Convergence in Financial Development and Growth[*]

Zhiheng He [§]
Tsinghua

Yang You [§]
HKU

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Abstract

We evaluate the cross-country convergence of financial development and its relationship with GDP growth. Financial inclusion variables have been widely converged across countries, and the catch-up effect of countries with poor financial coverage mainly drives the convergence. In contrast, financial development measures — including domestic credit, liability, mutual fund size, and stock market capitalization — have diverged since 1985 despite the absolute convergence in GDP and financial inclusion. The GDP growth rates strongly correlate with the change in financial development but not the improvement in financial inclusion.

JEL Classification: G20, O11, O43, O47.

Keywords*: Economic Convergence, Financial Inclusion, Divergence in Finance*

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[§]Tsinghua University, Email:hezh19@mails.tsinghua.edu.cn.

[§]HKU Business School, The University of Hong Kong, Email:yangyou@hku.hk.

1 Introduction

Kremer et al. (2022) documents the emergence of absolute convergence since 1985 and relates this new trend with the prevailing convergence of policy correlates. Countries are becoming more and more similar; thus, the rate of absolute convergence gradually converges to the rate of conditional convergence. Many policy-related financial variables have converged, such as financial freedom, inflation, central bank independence, etc. However, converging policies do not necessarily lead to financial development and market performance convergence. For example, in Kremer et al. (2022), credit to GDP diverged from 1985 to 2015. This paper examines the convergence of more financial outcomes.

To further explore the convergence of financial inclusion and performance, we collect 11 country-level panel data from the Global Financial Development database released by the World Bank and divide them into two groups, i.e., *inclusion* (of financial accesses) and *performance* (of financial activities), respectively. The financial inclusion variables include physical banking infrastructures measured by the number of bank branches and ATMs, and financial accessibility measured by the number of listed companies and bank accounts normalized by the population size. These variables capture the availability of financial services in the nation. To some extent, these variables capture the extensive margin of the financial sector reaching the general public.

The performance variables capture the scale of the country's financial activities by the following seven dimensions: deposit money banks' assets, liquid liabilities, mutual fund assets, financial system deposits, insurance company assets, domestic credit to private, and stock market capitalization as a percentage of GDP. These variables quantify the financial development along the intensive margin, and professional institutions mostly operate these financial services.

We first demonstrate that higher-income countries typically exhibit greater financial inclusion and better performance in the financial sector. Moreover, these variables' global averages moved toward higher-income countries, respectively. The number of bank accounts, bank branches, and ATMs has been rising since 2020, and we see no significant increase in the number of listed companies per capita. Also, not surprisingly, all metrics for financial sector performance rose from 1985 to 2020. On average, countries experience expansion of the financial sector in both inclusion and performance.

Next, we reveal a fascinating pattern: financial inclusion is generally moving towards convergence, whereas six out of seven financial performance indicators show a significant divergence trend over time. We document that financial inclusions have converged since 2000 in both cross-section and panel regressions. For example, the number of bank branches per capita measures

financial inclusion. In a study of 140 countries, we find that a 1%-lower initial number of bank branches per capita is associated with 0.319%-higher ($se = 0.034\%$) corresponding log growth towards 2020. This suggests a catch-up trend among lower-income countries in terms of financial inclusion. The cross-section convergence rate from 2000 to 2020 ranges from -0.32 ($s.e.$= 0.034) to -0.40 ($s.e.$= 0.045) for the three banking variables, and the number of public companies per capita converges at a rate of -0.17 ($s.e.$= 0.069). We further run panel regressions with 5-year and 10-year changes as the outcome variables, allowing both country and year-fixed effects. The convergence rates become even faster in panel regressions. In contrast, considering financial performance, the analysis of 136 countries shows that a one-percentage-point higher initial ratio of private credit to GDP in 2000 correlates with a 0.140-percentage point ($se = 0.078$) increase in the growth of this ratio over the next two decades. Similarly, liquid liabilities, stock market value, insurance company size, mutual fund assets, and deposits in the financial system also show widened gaps between financially developed and under-developed countries. The financial performance is highly path-dependent concerning its initial development level and exhibits no catch-up effects.

Our third analysis links financial development with economic growth. Observing absolute convergence in the past two decades, we find four out of seven financial performance metrics significantly and consistently explain GDP growth. For instance, among 105 applicable countries, after controlling initial GDP, we observe that every one-percentage point increase in the ratio of private credit to GDP (e.g., from 10% to 11%) is associated with 0.548%-higher logarithmic GDP growth ($s.e. = 0.147\%$) over the same period. On the contrary, financial inclusion does not show a significant predictive power to GDP growth, at least within a twenty-year time span. We further compare the convergence speed with and without controls of the growth of both financial inclusions and performance variables. For financial inclusion measures, the unconditional convergence rate is not statistically different from the conditional convergence rate. However, the unconditional convergence rate is only half of the unconditional convergence rate after controlling the changes in liquid liability, financial system deposits, and credit to the private sector. The divergence of financial sector performance counteracts the unconditional convergence of GDP documented in Kremer et al. (2022).

In conjunction with our three empirical findings, we delve into the implied puzzle concerning the relationship between economic convergence and financial development: Given that both inclusion and performance are parts of financial development and are positively correlated with higher income, how can financial performance show divergent growth despite the convergence in financial inclusion and economic growth? This discrepancy suggests a missing link in the transmission process — from the catch-up in financial inclusion to the widening gap in financial

performance. On the extensive margin, financial services do reach more people. However, the scale of financial development exhibits a widened gap, and such a gap further affects economic growth. Financial inclusion is often viewed as a fundamental prerequisite for developing financial activities. Yet, we find that an advancement in financial inclusion alone is insufficient to spur economic growth. Effective growth also requires an increase in the scale of actual financial activities. Therefore, the missing link offers a counterforce of economic convergence by enhancing the gap in financial development. Persistent country-specific characteristics, such as cultural factors, offer potential for rationalizing the transmission variation, as inspired by Kinnan and Townsend (2012), for example, which still calls for further exploration.

Literature. The paper revisits the economic convergence, especially the new trend over the past two decades. This branch of literature flowered in the 1990s, with major findings of nonexistence of absolute economic convergence (e.g., Barro, 1991; Pritchett, 1997), but convergence within countries (e.g., Barro and Sala-i Martin, 1992). Kremer et al. (2022) documents that although overall longer-period economic growth appeared to diverge, there is a trend toward unconditional convergence since 1990 and convergence since 2000. During this period, many correlates of growth, e.g., human capital, policies, and institutions, also converged and moved in the direction associated with higher income. Such absolute convergence is also documented by Roy et al. (2016); Patel et al. (2021).

The paper adds to the literature on discussing the relationship between financial development and economic growth. King and Levine (1993a,b) presents cross-country evidence consistent with Schumpeter's view that the financial system promotes economic growth using data over the 1960-1989 period. Fung (2009) finds that the mutually enhancing relationship between financial development and economic growth diminishes as sustained economic growth begins to take shape. As such, low-income countries with a relatively underdeveloped financial sector are more likely to be trapped in poverty. This view is also corroborated by meta-analysis across 67 studies (e.g., Valickova et al., 2015). The recent relationship is also discussed by a set of literature (e.g., Guru and Yadav, 2019; Asteriou and Spanos, 2019; Zhang and Naceur, 2019; Shahbaz et al., 2022) The paper also relates to the growth of specific financial correlates, such as credit growth (e.g., Coeurdacier et al., 2015; Albanesi et al., 2022), liquid liabilities (e.g., McCaig and Stengos, 2005; Loayza and Ranciere, 2006), stock market capitalization (e.g., Harris, 1997; Arestis et al., 2001), and financial system deposits (e.g., Bruno et al., 2012). There is evidence that specific correlates also exhibit divergence among countries: Kiss et al. (2006) identify the growth of credit to the private sector (credit/GDP levels) across Central and Eastern Europe, disentangling the observed

growth into an equilibrium trend and an excess (boom) component, which is also documented as an exception for convergence in Kremer et al. (2022).

The paper also relates to research on access to financial systems and financial inclusion, as comprehensively introduced by World Bank working series (e.g., Beck et al., 2009; Kendall et al., 2010; Demirgüç-Kunt and Klapper, 2012). The development of access to finance can be treated as a growth constraint, reflected in firm financing (e.g., Beck and Demirguc-Kunt, 2006), as well as the adoption of private financial activities. However, the adoption of financial systems is not only affected by physical access; e.g., Kinnan and Townsend (2012) mentions that the adoption of financial inclusion is facilitated by kinship. This, as a result, leaves a potential gap between the development of access levels and financial activities. On the other hand, Honohan (2008) examines the cross-country variation in household access to financial services. The within-country effects of financial access to economic growth are also widely discussed (e.g., Paramasivan and Ganeshkumar, 2013; Demirgüç-Kunt and Klapper, 2013; Wang and Guan, 2017). Together with these findings, we combine the development of financial access levels with financial development and economic growth and discuss how access affects economic growth.

The remainder of this paper is structured as follows. Section 2 introduces data, variables, and specification methods. Section 3 documents three strands of empirical findings. Section 4 discusses the interaction among the development of financial inclusion, financial performance, and economic growth. Section 5 concludes.

2 Empirical Setup

2.1 Data and Variables

We collect 11 country-level yearly indicators from 1985 to 2020 from the Global Financial Development (GFD) database released by the World Bank and divide them into two groups: *inclusion* of financial systems and *performance* of financial activities.[1] The inclusion indicators reflect the states of construction and popularization of the physical infrastructure related to access to the financial system, i.e., bank branches and ATMs, as well as the size of the participating entities, i.e., bank accounts and listed companies. Given that they are quantitative terms with large cross-country variations, we logarithmize them in the following analysis. The performance indicators

[1]Our database collects credible data from various resources. For inclusion indicators, I1-I3 are collected from the Financial Access Survey (FAS) by the International Monetary Fund (IMF). I4 is collected from the World Federation of Exchanges. For performance indicators, P1-P6 are from International Financial Statistics (IFS) by the International Monetary Fund (IMF). P7 is from the World Federation of Exchanges.

demonstrate the country-level market scales of major financial activities, especially those documented in literature as being associated with economic growth, such as private sector credit growth. These indicators are already conceptualized in the original dataset relative to a country's GDP, i.e., the economy's size is eliminated. Another key variable is the measurement of economic growth. We use the GDP per capita, adjusted for Purchasing Power Parity (PPP), in our main specification.

Table 1 provides the indicator name, detailed description, and raw summary statistics for each indicator. All indicators exhibit large variations across countries. Take P6, domestic credit to the private sector, as an example. Its minimum value is only 0.02% (to GDP), implying that the corresponding country had almost no private credit supply then. However, the maximum value reaches 304.57%. These maxima of financial variables are not simply outliers or data errors but correspond to fat tails of the indicator values. Such large variations may reflect differences in the characteristics of economic activity between countries, also encompass overall growth, and are discussed further in subsequent analysis.

Combining all the variables, we work with an unbalanced panel in which different variables can start in different years upon data availability. We also calculate the financial development levels and their changes to generate cross-sectional data for our main analysis.

Table 1. Summary Statistics of Raw Variables

Code	Name & Description	Detailed Description	Mean	Std.Dev	Min	25%	Median	75%	Max
Inclusion									
I1	(Log) Bank accounts per 1,000 adults	Number of depositors with commercial banks per 1,000 adults.	5.87	1.53	0.00	5.00	6.16	6.88	12.52
I2	(Log) Bank branches per 100,000 adults	Number of commercial bank branches per 100,000 adults.	2.61	1.09	0.13	1.82	2.69	3.26	7.49
I3	(Log) ATMs per 100,000 adults	Number of ATMs per 100,000 adults.	3.27	1.44	0.00	2.25	3.58	4.17	9.65
I4	(Log) Number of listed companies per 1,000,000 people	Number of domestically incorporated companies listed on the country's stock exchanges at the end of the year per 1,000,000 people (does not include investment companies, mutual funds, or other collective investment vehicles).	2.54	1.24	0.00	1.53	2.47	3.50	6.84
Performance									
P1	Deposit money banks' assets (% of GDP)	Total assets held by deposit money banks as a share of GDP. Assets include claims on domestic real non-financial sector which includes central, state and local governments, non-financial public enterprises and private sector. Deposit money banks comprise commercial banks and other financial institutions that accept transferable deposits, such as demand deposits.	53.05	42.79	0.03	20.66	41.99	71.97	305.24

Continued on next page.

Table 1 Continued.

Code	Name & Description	Detailed Description	Mean	Std.Dev	Min	25%	Median	75%	Max
P2	Liquid liabilities (% of GDP)	Ratio of liquid liabilities to GDP. Liquid liabilities are also known as broad money, or M3. They are the sum of currency and deposits in the central bank (M0), plus transferable deposits and electronic currency (M1), plus time and savings deposits, foreign currency transferable deposits, certificates of deposit, and securities repurchase agreements (M2), plus traveler's checks, foreign currency time deposits, commercial paper, and shares of mutual funds or market funds held by residents.	57.90	59.66	0.06	26.39	45.19	71.36	927.43
P3	Mutual fund assets (% of GDP)	Ratio of assets of mutual funds to GDP. A mutual fund is a type of managed collective investment scheme that pools money from many investors to purchase securities.	41.93	107.30	0.01	3.22	11.82	33.22	998.32
P4	Financial system deposits (% of GDP)	Demand, time and saving deposits in deposit money banks and other financial institutions as a share of GDP.	48.25	44.50	0.02	19.49	38.62	62.77	462.13
P5	Insurance company assets (% of GDP)	Ratio of assets of insurance companies to GDP.	18.21	26.93	0.10	2.07	5.58	22.75	198.68
P6	Domestic credit to private sector (% of GDP)	Private credit by deposit money banks and other financial institutions to GDP.	45.61	40.45	0.02	15.51	33.24	62.55	304.57
P7	Stock market capitalization (% of GDP)	Total value of all listed shares in a stock market as a percentage of GDP.	62.50	106.68	0.01	18.13	37.37	75.61	1777.54

Note: In the main analysis, we use $\log(IX+1)$ rather than $\log(IX)$, $(X=1,2,3,4)$ to avoid zero raw values. The data coverage is from 1985 (or the earliest applicable year) to 2021 (or the latest applicable year, at least 2020).

2.2 Specification

For the selected indicator X, denote the first applicable year as t_0, and the corresponding value of country i in year t as $X_{i,t}$. To first access the relationship finance and development level, we first test the cross-sectional correlation between X and GDP, i.e.,

$$X_{i,t} = \alpha + \delta \log(GDP_{i,t}) + \epsilon_{i,t}. \tag{1}$$

Indicator X is defined as "high development favored" if the coefficient δ is significantly positive, i.e., higher-GDP countries are associated with higher values of X.

The next step is to measure the convergence of the financial indicators, that is, the β-convergence of policy correlates in Kremer et al. (2022). Formally, β-convergence of indicator X from year t_0 to year 2020 is the coefficient β in the following country-level cross-sectional regression:

$$\Delta_{t_0 \to 2020} X_i = \alpha + \beta X_{i,t_0} + \epsilon_i, \tag{2}$$

where $\Delta_{t_0 \to 2020} X_i = X_{i,2020} - X_{i,t_0}$ is the change of X during the sample period. A negative

β indicates that higher initial values correspond to lower future growth; that is, the indicator X exhibits convergence across countries.

The third step is to estimate the convergence of economic growth with financial indicators as the control variable,

$$\Delta_{t_0 \to 2020} \log(GDP)_i = \alpha + \beta \log(GDP_{i,t_0}) + \gamma \Delta_{t_0 \to 2020} X_i + \epsilon_i, \tag{3}$$

where $\beta < 0$ implies the convergence of economic growth, and a significant positive estimated γ indicates that the growth of X contributes to economic growth. To further confirm that the inclusion of financial correlates generates a proper specification, we run the corresponding benchmark regression, i.e., (3) without $\Delta_{t_0 \to 2020} X_i$, on the same sample. Then, we also present the F-test between the two regressions to examine how the GDP convergence rate changes with and without controlling for the change in financial inclusions/performance.

3 Empirical Findings

3.1 Cross Sectional Relationship between Indicators and Economic Growth

Table 2 reports how the indicators relate to economic growth status and their general changes during the sample period.

First, all inclusion indicators are "high development favored": a high-income country tends to own more bank accounts, bank branches, ATMs, and listed companies per capita, respectively. On the other hand, the annual average increases from the first available year to 2020, indicating that worldwide countries have developed physical access to financial systems on average.[2] Take indicator I2 as example. Among 157 countries in 2004, one country had 11.36 ($\simeq e^{2.43}$) bank branches per hundred thousand adults. The 1%-higher GDP per capita is associated with the 0.599%-higher number of branches per capita (significant at 1% level) — higher-income countries are associated with more bank branches. This is reasonable, as the popularization of physical facilities to financial systems reflects a boom in financial activities, which is also positively related to the scale of supply and demand for relevant economic activities. Over the past two decades, the global average has increased from 11.36 to 14.15. Although this does not directly imply economic growth, the wider availability of physical facilities creates the basic prerequisites for developing and expanding the scale of relevant economic activities.

[2]The number of observations of the first year and 2020 may differ. Since new entrants to the sample typically are small economies, the results in this table tend to underestimate the overall change. In addition, we also repeat the same test on the balanced data. The results show the robustness of such implications.

Table 2. Correlation with GDP and Changes of Financial Fundamentals

Code	Name & Description	First Year	Dev. Favored	$\delta_{\text{FirstYear}}$		Yearly Mean		N
				Estimate	Std.Err	First	2020	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Inclusion								
I1	(Log) Bank accounts per 1,000 adults	2004	High	0.884^{***}	0.138	4.99	6.43	48
I2	(Log) Bank branches per 100,000 adults	2004	High	0.599^{***}	0.041	2.43	2.65	157
I3	(Log) ATMs per 100,000 adults	2004	High	0.912^{***}	0.054	2.69	3.64	122
I4	(Log) Number of listed companies per 1,000,000 people	2000	High	0.653^{***}	0.071	2.62	2.51	82
Performance								
P1	Deposit money banks' assets (% of GDP)	1985	High	10.489^{***}	1.894	42.12	72.89	127
P2	Liquid liabilities (% of GDP)	1985	High	9.290^{***}	1.834	45.69	85.06	124
P3	Mutual fund assets (% of GDP)	2000	High	17.001^{***}	5.564	29.97	68.19	40
P4	Financial system deposits (% of GDP)	1985	High	10.290^{***}	1.549	36.64	72.78	126
P5	Insurance company assets (% of GDP)	2000	High	15.930^{***}	2.538	24.47	25.78	50
P6	Domestic credit to private sector (% of GDP)	1985	High	11.087^{***}	1.618	35.44	63.24	126
P7	Stock market capitalization (% of GDP)	2000	High	24.417^{***}	4.746	55.28	102.17	68

Note: Column (3) presents the first year, denoted as year t_0 in the following. Default is 1985. If fewer than 40 observations (countries) are applicable in 1985, then 2000 or the earliest applicable year is used; (4) reports the development-favored correlates determined by their correlation with GDP per capita in t_0. "High" refers to significant positive estimates of δ; (5) and (6) report the corresponding estimations and standard errors. $^{***},^{**},^{*}$ indicate statistical significance at the 1%, 5% and 10% respectively. (7) and (8) report the mean of fundamentals in t_0 and 2020 respectively. (9) presents the number of initial observations (countries) in t_0.

The performance indicators exhibit similar properties. Take indicator P6 as an example. Among 126 sample countries in 1985, the average scale (to GDP) of domestic credit to private sector was 35.44%. A 1%-higher GDP per capita is associated with 0.11-points higher of the corresponding ratio (e.g., from 10% to 10.11%) on average. This is an echo with the findings in Kremer et al. (2022). These financial activities correspond to a high level of economic development, although they are also partly affected by specific economic structures of countries. During the sample period, the overall scale of credit supply has experienced rapid growth faster than global GDP growth, as the corresponding ratio has increased to 63.24% until 2020. Similar changes have also been seen in deposit money bank's assets, liquid liabilities, mutual fund assets, financial system deposits, issuance company assets, and stock market capitalization. They imply that the roles of financial activities have been increasingly important with the rapid development of overall scales.

3.2 Different Convergence Patterns between Inclusion and Performance

We first examine the convergence of financial inclusion as Table 3 reports. Columns (1)-(4) document the results of (2), indicating that during the past two decades, the four inclusion

indicators exhibit convergence across countries. The growth and change of such physical access and participating entities are relatively stable, allowing this finding of convergence to survive under tighter controls. As columns (5)-(12) show, we regress the change of $X_{i,t}$ in Δ_t years on its previous status based on the panel data. With country- and year-fixed effects, potential country-specific fundamentals and aggregate time trends are omitted separately. The convergence is still robust. As a result, low-income countries catch up with high-income in financial inclusion.

Table 3. Convergence of Financial Inclusion

Dependent:	$\Delta_{t_0 \to 2020} X_i$				$X_{i,t+\Delta_t} - X_{i,t}, \ \Delta t = 5$				$X_{i,t+\Delta_t} - X_{i,t}, \ \Delta t = 10$			
X:	I1	I2	I3	I4	I1	I2	I3	I4	I1	I2	I3	I4
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Variables												
$I1_{i,t_0}$	-0.358***											
	(0.063)											
$I2_{i,t_0}$		-0.319***										
		(0.034)										
$I3_{i,t_0}$			-0.403***									
			(0.045)									
$I4_{i,t_0}$				-0.169**								
				(0.069)								
$I1_{i,t}$					-0.860***				-1.03***			
					(0.090)				(0.100)			
$I2_{i,t}$						-0.572***				-0.893***		
						(0.067)				(0.064)		
$I3_{i,t}$							-0.634***				-0.917***	
							(0.044)				(0.030)	
$I4_{i,t}$								-0.534***				-0.839***
								(0.042)				(0.068)
Fixed-effects												
Country					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
year					Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Fit statistics												
Observations	42	140	110	60	881	2,085	1,954	1,969	428	1,169	1,047	1,529
R^2	0.445	0.388	0.431	0.094	0.807	0.756	0.830	0.588	0.955	0.936	0.953	0.829

Note: Column (1)-(4) report country-level cross-sectional estimates. Variables $I1$-$I4$ are four fundamental indicators for inclusion of financial systems, i.e., bank accounts (logarithmic, same below) per 1,000 adults; bank branches per 100,000 adults; ATMs per 100,000 adults; and number of listed companies per 1,000,000 people, respectively. Standard-errors in parentheses. Column (5)-(12) report panel-data analysis, where Δt equals 5 (10) years in the first (last) four columns. Country and time effects are fixed. Clustered (country & year) standard-errors in parentheses. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1.

This can be interpreted as a catch-up effect that benefits developing countries — There is a comparative limit to the need for both the popularization of physical access to financial systems and the growth of participating entities, and when the relevant indicators in developed countries reach a certain level, there is gradually no longer a room or a necessity for further growth. Therefore, developing countries, in general, have a tendency to close the gap in these development aspects gradually. However, the concern is that the convergence mainly originates from the

poor starting level of the financial development. Financial modernization benefits low-income countries more since the financial infrastructure is well-established in developed economies.

We then apply the specification (2) to the performance indicators. Table 4 Panel A shows the results. In contrast to inclusion indicators, all the performance indicators do not show significant convergence. Interestingly, six indicators show significant divergence. For example, column (6) documents that a one-percentage point higher of domestic credit (to the private sector) to GDP in 1985 is associated with a 0.266-percentage point ($se = 0.155$) higher growth of credit to GDP from 1985 to 2020. Recall the large variation across countries of domestic credit to GDP in 1985 with a standard deviation of 40.45%, and the above divergence can cause a huge enhancement to the development gap of private credit.

Unlike inclusion indicators, although it is also technically applicable to test the convergence of performance on the panel data, the results are more affected by the selection of the sample interval as well as the time interval and, therefore, less reliable. This is because the performance indicators are usually more sensitive to various external shocks, e.g., financial crises, and the yearly values are always more volatile. As such, we repeat the same specification with a shorter sample period as an alternative robustness test, which is also more comparable to the access indicators, as Table 4 Panel B shows. The corresponding estimates show the same significant levels and signs. Moreover, the coefficients are relatively closer to zero. Lateralizing the process of divergence is generally persistent in the same direction so that longer time windows bring larger coefficients.

3.3 Financial Inclusion and Performance Contribute to Economic Growth

The third specification focuses on economic growth. We treat the financial inclusion and performance indicators as correlates of economic growth as (3) shows. We want to know how and how much these financial developments explain the growth.

Table 5 reports the results. Panel A shows the results of the cross-sectional specification (3), and Panel B corresponds to the absolute convergence test on the same sample. Column (1) provides the benchmark result of growth convergence since 2000 without adding any potential correlates.[3] The estimated coefficients of $\log(GDP)_{i,t_0}$ are negative, implying that economic growth exhibits convergence in the sample period. This is in line with the recent research, i.e., the trend towards unconditional convergence since 1990 and convergence since 2000 (Kremer et

[3]Though it is not directly comparable with the right columns due to missing data on covariates for some countries, the benchmark presents the overall converging trends in economic development of the world over the last 20 years across a larger data set.

Table 4. Test of the Convergence of Financial Performance Indicators

Independent:	P1	P2	P3	P4	P5	P6	P7
X: (% of GDP)	Deposit money banks' assets	Liquid liabilities	Mutual fund assets	Financial system deposits	Insurance company assets	Domestic credit to private sector	Stock market cap
Panel A							
Dependent:	$\Delta_{t_0 \to 2020} X_i$						
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Variables							
X_{i,t_0}	-0.194	0.760***	3.690***	0.518***	0.395***	0.266*	1.71***
	(0.144)	(0.229)	(0.368)	(0.162)	(0.098)	(0.155)	(0.357)
Fit statistics							
Observations	110	107	41	108	40	109	50
R^2	0.016	0.095	0.721	0.088	0.299	0.027	0.323
Panel B							
Dependent:	$\Delta_{t_0 \to 2020} X_i, \quad t_0 = 2000$						
Model:	(1)	(2)	(3)*	(4)	(5)*	(6)	(7)*
Variables							
X_{i,t_0}	-0.099	0.346***	3.690***	0.306***	0.395***	0.140*	1.71***
	(0.086)	(0.107)	(0.368)	(0.081)	(0.098)	(0.078)	(0.357)
Fit statistics							
Observations	137	132	41	134	40	136	50
R^2	0.010	0.075	0.721	0.097	0.299	0.024	0.323

Note: Country-level OLS estimates. Standard-errors in parentheses. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1.

al., 2022).

Regarding the estimates of the financial indicators. Five performance indicators show significant and robust impacts according to the significant positive estimated coefficients and the corresponding F tests.[4] In precise, higher deposit money bank assets, liquid liabilities, mutual fund assets, financial system deposits, and private credit positively contribute to economic growth. The common feature is that they are related to borrowing and lending, albeit reflected in different sectors. They manifest investment and, therefore, are linked to economic growth.

Moreover, columns (5)-(8) and (10) of Table 5 reveal that after including financial indicators, the absolute convergence appears to be more significant. This aligns with our previous findings,

[4]We also examine their contribution to growth on the panel data set to account for potential differences in steady states, as discussed in Acemoglu and Molina (2022), while our focus is not on the convergence coefficient β, but the contribution of the correlates, γ. The panel suggests the robust contribution to economic growth of P1, P2, P4, and P6.

i.e., financial performance is diverged across countries. Therefore, the development of financial performance acts as a counterforce of economic convergence.

Interestingly, better inclusion of financial systems does not show significant impacts on economic growth, even though financial activities are naturally related to economic growth.

There are mainly two explanations. First, the initial state of GDP absorbs a large part of the effect of inclusion growth. As mentioned above, higher access growth is often born out of the catch-up effect in low-income countries. The same effect is simultaneously reflected in lower GDP countries' higher GDP growth. Second, several additional factors and country-level characteristics affect the transmission from the inclusion facilities to the actual performance of financial activities. The above two explanations are not mutually exclusive, but more likely, both make sense. Regarding the first one, which is more like a technical cause, we are interested in rationalizing the second logic, which will be discussed in the following section.

Table 5. Growth Predicted by Financial Inclusion and Performance Indicators

Dependent:	$\Delta_{t_0 \to 2020} \log(GDP)_i$										
Panel A											
Independent X:	Inclusion				Performance						
	I1	I2	I3	I4	P1	P2	P3	P4	P5	P6	P7
	Bank accounts	Bank branches	ATMs	Listed companies	Deposit money banks' assets	Liquid liabilities	Mutual fund assets	Financial system deposits	Insurance company assets	Domestic credit to private sector	Stock market cap
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Variables											
$\frac{1}{100}\Delta_{t_0 \to 2020} X_i$	-5.73	-4.63	5.92	10.7	0.239*	0.340***	0.057*	0.476***	-0.288	0.548***	-0.023
	(6.55)	(6.47)	(4.75)	(7.59)	(0.133)	(0.093)	(0.030)	(0.140)	(0.341)	(0.147)	(0.025)
$\log(GDP_{i,t_0})$	-0.156***	-0.167***	-0.131***	-0.205***	-0.078*	-0.107**	-0.266***	-0.110**	-0.164***	-0.117***	-0.206***
	(0.044)	(0.026)	(0.030)	(0.040)	(0.044)	(0.043)	(0.050)	(0.044)	(0.054)	(0.043)	(0.037)
Fit statistics											
Observations	41	137	107	56	106	103	39	104	38	105	47
R^2	0.255	0.310	0.308	0.369	0.044	0.133	0.445	0.116	0.296	0.133	0.428
Panel B											
Variables											
$\log(GDP_{i,t_0})$	-0.140***	-0.155***	-0.156***	-0.214***	-0.052	-0.055	-0.241***	-0.055	-0.183***	-0.054	-0.209***
	(0.040)	(0.020)	(0.023)	(0.040)	(0.042)	(0.043)	(0.050)	(0.043)	(0.049)	(0.042)	(0.037)
Fit statistics											
Observations	41	137	107	56	106	103	39	104	38	105	47
R^2	0.240	0.307	0.298	0.345	0.014	0.016	0.388	0.016	0.282	0.015	0.417
F-test between Panel A & B. Null Hypothesis: The model in Panel A is better.											
F	0.764	0.514	1.556	2.005	3.228*	13.532***	3.685*	11.515***	0.714	13.866***	0.843
p-value	0.388	0.475	0.215	0.163	0.075	0.000	0.063	0.001	0.404	0.000	0.364

Note: Country-level OLS estimates. Standard-errors in parentheses. Signif. Codes: ***: 0.01, **: 0.05, *: 0.1.

4 Combine Inclusion, Performance, and Economic Growth

To generate a vivid understanding of how the changes in financial inclusion, financial performance, and economic growth interact, we select two representative indicators of inclusion and performance, respectively, and explore their correlation. For inclusion, the data preprocessing suggests that they are positively related with high correlations. Therefore, we choose I2, bank branches per capita, with the maximum number of applicable observations. For the performance indicators, we choose I6, private credit, from the four significant and robust correlates of economic growth, as documented in Section 3.3.[5] This proxy is also examined in Kremer et al. (2022), while its divergence property has not been widely discussed.

Figure 1 visualizes how private credit growth correlates to GDP per capita growth. The x-axis represents the log growth of the financial performance proxy, private credit,[6] from 1985 to 2020, and the y-axis is the log GDP per capita growth. The colors present the initial states of GDP per capita, and the larger scatter size indicates better inclusion of financial systems (the larger number of bank branches) in 2020. First, higher credit growth is associated with higher GDP per capita growth, as documented in Table 5. Second, the small points are dispersed throughout the graph, implying that it is not significantly correlated with credit growth, although positively correlated with credit scale in the cross-section. This makes it difficult for low-income countries to translate into the performance of financial activities even if they have achieved catch-up in terms of financial inclusion.

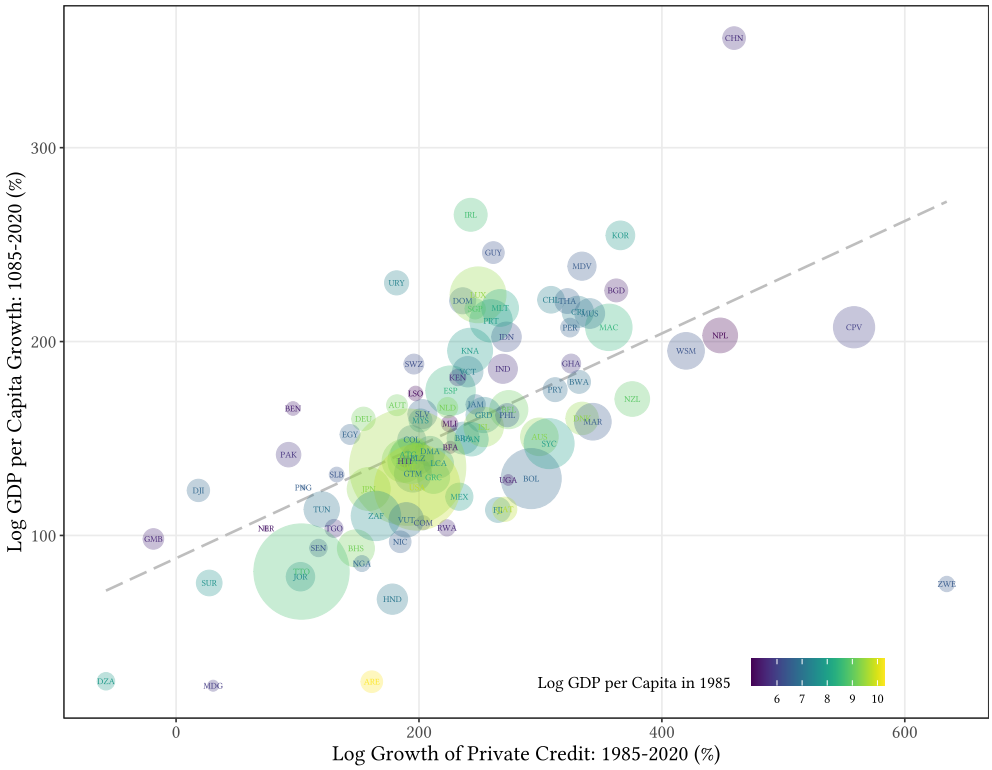
Figure 2 visualizes the second observation more clearly. The x-axis represents the log growth rate (%) of the financial inclusion proxy from 2004 to 2020,[7] and the y-axis is the growth spread, i.e., the growth rate of the financial performance (private credit growth) minus the growth rate of financial inclusion. If the development of inclusion all corresponded to a response in the scale of financial activities, these scatters should be at around $y = 0$, or at least have a linear fit with a slope close to zero (when there is a common trend). However, the linear fit is negatively sloped with a small r-square. Combining with the initial state of financial inclusion (scatter size) and the income level (scatter color), the scatter in the figure seems to be clustered into two categories: Low-level countries are located on the right side experiencing higher rates of inclusion devel-

[5]The main findings below are robust to different selection of indicators. We use these two indicators only for better-visualized exploration as examples.

[6]In previous analysis, the indicator used is the private credit (relative) to GDP. Here, we focus on its absolute growth, so the absolute scale of private credit is used.

[7]Due to constraints on data availability, we have used the maximum possible time range in both plots without guaranteeing that the time ranges are equal. This is because it always makes more sense to include longer time ranges.

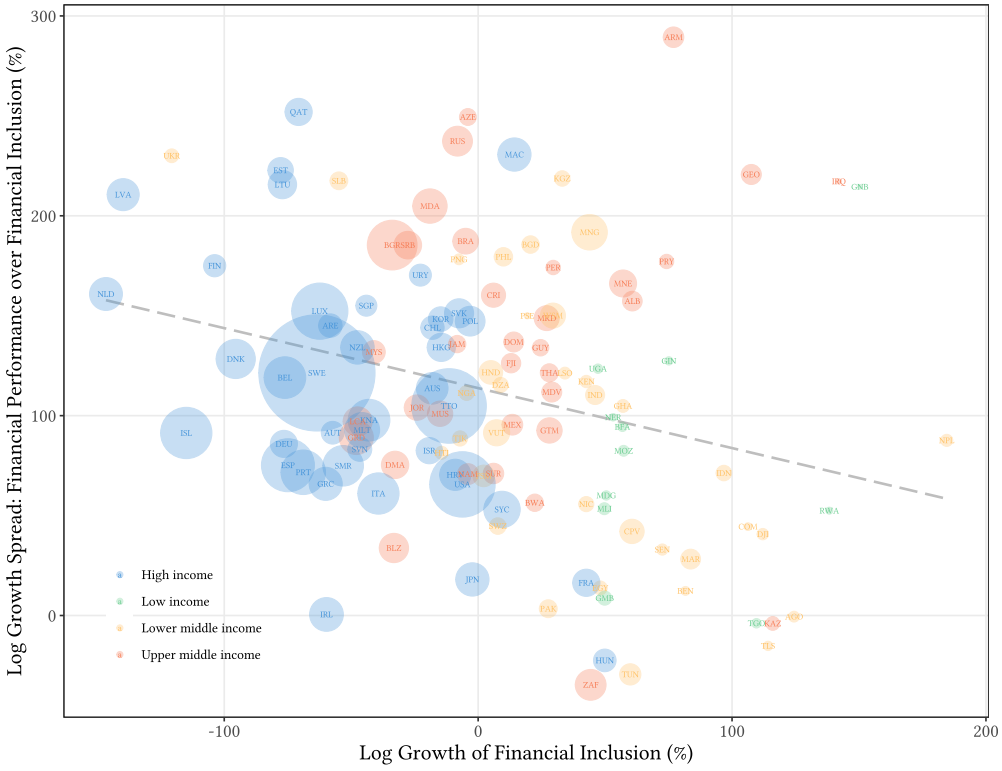
Figure 1. Growth of private credit and GDP per capita



Notes: The x-axis represents the log growth rate (%) of the financial performance proxy, private credit, from 1985 to 2020. The y-axis is the log growth rate (%) of GDP per capita from 1985 to 2020. The colors present the initial states of GDP per capita, and the larger scatter size indicates better inclusion of financial systems (the larger number of bank branches) in 2020.

opment; while high-income countries are located on the left side benefiting from higher credit growth.

Figure 2. Growth of financial inclusion and financial performance



Notes: The x-axis represents the log growth rate (%) of the financial inclusion proxy, the number of bank branches per 100,000 adults, from 2004 to 2020. The y-axis is the growth spread (%) of the financial performance (private credit growth) over the financial inclusion. The colors present the income levels defined by the World Bank, and a larger scatter size indicates better inclusion of financial systems (the larger number of bank branches) in the initial state (2004).

It aligns with the intuition that high income is positively associated with high financial access and inclusion in a given initial cross-section. However, as low-income countries gradually catch up and compensate for the disadvantage of low levels of financial inclusion, they still fail to achieve a matching development of the actual performance and scale of related financial activities, at least over a 20-year span. Together with the economic meaning and the cross-sectional correlation, it is almost impossible that the above phenomenon results from an irrelevance of financial inclusion to the scale of financial performance.

A more plausible explanation for this phenomenon is that the development of financial inclusion does not immediately expand the performance (market size) of the financial activities in question. Several additional country-level correlates may exist that affect the transmission from

the physical inclusion (access) base to the financial performance. These correlates, however, are more persistent and difficult to be affected by short-term changes. For example, people's habits of engaging in economic activities do not change rapidly due to innovations in financial facilities. Kinnan and Townsend (2012) leaves the potential for kinship to affect and facilitate participation in financial activities. Kremer et al. (2022) also sheds light that cultural factors are also correlated to economic growth yet are always persistent. As a result, catching up on financial inclusion in low-income countries is not an exercise in futility, yet their contribution to financial performance and the corresponding market size may depend on other factors. Further research is needed to identify what types of factors drive the persistence of performance indicators and explain why the factors can facilitate economic growth.

5 Conclusion

In addition to financial policy convergence documented in Kremer et al. (2022), we further document that financial inclusion has converged across countries since 1985. However, if we measure the actual performance of the financial sector, we find six out of seven variables exhibit significant divergence over time: liquid liability, credit, issuance company assets, mutual fund assets, financial system deposits, and stock market capitalization. The widened gap in financial market development demonstrates strong path dependence — the countries with better financial performance tend to advance further despite convergence in GDP, policy correlates, and financial inclusion. Further research is needed to explain why financial sector performance persists.

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