of government to GDP. Second, Financial Market Access Index(FMA), which includes data on percentage of market capitalization outside of the top 10 largest countries and total number of issuers of debt(financial and non-financial corporations, domestic and external) per 100,000 adults. Third, the Financial Market Efficiency Index (FMI), which comprises a stock market turnover ratio. The summary of the IMF Working Paper for the detailed methodology of calculating the FD index by Katsiaryna Svirydzhenka is given in Appendix 1 for reference [2].

²Some countries were dropped in further analysis due to unavailability of data

Another key variable is economic growth, which is a dependent variable calculated by the annual percentage growth rate of GDP at market prices based on constant local currency. The aggregates are based on constant prices for 2015, expressed in US dollars. GDP is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for the depreciation of fabricated assets or for the depletion and degradation of natural resources.

In addition, the control variables are Gross Fixed Capital Formation (% of GDP), Gross National Expenditure (% of GDP), Trade (% of GDP). Gross fixed capital formation (GFCF) includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the 1993 SNA, net acquisitions of valuables are also considered capital formation.

Gross national expenditure (GNE) is the sum of the final consumption expenditure of households (formerly private consumption), the final consumption expenditure of the general government (formerly general government, consumption), and the gross capital formation (formerly gross domestic investment).

Trade openness (TO) is the sum of exports and imports of goods and services measured as a share of the gross domestic product.

4 Methodology

The panel data are highly balanced, but before moving forward tests for autocorrelation, heteroskedasticity, and cross-sectional dependence need to be conducted. Then, using the model which can handle the problems in panel data we have to check the poolability of data through fixed effect and random effect, and compare them using the hausman test.

The modified Wald test for groupwise heteroskedasticity is used, which has the null hypothesis that there is homoskedasticity. The null hypothesis is rejected ($prob > \chi^2 = 0.000$). Thus, there is a prevalence of heteroskedasticity in the sample data.

Wooldridge test for autocorrelation is conducted, which has the null hypothesis that there is no first-order autocorrelation. The null hypothesis is not rejected ($prob > F = 0.4240$). Thus, there is no first-order autocorrelation in the data.

As the sample has a small number of years and a large number of countries thus, the Breusch-Pagan LM test is used for testing the cross-sectional dependence. The null hypothesis that there is no cross-sectional dependence is rejected (prob=0.000).

Since data is found to have the problem of heteroskedasticity and cross-sectional dependence(CSD), but no first-order autocorrelation thus, we use Driscoll-Kraay standard errors, as they correct for both heteroskedasticity and CSD.

Moving forward, fixed-effect and random-effect regressions are run with Driscoll-Kraay standard errors. Conducting the Hausman test, it is found that the fixed effect is better than the random effect for this sample data.

Table 1: **Hausman Test Results**

	Coefficients		Difference	S.E.
	(b) Scc_fe	(B) Scc_re	(b-B)	sqrt(diag(V_b-V_B))
FDIndex	-13.70938	-3.742374	-9.96703	5.784597
GFCF	0.1608082	0.113615	0.0471931	0.0383174
GNE	-0.1469113	-0.0351759	-0.1117354	0.0343225
Trade	0.1097827	0.0070971	0.1026856	0.0271421

Test: Ho: difference in coefficients not systematic
Chi2(4) = 20.54
Prob >Chi2 = 0.0004

5 Model Specification

Model 1: Base Model

$$GDP_growth_i = \beta_0 + \beta_1 FDIndex_i + \beta_2 GFCF_i + \beta_3 GNE_i + \beta_4 Trade_i + \epsilon_i \quad (1)$$

where:

GDP_growth = GDP growth (annual %), $FDIndex$ = Financial Development Index, $GFCF$ = Gross Fixed Capital Formation (% of GDP), GNE = Gross National Expenditure (% of GDP), $Trade$ = Trade Openness (exports + imports, % of GDP), ϵ_i = Error term

Note: $\beta_1, \beta_2, \beta_3, \dots$ represent the estimated coefficients for each independent variable.

The Financial Development Index has a significant negative impact on GDP growth (-13.709), significant at the 5% level. This suggests that

in the post-2008 period, higher financial development is associated with lower GDP growth in the sample. Then if we see the impact on developed and developing countries separately, developed countries have more negative and significant impact (-21.5335) than developing countries (-9.5673), which is less negative and insignificant. Refer to Table 1 for the results. Gross Fixed Capital Formation (GFCF) is positive and significant in both the overall sample (0.1608, $p < 0.01$) and developing countries (0.1694, $p < 0.01$), indicating that investment plays a crucial role in driving economic growth. However, in developed countries, the GFCF is positive but insignificant (0.0861, $p = 0.427$). This suggests that investment does not have the same impact on growth in developed economies, possibly due to diminishing returns on capital or already high levels of capital accumulation.

Table 2: **Regression Results: Base Model**

	(1) Overall Sample	(2) Developed Countries	(3) Developing Countries
Dependent Variable: GDP Growth (%)			
FDIndex	-13.7094** (5.8601)	-21.5335*** (6.7938)	-9.5673 (6.5569)
GFCF	0.1608*** (0.0433)	0.0861 (0.1051)	0.1694*** (0.0509)
GNE	-0.1469*** (0.0372)	-0.1526 (0.1054)	-0.1393** (0.0364)
Trade	0.1098*** (0.0273)	0.0969*** (0.0178)	0.1152** (0.0381)
Constant	9.4848** (3.9395)	17.0354 (11.2901)	7.2379 (4.3489)
Observations	1928	509	1419
R-squared	0.1187	0.1256	0.1184

Note: Standard errors in parentheses. All regressions use Driscoll-Kraay standard errors to account for cross-sectional dependence. * indicates significance at 10%, ** at 5%, and *** at 1%.

In the overall sample, government expenditure (GNE) has a significant negative effect (-0.1469, $p < 0.01$), implying that higher government spending is associated with lower economic growth. This could indicate inefficiencies in public spending or crowding out of private sector investment. In developing countries, GNE also has a negative and significant impact (-0.1393, $p < 0$).

From the regression of the base model, it is clear that the negative effect of

financial development is strongest in developed countries, indicating that excessive financialization might have hindered economic growth in high-income economies. However, for developing countries, the effect is weaker and statistically insignificant, suggesting that financial development may not yet be a limiting factor for growth in these economies. In addition, the overall sample reflects a significant negative relationship in the base model, as it is driven mainly by the results from developed countries.

Model 2: Post-2013 Effect

In the 2008-2021 period, 2013 is considered to be a crucial year as the US Federal Reserve signaled tapering in quantitative easing program, reducing bond purchases. This led to capital outflow, currency depreciation, and financial instability in emerging markets such as India, Brazil, Indonesia, and Turkey. This is also known as the Taper Tantrum. In addition, the Shanghai Free Trade Zone was established in 2013, allowing financial liberalization and internationalization of Renminbi (RMB). Moreover, many global banks, including major institutions in the US and Europe, began downsizing and restructuring due to stricter regulations and lower profitability post-global financial crisis. 2013 marked the beginning of widespread cost cutting, bank closures, and a focus on digital transformation in the banking sector across countries. 2013 is also the year that saw significant advancements in financial technology (FinTech), including digital payments and blockchain technology, which set financial development on a new path of progress. Thus, this study has included a post-2013 impact analysis of financial development on economic growth. The following model has been used for the analysis.

$$GDP_growth = \beta_1 FDIndex + \beta_2 GFCF + \beta_3 GNE + \beta_4 Trade + \beta_5 FD_post2013 + \epsilon_i \quad (2)$$

In Table 3, the negative impact of the post-2013 financial development has become stronger (-14.474) and remains significant at the level 5%. Investment and trade openness maintain their positive and significant effects. Government expenditure continues to have a negative and significant impact. The post-2013 dummy (FD_post2013) is positive but not significant, indicating that there is no clear evidence that financial development has a stronger or weaker impact after 2013 for the overall sample.

For developed countries, the negative impact of financial development is

even stronger (-20.414) and remains significant at the 5% level. Investment (GFCF) loses significance, suggesting that in developed countries, investment may not be as strongly linked to GDP growth. Government expenditure (GNE) is not significant, but trade openness (TO) has a strong positive and highly significant effect. However, the post-2013 dummy is positive but not significant, indicating that there is no major change in the impact of financial development after 2013.

Table 3: **Regression Results: Post-2013 Effect**

	(1)	(2)	(3)	(4)
	Baseline	Post-2013 Effect		
		Overall Sample	Developed Countries	Developing Countries
FDIndex	-13.709** (5.860)	-14.474** (4.769)	-20.414** (7.999)	-10.442** (4.707)
GFCF	0.161*** (0.043)	0.162*** (0.040)	0.085 (0.105)	0.170*** (0.049)
GNE	-0.147*** (0.037)	-0.148*** (0.036)	-0.158 (0.099)	-0.139*** (0.036)
Trade	0.109*** (0.027)	0.109*** (0.027)	0.097*** (0.017)	0.116*** (0.037)
FD_post2013	– –	0.721 (1.362)	0.905 (1.207)	0.370 (1.465)
Constant	9.485** (3.939)	9.711** (3.685)	16.794 (11.637)	7.341 (4.366)
Observations	1928	1928	509	1419
R-squared	0.119	0.119	0.128	0.119

Notes: Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

For developing countries, financial development still negatively affects GDP growth (-10.442) and remains significant at the 5% level. Investment maintains its strong positive effect, significant at the 1% level, and government expenditure continues to have a negative and significant impact. Trade openness also remains positive and significant; however, the post-2013 dummy is positive but insignificant.

The post-2013 dummy is not statistically significant in any model, suggesting that the negative impact of financial development does not change

significantly post-2013. The negative effect of financial development is observed across all models, but is strongest in developed countries.

Model 3: Time Fixed Effect

$$GDP_growth_{it} = \beta_0 + \beta_1 FDIndex_{it} + \beta_2 GFCF_{it} + \beta_3 GNE_{it} + \beta_4 TO_{it} + \sum_{t=2009}^{2021} \delta_t Year_t + u_i + \epsilon_{it}$$

where, GDP_growth_{it} = Economic growth for country i in year t , $FDIndex_{it}$ = Financial Development Index, $GFCF_{it}$ = Gross Fixed Capital Formation (Investment), GNE_{it} = Government expenditure, TO_{it} = Trade openness, $\sum_{t=2009}^{2021} \delta_t Year_t$ = Time fixed effects (year dummies for 2009–2021, with 2008 as the base year), u_i = Country fixed effects (absorbed in the fixed-effects model), ϵ_{it} = Error term

Time-fixed effects are used in panel data to control for unobserved time-specific factors that may influence the dependent variable but remain constant across all cross-sectional units (countries) in a given time period. Here, $\sum_{t=2009}^{2021} \delta_t Year_t$ represents the time dummies for each year (except for the base year). Each δ_t captures the effect of that specific year on GDP growth, independent of other explanatory variables.

In Table 4, year 2008 is the reference category (empty), meaning all other year coefficients should be interpreted relative to 2008. The coefficient for 2009 is negative and statistically significant in all samples (Overall: -3.08, Developed: -3.44, Developing: -2.97), indicating that GDP growth was significantly lower in 2009 compared to 2008. In 2010, there is a significant positive rebound in GDP growth in all samples, suggesting economic recovery following the crisis.

The coefficients for 2011 and 2012 are generally negative but not always significant, implying weak growth during the European sovereign debt crisis. The 2012 coefficient is significantly negative for developed countries (-1.96), suggesting a stronger impact on advanced economies compared to developing ones.

The coefficients for 2014 and 2015 are close to zero and insignificant, suggesting that there are no major deviations from 2008. From 2016 to 2018, there are positive and significant coefficients in developed and developing countries, reflecting strong global economic growth during this period.

The year 2020 shows a sharp decline in GDP growth in all samples, with

a particularly strong negative impact in developed countries (-7.50). The year 2021 shows a significant positive rebound, capturing post-pandemic recovery.

Table 4: **Fixed Effects Regression Results with Driscoll-Kraay Standard Errors**

	Overall Sample	Developed Countries	Developing Countries
FDIndex	-13.96*** (3.26)	-20.73** (8.49)	-8.75*** (2.38)
GFCF	0.164*** (0.03)	0.144 (0.11)	0.166*** (0.04)
GNE	-0.138*** (0.03)	-0.143 (0.09)	-0.134*** (0.04)
TO	0.074*** (0.01)	0.063*** (0.01)	0.079** (0.02)
Year Fixed Effects			
2008	0 (empty)	0 (empty)	0 (empty)
2009	-3.08***	-3.44***	-2.97***
2010	1.22***	1.88***	0.95***
2011	-0.015	1.23***	-0.48***
2012	-0.084**	-0.96***	0.15**
2013	-0.108	1.12***	-0.63***
2014	-0.141	0.24	-0.40**
2015	-0.238	-0.27	-0.33
2016	0.308**	0.49**	0.10
2017	0.834***	1.45***	0.49**
2018	0.274**	0.89***	-0.07
2019	-0.333***	-0.36	-0.45***
2020	-6.864***	-7.50***	-6.77***
2021	3.209***	5.03***	2.40***
Observations	1928	509	1419
Number of Groups	144	39	105
Within R-squared	0.2837	0.3508	0.2659

Notes: Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

6 Future Research Scope

Traditional view that financial development acts as a driver of growth is challenged in the recent literature, including this research paper. It proposes that excessive financialization leads to economic volatility and inequality. Moreover, future studies can explore whether there is any optimal level of financial development beyond which it starts to harm economic development? Any non-linear relationship between financial development

and economic growth can also be explored.

The contrasting results in developed and developing countries highlight the need for context-specific financial policies. It can be explored whether developing countries should prioritize financial deepening and developed countries should focus on stability.

Moreover, it can be examined whether financial regulations aimed at stabilizing economies also limit growth potential. Country-specific studies may also be conducted.

7 Policy Implications

Given the heterogeneous impact of financial development in different countries, a one-size-fits-all approach is ineffective. Instead, policies should be tailored according to the stage of financial maturity and institutional strengths of a country. 4.

In developed countries, policymakers should ensure that the expansion of the financial sector does not lead to misallocation of resources and speculative bubbles. In developing countries, financial development policies should focus on directing capital into productive sectors to enhance real economic activity.

8 Conclusion

The paper analyzes the connection between economic growth and financial development in different economies. The results provide evidence of a negative association between GDP growth and financial development, measured by the Financial Development Index, with the effects being more pronounced in developed economies compared to developing economies. This outcome contradicts the general belief that financial development drives economic growth in all economies.

One of the possible reasons for this adverse correlation is the risk of financialization, effects such that excess growth in the financial sector might lead to resource diversion from productive to speculative investments. In addition, financial instability, debt overhang, and marginal decreasing returns in developed economies can also be responsible for the noted adverse effect.

The research also discovers that investment (GFCF) and trade openness (TO) are positively related to economic growth, whereas government spend-

ing (GNE) negatively affects economic growth, perhaps as a result of wasteful public expenditure or crowding-out effects. Time fixed effects uncover significant external shocks such as the global financial crisis and COVID-19 impacting economic growth trends.

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A Appendix

Methodology for calculating the Financial Development Index (FDI) used by the International Monetary Fund[2]:

The Financial Development Index (FDI) is a composite measure that captures the multidimensional nature of financial development. It incorporates aspects of financial institutions and financial markets in terms of depth, access, and efficiency. The index is constructed using the following methodology.

1. Data Sources and Coverage The data set covers 183 countries from 1980 to 2013 using multiple sources, including the World Bank FinStats, IMF Financial Access Survey, BIS Debt Securities, Database and Dealogic Corporate Debt Database.

The index is built on nine sub-indices, divided into Financial Institutions (FI) and Financial Markets (FM): Financial institutions: Depth (FID), Access (FIA), Efficiency (FIE). Financial markets: Depth (FMD), Access (FMA), Efficiency (FME). These sub-indices are aggregated into an overall Financial Development Index (FDI).

2. Treatment of Missing Data - If data for a certain year are unavailable, the most recent available observation is used.

- If a whole series is missing for a country, it is assumed that the financial market is absent or underdeveloped.

- Splicing method is used when a data series starts later than others. This avoids artificial jumps in the index due to the introduction of new data.

3. Normalization and Treatment of Outliers

- Each variable is winsorized at the 5th and 95th percentiles to mitigate the influence of extreme values.

- Min-Max normalization is applied:

$$X^* = \frac{X - X_{\min}}{X_{\max} - X_{\min}}$$

where X^* is the normalized variable, ensuring that the values range between 0 and 1.

4. Aggregation and weighting

- The sub-indices are aggregated using Principal Component Analysis (PCA), which assigns weights based on the contribution of each variable to overall financial development.

- The linear aggregation formula used is:

Financial Development Index - Overview

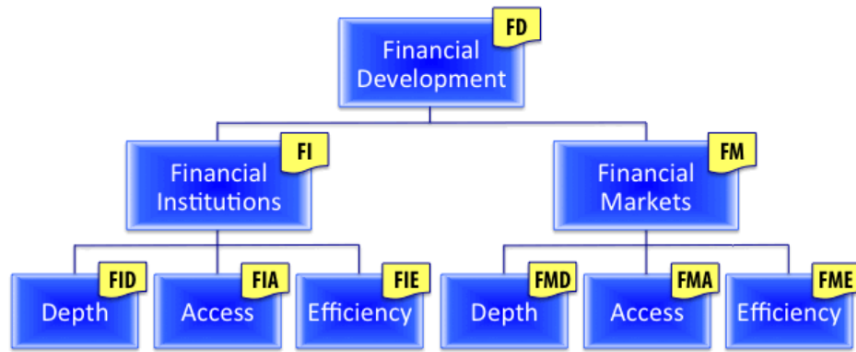


Figure 1: Financial Development Index, source:International Monetary Fund, [Source: IMF]

$$FI = 0.40 \times FID + 0.30 \times FIA + 0.30 \times FIE$$

$$FM = 0.40 \times FMD + 0.30 \times FMA + 0.30 \times FME$$

$$FD = 0.50 \times FI + 0.50 \times FM$$

- A geometric mean approach was considered but rejected due to its disproportionate penalty on missing or zero-value indicators.

5. Final Index Calculation

- The Financial Development Index (FDI) is constructed as a weighted combination of financial institutions (FI) and financial markets (FM).

- The final FDI scores are normalized between 0 and 1, where higher values indicate higher financial development.

This methodology ensures that the Financial Development Index provides a comprehensive and comparable measure of financial development between the countries and over time.

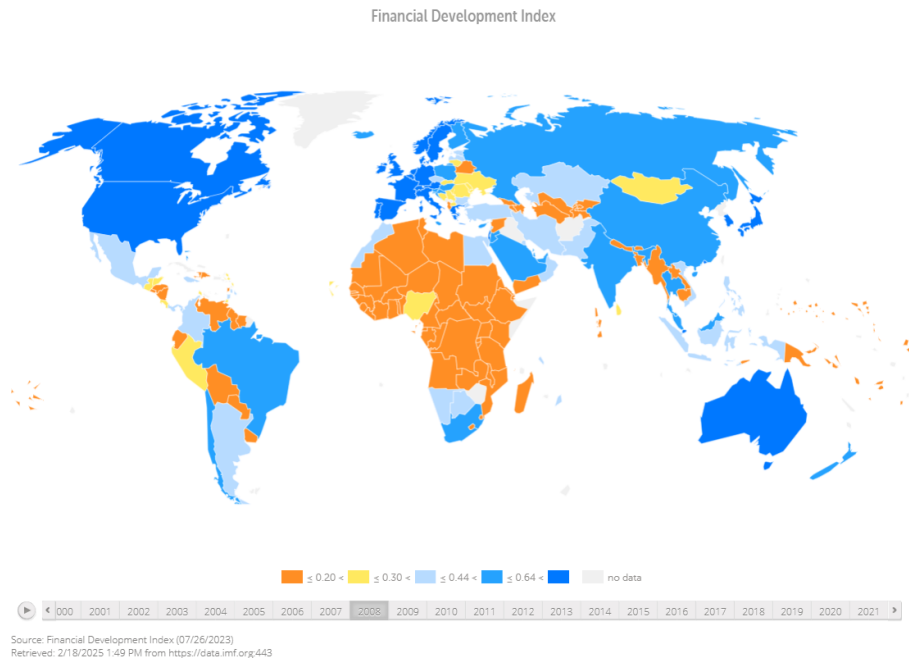


Figure 2: Financial Development Index 2008, [Source: IMF]

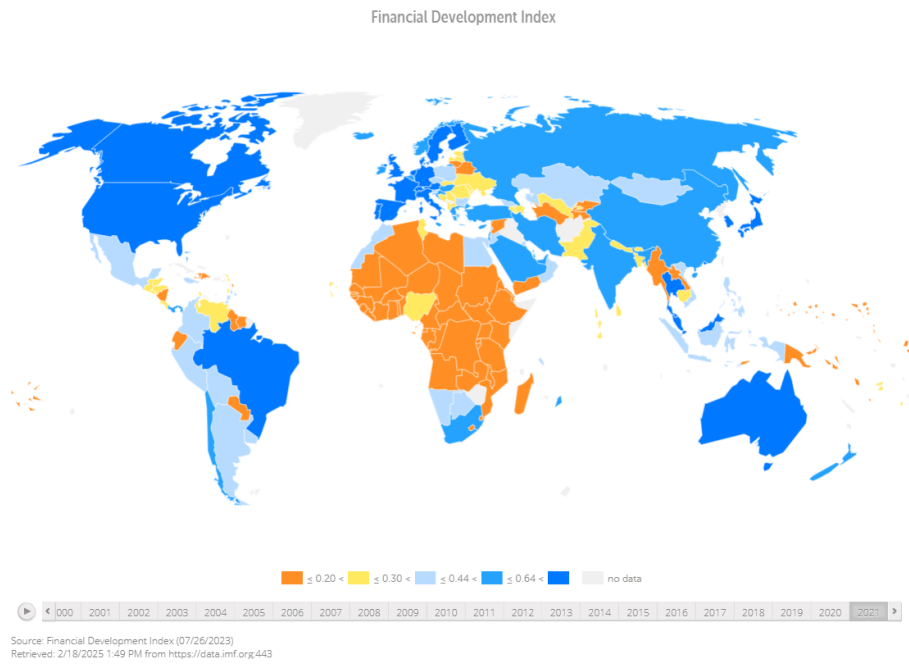


Figure 3: Financial Development Index 2021, [Source: IMF]

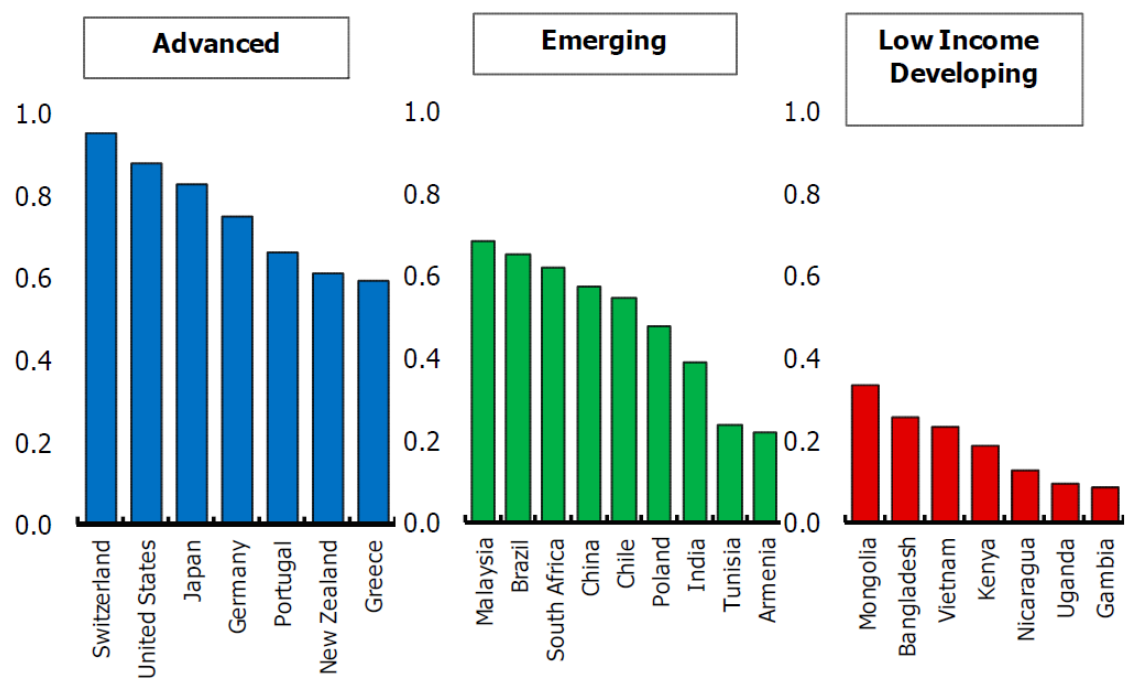


Figure 4: Financial Development Index, selected countries, 2013; [Source: IMF staff estimates]