THE NEXUS BETWEEN FINANCIAL INCLUSION AND ECONOMIC DEVELOPMENT IN SOUTH ASIA EVIDENCE FROM; SELECTED SOUTH ASIAN COUNTRIES

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ABSTRACT

The purpose of this study is to examine the nexus between financial inclusion (FI) and economic development in South Asian countries. Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs, transactions, payments, savings, credit, and insurance delivered in a responsible and sustainable way. FI has been shown to reduce poverty, improve societal well-being, and promote more inclusive economic development. This research uses the panel data set for six selected countries from the South Asian region for a period from 2004 to 2021. The number of bank branches, outstanding loans from commercial banks, outstanding deposits with commercial banks, and the number of automated teller machines are used to measure financial inclusion, and the Human Development Index is used to measure economic development. This study used the descriptive statistical approach, unit root test, panel Auto regressive distributed lag (ARDL) co-integration test, and pairwise Dumitrescu-Hurlin panel causality test to investigate the nexus between financial inclusion and economic growth in South Asia. The findings of this study indicate the existence of a long-run co-integration between financial inclusion and economic development in South Asian countries. Specifically, the number of bank branches, outstanding loans from commercial banks, and outstanding deposits with commercial banks exhibit a positive long-term relationship with economic development. Conversely, the number of automated teller machines (ATMs) demonstrates a negative long-term relationship with economic development. A main finding of the Dumitrescu-Hurlin Panel Causality Test shows that there is homogeneous Granger causality from outstanding deposits to the Human Development Index (HDI). The test does not find enough evidence to support a causal relationship between economic development and the other variables of financial inclusion, such as the number of bank branches, outstanding loans, and ATMs. This implies that, out of the four financial inclusion variables examined, only one demonstrates a causal relationship with human development in South Asia. Consequently, the study concludes that there is no significant causal relationship between financial inclusion and economic development in the region.

Keywords: Financial Inclusion, Economic Development, South Asia, Human Development, Causal Relationship

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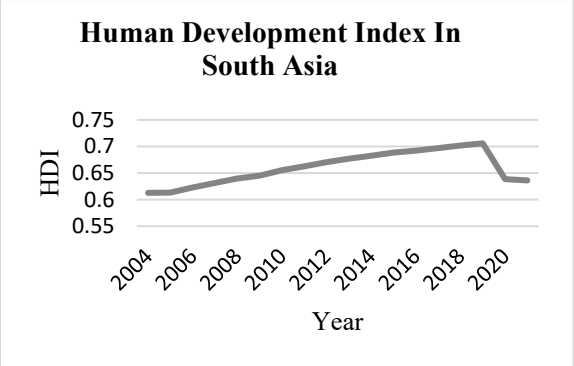
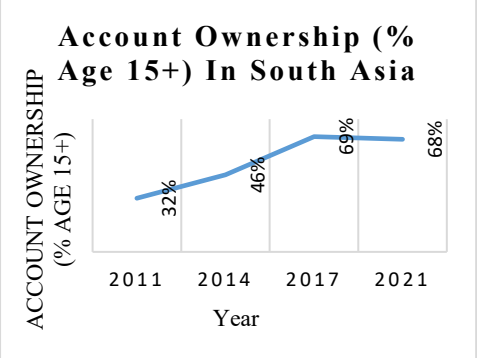
1. INTRODUCTION

Financial inclusion means that individuals and businesses have access to useful and affordable financial products and services that meet their needs, transactions, payments, savings, credit and insurance delivered in a responsible and sustainable way. FI has been shown to reduce poverty, improve societal well-being, and promote more inclusive economic development (Beck et al., 2007). Over the past ten years, South Asian members have taken the mandate of financial inclusion extremely seriously and have implemented several measures to maintain access for the unbanked and underbanked, as it is seen as a crucial facilitator for sustainable and equitable economic development. Adult financial inclusion levels have improved from 23% in 2011 to 40% in 2021, according to global Findex data.



Source: World Development Indicators

Figure 1: Human Development Index in South Asia



Source: World Bank

Figure 2: Account Ownership (% age 15+) in South Asia

Figure 1 shows a continuous increase in the HDI in South Asia until 2019, after which it experienced a decrease in 2020 and 2021 due to factors such as the COVID-19 pandemic. According to the figure 02, the account ownership (% age 15+) in South Asia is 69% in 2017 and it has become 68% in 2021 with a 1% decrease. Considering the above data, the human development index and account ownership have pretty much the same pattern. By drawing attention to that data, this research aims to find out if there is any impact of financial inclusion on economic development in South Asia and aims to investigate the nexus between financial inclusion and economic development in the South Asian region.

Not many studies have been done on the big picture of financial inclusion, determinants of financial inclusion, the current state of financial inclusion, or its progress (Andrianaivo and Kpodar, 2011; Lenka, 2021; Sarma, 2015). Several studies (Beck et al., 2007; Demirgüç-Kunt and Klapper, 2012; Honohan, 2008;) have investigated the measurement of financial inclusion. Most studies have been done to determine the nexus between financial inclusion and economic growth based on various countries and regions (Azimi, 2022; Dahiya and Kumar, 2020; Sethi and Acharya, 2018). And there are researches available only studying the nexus between

other countries and researchers have done research by investigating the nexus between financial inclusion and economic development only based on the countries in the South Asian region individually (Azimi, 2022; Raza, 2019). Thus, considering this previous empirical literature, there is an empirical gap: there is no previous research done to investigate the nexus between financial inclusion and economic development in the South Asian region. This study is going to cover that empirical gap. There are two main objectives of the study to cover that empirical gap. The first aim of this study is to examine the long-run co-integration between financial inclusion and economic development in South Asian countries and the second aim of this study is to examine the causal relationship between financial inclusion and economic development in South Asian countries.

2. LITERATURE REVIEW

The literature on financial inclusion and economic development has grown significantly over the past decades, with an increasing focus on understanding how access to financial services impacts economic growth, poverty reduction, and social equality. This chapter reviews existing theoretical and empirical studies to provide insights into the relationship between financial inclusion and economic development, with a specific emphasis on South Asian countries. According to the public good theory of financial inclusion, providing formal financial services to the whole population and guaranteeing that everyone has unrestricted access to finance should be viewed as a public good for the benefit of all population members. But it does not explicitly establish how financial inclusion translates into broader economic development outcomes such as poverty reduction, employment generation, and income equality. This research fills that theoretical gap by analyzing the direct and indirect effects of financial inclusion on economic development in selected South Asian countries.

2.1 Concept of Financial Inclusion

The financial sector may be roughly categorized into two categories: financial development (financial depth and liquidity) and financial inclusion (financial access). The goal of financial inclusion is to provide accessible, trustworthy, and inexpensive financial services to those who lack or have limited access to them (Sarma, 2015). Although financial inclusion and financial development are generally mutually exclusive concepts (financial inclusion is a fundamental determinant of financial development), it is crucial to understand that a nation can be financially developed while still having a significant number of its citizens who do not participate in the formal financial system (Lenka, 2021). In different ways, both encourage economic growth (Chauve and Jacolin, 2015).

2.2 Measuring financial inclusion

There is no consensus on how to define financial inclusion. Honohan (2008) used the percentage of families with access to accounts in the formal financial sector to measure financial inclusion. Sarma (2008) used the availability, penetration, and

utilization dimensions of banking as three components for building the financial inclusion index. Gupte et al. (2012) calculated the average across four factors, which included utilization, outreach, transaction cost, and transaction convenience. Raza et al. (2019) used automated teller machines (ATMs) per 1,000 km2. The number of bank branches per 100,000 people and the number of deposit accounts with commercial banks were used to measure financial inclusion. Eze and Dumani, (2020) used the number of bank branches, demand deposits from the rural areas, and loans to rural areas to measure financial inclusion based on Nigeria. As proof from Bangladesh, India, and Pakistan, Chowdhury and Chowdhury (2024) looked at how many ATMs there were per 1000 people, how many borrowers there were at commercial banks per 1000 adults, how many commercial bank branches there were per 1000 km, how many deposit accounts and loan accounts there were at commercial banks per 1000 adults, and how many cell phone subscriptions there were per 100 people.

2.3 Economic Development

According to Onaolapo (2015), "economic development" is the link between economic growth and financial stability as well as the models and tactics put out to attain complementarities like those of developed countries. Additionally, it could promote human growth (Yorulmaz, 2012). According to Sen (1983), economic development entails sustained and collaborative efforts by communities and governments to raise regional living standards and economic well-being. It entails enhancing key infrastructure, regional competitiveness, social inclusion, healthcare, safety, and literacy, as well as human resources.

2.4 Financial Inclusion and Economic Development Nexus

An early study by Demetriades and Hussein (1996) points out that economic prosperity creates demand. A strong and inclusive finance system is necessary to achieve a sustainable financial infrastructure. Financial inclusion and economic development were then considered different dimensions. Deepening financial inclusion has been shown to improve human development (Sarma and Pais, 2011), reduce poverty, promote inequality (Bruhn and Love, 2014), promote household investment (Dupas and Robinson, 2013), and drive financial development (Mohan, 2006), ultimately leading to production.

2.5 The Long-Run Co-Integration and Causal Relationship Between Financial Inclusion and Economic Development

Asmalidar and Pratomo (2021) have determined the causality between financial inclusion and economic development in Indonesia. This study has found that there is no significant causality relationship between the financial inclusion and economic development indicators. Meshesha Demie Jima & Patricia Lindelwa Makoni (2003) have examined the relationship between financial inclusion and economic growth while further identifying the direction of causality between the two variables. This study revealed that financial inclusion and economic growth share a strong long-run

relationship and that there is bi-directional causality, indicating synergy between these two variables.

2.6 Financial Inclusion and Economic Development in South Asian Context

Anwar et al. (2017) constructed the FI index for SAARC nations, except the Maldives, using the three-dimensional model created by Sarma (2008). From this calculated index, South Asia's financial inclusion (FI) remains subpar when compared to other continents, with a large difference in performance between nations. India and Bhutan were ranked higher among the SAARC nations, whereas Afghanistan and Pakistan had the lowest FI. Mukta (2018) has assessed and compared the levels of financial inclusion across South Asian countries based on an evaluation of 89 parameters; it reveals that financial inclusion in South Asia is relatively moderate when compared to other regions globally. The utilization of banking services, including debit and credit card usage, borrowing from banks, and savings deposits, remains low. Similarly, the adoption of e-banking services is minimal, although mobile banking is showing signs of growth. According to Susanta and Phanindra (2022), all dimensions of financial inclusion, like availability, accessibility, and usage of formal financial services, have shown significant growth in South Asian countries. Cross-country evidence indicates a steady increase in the Financial Inclusion Index (FII) for all South Asian nations from 2004 to 2018. Notably, among the seven South Asian countries, India outperformed others, maintaining the highest FII value during the period from 2013 to 2017. Additionally, the findings revealed that by 2018, all South Asian countries had achieved inclusion in the high financial inclusion category.

Lenka and Barik (2018) investigated how and why mobile and Internet services affect FI in SAARC countries. They used standard demographic and regional measures of penetration and usage to do this. This study found a favorable and substantial association between FI growth and the development of both mobile phone and Internet services by utilizing three distinct models: the fixed effect, random effect, and panel correction standard errors models. Additionally, the empirical study revealed that in the SAARC nations, the size of the rural population and unemployment rates were adversely related to FI, but income and education levels are favorably associated with FI.

3. METHODOLOGY

This research is going to be conducted as a quantitative research method by using secondary data. This study's population is South Asian countries. Afghanistan, Bangladesh, Bhutan, India, Nepal, Maldives, Pakistan, and Sri Lanka are members of the South Asia Region. Samples of this research include 6 South Asian countries: Afghanistan, Bangladesh, India, Maldives, Pakistan, and Sri Lanka. The sample was fairly selected from high-income countries, middle-income countries, and low-income countries in South Asia. Bhutan and Nepal can't be included in the sample because of the lack of data availability. The sample comprised 18 years' data ranging from 2004 – 2021, taken from the Financial Access Survey 2022, the United Nations Development Program, and the World Bank database. Based on the gathered

quantitative data, this research was basically driven by the panel ARDL co-integration test and Granger causality test by using STATA and E-Views software.

3.1 Unit Root Test

The initial step in this approach is to identify the order of integration in the data. This is important to estimate an ARDL model, it needs to be ensured that the variables in the regression are either integrated of order zero I (0) or at most integrated at order one I (1). To test unit root in the group of panel series in this study, the Levin-Lin-Chu (LLC) panel unit root test is used.

3.2 Panel ARDL Co-Integration Test

The panel ARDL co-integration test is applied to determine whether there is a long-run relationship between financial inclusion and economic development. Other than that, it helps to determine whether there is a short-run relationship between the dependent and independent variables. This method uses lagged and differenced variables to reveal the association and equilibrium adjustment speed after each shock. If a study has a mix of variables that stay the same at level (I (0)) and at the first difference I(1)), the panel ARDL model can be used.

3.3 Granger Causality Test

Once the existence of a long-run relationship is ascertained between financial inclusion and economic development, it is logical to assess the causalities between financial inclusion and economic development and identify the directions of causality (Dumitrescu and Hurlin, 2012).

3.4 Conceptual Framework

According to prior studies, multiple dependent and independent variables are used to analyze those findings and evaluate the most appropriate results from their investigations. However, there are 4 independent variables and one dependent variable in this study.

3.4.1 Human Development Index (HDI)

HDI shows the average performance in three important areas of human development. The three important areas of human development are living a long and healthy life, having access to education, and having an acceptable standard of living. The HDI was developed to highlight the importance of people and their potential rather than just economic growth as the primary criterion for evaluating a nation's level of development. HDI is an alternative to the purely economic assessment of national progress, such as GDP growth and serves as a frame of reference for both social and economic development (Van and Linh, 2019).

3.4.2 Financial Inclusion

Financial inclusion is measured by various measures, the two most widely used measures of accessibility are number of commercial bank branches per 100,000 adults and number of ATMs per 100,000 adults. And measure the usage of financial services by using outstanding deposits with commercial banks (% of GDP) and outstanding loans with commercial banks (% of GDP) (Van and Linh, 2019).

3.5 Operationalization

Table 1: Details of variables

Variable	Indicator	Measurement	Source	Author	Relevant Literature
Economic Development	Human Development Index(HDI)	Human Development Index shows the average performance in the three important areas of human development: living a long and healthy life, having access to education, and having an acceptable standard of living. It is a statistical method for assessing a nation's overall success in terms of its social and economic components.	United Nations Development Programme (UNDP) Reports	United Nations Development Programme	(Van and Linh, 2019), (Sarma and Pais, 2011)

Financial inclusion	Number of commercial bank branches per 100,000 adults(NCBB)	This is used to measure the number of commercial bank branches per 100000 adults available in the country within the period examined. This is used as a financial access indicator.	Financial Access Survey 2022	International Monetary Fund	(Van and Linh, 2019)
	Number of ATMs per 100,000 adults (NOA)	This is used to measure the number of ATMs per 100000 adults available in the country within the period examined. This is used as a financial access indicator.	Financial Access Survey 2022	International Monetary Fund	(Van and Linh, 2019)
	Outstanding deposits with commercial banks - % of GDP (ODCB)	This is referred to amount of outstanding deposits in the commercial banks as a percentage of GDP.	Financial Access Survey 2022	International Monetary Fund	(Van and Linh, 2019)
	Outstanding loans with commercial banks - % of GDP (OLCB)	This is used to measure the outstanding loans with commercial banks as a percentage of GDP.	Financial Access Survey 2022	International Monetary Fund	(Van and Linh, 2019)

Based on the assumed impact of independent variables on economic development, the following hypotheses were developed for testing.

H_1 – There is a long-run co-integration between financial inclusion and economic development in South Asian countries.

4. RESULTS AND DISCUSSION

4.1 Descriptive statistics

Table 2: Descriptive Statistics

Variable	Mean	Std. Dev.	Minimum	Maximum
HDI	.602	.101	.418	.78
NCBB	9.633	4.543	.583	17.838
NOA	10.153	9.120	.059	37.966
ODCB	.397	.146	.063	.663
OLCB	.305	.154	.027	.568

Source: Author Constructed

Table 2 represents the descriptive statistics for all variables applied in the current study. It provides the total number of observe tons, which is 108 provided from the sample of 6 countries. The mean HDI for South Asia is 0.602, with a standard deviation of 0.101, indicating that the region's average level of human development lies between 0.418 and 0.78. The HDI, which measures factors such as life expectancy, education, and income, highlights areas for improvement in key human development indicators across South Asian countries. The number of ATMs per 100,000 adults has a mean of 10.153 and a standard deviation of 9.120, reflecting varying levels of accessibility to automated banking services within the region. This wide variation suggests that some countries have adopted technological advancements in the banking sector more effectively than others, impacting the efficiency and convenience of financial transactions. The mean proportion of outstanding deposits from commercial banks as a percentage of GDP is 0.397, with a standard deviation of 0.146. This indicates that South Asia maintains a reasonable level of savings in the banking sector relative to its economic output, though there are significant differences in savings behavior among the countries. Also, the average amount of loans is still outstanding from commercial banks as a share of GDP is 0.305, and the standard deviation is 0.154. This shows that people in different parts of the region borrow money and take out loans in different ways.

4.2 Unit Root Test

Table 3: Unit Root Test

Levin Lin Chu (LLC)			
Variable	**Statistic**	**Prob.****	**Order**
HDI	-2.877	0.025	I (0)
NCBB	-4.564	0.001	I (0)
NOA	-2.318	0.038	I (0)
ODCB	-4.674	0.024	I (0)
OLCB	-5.902	0.022	I (1)

Source: Author Constructed

Table 3 provides the results of the Levin-Lin-Chu (LLC) unit root test. The Levin-Lin-Chu test yields a test statistic of -2.877 with a probability value of 0.025. Since the probability value is less than the common significance level (such as 0.05), it suggests that the HDI is stationary at the level denoted by I (0). This implies that the Human Development Index is not affected by shocks in the short run and maintains a stable long-run relationship, providing a solid foundation for assessing its role as a measure of economic development. For NCBB, the test statistic is -4.564 with a probability value of 0.001, indicating stationarity at the level, denoted by I (0). This implies that the number of commercial bank branches per 100,000 adults remains stable over time without being influenced by short-term fluctuations. The presence of a stable long-run relationship suggests that this indicator can be considered a reliable measure of financial infrastructure development in South Asia.

The test statistic for NOA is -2.318 with a probability value of 0.0383, indicating stationarity at the level, denoted by I (0). This suggests that the number of ATMs per 100,000 adults remains constant over time without being affected by short-term disturbances. The stable long-run relationship highlights the importance of this indicator in assessing the accessibility and penetration of automated banking services in the South Asian region. The test statistic for ODCB is -4.674 with a probability value of 0.025, suggesting stationarity at the level, denoted by I (0). This implies that the proportion of outstanding deposits from commercial banks as a percentage of GDP remains relatively constant over time and is not significantly impacted by short-term fluctuations. The stable long-run relationship underscores the importance of this indicator in gauging the savings behavior and financial stability within the South Asian economies. The test statistic for OLCB is -5.902 with a probability value of 0.022, indicating stationarity at the first difference, denoted by I (1). This suggests that the amount of outstanding loans from commercial banks as a percentage of GDP changes over the short term, but that the relationship is stable over the long term after considering differences. This implies that the indicator might experience short-term

shocks but eventually converges to a steady state, emphasizing the role of credit accessibility and usage in the economic development of South Asian countries.

4.3 Optimal lag length selection criteria

Table 4: Optimal lag length selection criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	100.093	NA	3.37e-05	3.892	4.076	3.963
1	330.086	764.765	1.03e-11	-11.114	10.009*	10.688*
2	352.772	36.129	1.15e-11	-11.028	-9.002	-10.247
3	387.664	49.107	8.48e-12	-11.394	-8.448	-10.258
4	418.953	38.241*	7.61e-12	-11.627	-7.760	-10.136
5	451.487	33.739	7.16e-12*	-11.906	-7.118	-10.060
6	473.872	19.068	1.13e-11	-11.810	-6.100	-9.608
7	520.302	30.953	9.19e-12	-12.603	-5.973	-10.046
8	568.781	23.341	1.02e-11	13.473*	-5.922	-10.561

* Indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

The results of the lag length selection criteria for a study that investigates the link between financial inclusion and economic growth in South Asia can be seen in Table 4. Using different types of information criteria, like the Akaike Information Criterion (AIC), the Schwarz Information Criterion (SC), and the Hannan-Quinn Information Criterion (HQ), the study tries to find the best lag length for this analysis. From these various types of lag length criteria, AIC, SC, and HQ criteria are the most considerable criteria in panel data analysis. According to that, the results indicate that the optimal lag length in this panel data set is determined to be 1 based on the HQ and SC criteria.

4.4 Panel ARDL Co-Integration Test

After selecting the optimal lag length of the panel, the panel ARDL co-integration test is conducted using the Mean Group (MG) and Dynamic Fixed Effects estimator (DFE) estimators, and the Hausman test is applied to select the best estimator between these two estimators. Below, Tables 5,6 and 7 show the results for the three estimators.

Table 5: Mean Group (MG) Estimator

HDI	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
Long Run						
NCBB	.0111	.010	1.01	0.310	-.010	.032
NOA	.006	.008	-0.78	0.433	-.023	.010
ODCB	.063	.146	0.43	0.664	-.222	.349
OLCB	.022	.149	0.15	0.881	-.270	.314
Short Run						
__ec	.534	.209	-2.55	0.011	-.945	-.123
NCBB	.014	.006	2.15	0.032	.001	.027
NOA	.004	.005	0.80	0.426	-.006	.014
ODCB	.025	.082	-0.31	0.759	-.187	.136
OLCB	.015	0.055	0.28	0.783	-.093	.124
_cons	.324	.110	2.94	0.003	.107	.540

Source: Author's calculation

Table 6: Dynamic Fixed Effects Estimator (DFE)

HDI	Coef.	Std. Err.	z	P>|z|	[95% Conf. Interval]	
__ec						
NCBB	-.005	.008	-0.60	0.549	-.022	.011
NOA	.003	.002	1.62	0.106	-.008	.008
ODCB	.053	.167	0.32	0.750	-.275	.382
OLCB	.107	.163	0.66	0.512	-.213	.428
SR						
__ec	-.107	.039	-2.74	0.006	-.184	-.030
NCBB	.002	.001	1.12	0.263	-.001	.005
NOA	-.002	.005	-0.44	0.659	-.001	.008
ODCB	-.064	.030	-2.14	0.032	-.123	-.005
OLCB	-.001	.025	-0.01	0.995	-.050	.049
_cons	.0656	.020	3.23	0.001	.025	.105

Source: Author's calculations

Table 5 presents the result of the Mean Group (MG) panel ARDL co-integration test. The mean group estimator indicates a long-run co-integration between financial inclusion and economic development in South Asia. The short-run error term is -0.534, and the p-value is 0.011 (significant at 5% level). To get the best results, the study also conducts the Dynamic Fixed Effects (DFE) estimator to identify if there is any long-run co-integration between financial inclusion and economic development in South Asia. As per the DFE estimator, it also implies that there is a long-run co-integration between financial inclusion and economic development in South Asia.

The short-run error term coefficient is -0.107, and the p-value is 0.006 (significant at 5% level).

After conducting both two-panel ARDL co-integration tests (MG and DFE) we can see that both MG and DFE estimators indicate a long-run relationship between financial inclusion and economic development in South Asia. After that, the Hausman test is conducted to identify the best co-integration test from MG and DFE that is suitable for the current study.

4.5 Hausman Test

Table 7: Hausman Test

	Coefficients		**(b-B) Difference**	**sqrt(diag(V_b-V_B)) S.E.**
	(b) MG	(B) DFE		
NCBB	.0111	-.005	.0163	16.951
NOA	-.006	.003	-.010	13.489
ODCB	.063	.053	.009	225.213
OLCB	.022	.107	-.085	230.144

b= consistent under Ho and Ha; obtained from xtpmg
B = inconsistent under Ha, efficient under Ho; obtained from xtpmg
Test: Ho: difference in coefficients not systematic
chi2(4) = (b-B)'[(V_b-V_B) ^ (-1)] (b-B)= 0.00
Prob>chi2 = 1.0000
Source: Author's calculations

To ascertain if the coefficients of two sets of data differ significantly from one another, statisticians employ the Hausman test. The test is used to select the best method between the Mean Group (MG) estimator and the Dynamic Fixed Effect Estimator (DFE). The test results show a chi-squared value of 0.00 with a probability greater than 0.05 (specifically, 1.000). This suggests that the null hypothesis, which posits a non-systematic difference in coefficients, cannot be definitively rejected. It means that there is a significant difference between MG and DFE estimators and confirms that the MG is more efficient and consistent compared to the DFE (Hausman,1978).

The output of the MG estimator indicates the error correction term's coefficient is -.5349024 and it's significant at 5%. It means there is a strong long-run co-integration between financial inclusion and economic development in South Asia. When analyzing the long run, the number of commercial bank branches per 100,000 adults (NCBB) coefficient value is 0.0111535 and it indicates a positive relationship with economic development (HDI) in South Asia. It means that a one-unit increase in the number of commercial bank branches per 100,000 adults leads to a 1.11% increase

in economic development in the long run (Van and Linh, 2019). However, the statistical significance is not strong (P>|z| = 0.310), suggesting that the relationship may not be robust. The number of ATMs per 100,000 adults (NOA) coefficient value is -0.006, implying a negative relationship with economic development in South Asia. That means a one-unit increase in the number of ATMs per 100,000 adults leads to a 0.69% decrease in economic development in South Asia. However, the lack of statistical significance (P>|z| = 0.433) suggests that this relationship may not be meaningful. This result is consistent with (Raza et al., 2019), which demonstrates that the amount of automated teller machines per 1,000 km² (per cent) reveals a negative relationship with economic development.

The outstanding deposits from commercial banks as a percentage of GDP (ODCB) coefficient value is 0.063. It implies a positive relationship with economic development in South Asia (Van and Linh, 2019). That means a one-unit increase in outstanding deposits from commercial banks as a percentage of GDP leads to a 6.34% increase in economic development in the long run. However, the lack of statistical significance (P>|z| = 0.664) suggests that this relationship may not be reliable. The outstanding loans from commercial banks as a percentage of GDP (OLCB) coefficient value is 0.022 and it indicates a positive relationship with economic development in South Asia. It suggests that a one-unit increase in outstanding loans from commercial banks as a percentage of GDP leads to a 2.22% increase in economic development in South Asia in the long run. However, the lack of statistical significance (P>|z| = 0.881) indicates that this relationship may not be statistically significant (Huang et al., 2020).

When analyzing the short run, the coefficient value is -0.534, indicating that in the short run, any deviation from the long-run equilibrium is corrected at a speed of 53.49% in the next period. The significance of this coefficient is highlighted by its p-value of 0.011 and this suggests that there is a significant short-run relationship between financial inclusion and economic development in South Asia. The coefficient value of 0.014 suggests that a one-unit increase in the number of commercial bank branches per 100,000 adults leads to a 1.41% increase in economic development in the short run (Van and Linh, 2019). The p-value of 0.032, indicates that this relationship is statistically significant. It indicates that there is a positive relationship between the number of commercial bank branches per 100,000 adults and economic development in South Asia in the short run. With a coefficient of 0.004 and a p-value of 0.426, the number of ATMs per 100,000 adults seems to have a positive but insignificant relationship between NOA and economic development in South Asia in the short run (Van and Linh, 2019). That means a one-unit increase in the number of ATMs per 100,000 adults leads to a 0.42% increase in economic development in South Asia.

The coefficient value of ODCB, -0.025 suggests that a one-unit increase in outstanding deposits from commercial banks as a percentage of GDP leads to a 2.54% decrease in economic development in the short run. That means there is a negative relationship between outstanding deposits from commercial banks as a percentage of GDP and economic development in South Asia. However, the p-value of 0.759

implies that this relationship is not statistically significant, indicating that the short-term impact of outstanding deposits on economic development is uncertain. The coefficient value of OLCB, 0.015 suggests that a one-unit increase in outstanding loans from commercial banks as a percentage of GDP leads to a 1.53% increase in economic development in the short run. That implies that there is a positive short-run relationship between outstanding loans from commercial banks as a percentage of GDP and economic development in South Asia. However, the p-value of 0.783 indicates that this relationship is not statistically significant, implying that the impact of outstanding loans on short-term economic development is uncertain. The constant term represents the baseline effect on economic development in the absence of the other variables. The coefficient value of 0.324 with a p-value of 0.003 suggests that even without considering the other factors, there is a significant positive effect on economic development in South Asia.

The Panel ARDL Co-integration test results allow for a revisit of the first hypothesis as shown below.

H_1– There is a long-run co-integration between financial inclusion and economic development in South Asian countries.

The findings from the MG estimator suggest that we reject the null hypothesis in favor of the alternative hypothesis (H_1). The MG estimator indicates a long-run co-integration between financial inclusion and economic development in South Asian countries. The result is in-line with (Asmalidar and Pratomo, 2021), which demonstrates that there is a long-run co-integration between financial inclusion and economic development. This implies that there is a stable and sustainable relationship between the variables over time, supporting the idea that financial inclusion plays a crucial role in shaping the economic landscape of the region. The findings emphasize the importance of a well-developed financial infrastructure, including accessible banking services, responsible credit utilization, and robust savings mechanisms, in fostering sustainable economic growth. Policymakers in the region could benefit from these insights by implementing targeted measures to enhance financial inclusion, promote responsible financial behavior, and strengthen the overall economic landscape. Additionally, further research could delve deeper into the specific factors influencing the observed relationships and explore variations among individual countries in South Asia.

4.6 Pairwise Dumitrescu Hurlin Panel Causality Test

Table 8: Pairwise Dumitrescu Hurlin Panel Causality Test

Null Hypothesis:	W-Stat	Zbar-Stat	Prob.
NCBB does not homogeneously cause HDI	2.567	1.823	0.068
HDI does not homogeneously cause NCBB	2.368	1.564	0.117
NOA does not homogeneously cause HDI	2.219	1.370	0.170
HDI does not homogeneously cause NOA	2.610	1.880	0.060
ODCB does not homogeneously cause HDI	3.906	3.567	0.004
HDI does not homogeneously cause ODCB	1.563	0.516	0.605
OLCB does not homogeneously cause HDI	1.575	0.531	0.594
HDI does not homogeneously cause OLCB	2.147	1.277	0.201

Source: Author Constructed

To test the direction of the causality, the Pairwise Dumitrescu and Hurlin Panel Causality test is used. The test compares the null hypothesis of no homogenous Granger causality to an alternative that indicates causality for at least one cross-sectional unit of the panel. Table 8 presents the results of the pairwise Dumitrescu-Hurlin panel causality tests. W-Stat value of 2.567 and Zbar-Stat value of 1.823show that the null hypothesis, which says that the number of commercial bank branches per 100,000 adults does not cause the Human Development Index (HDI) in a uniform way, cannot be thrown out at the standard level of significance (p-value of 0.068). Similarly, the test indicates that HDI does not homogeneously cause NCBB, with a Zbar-Stat value of 1.564 and a p-value of 0.1177. The W-Stat value of 2.21910 and Zbar-Stat value of 1.370 indicate that the number of ATMs per 100,000 adults does not homogeneously cause HDI, with a p-value of 0.1706. The test suggests that the HDI does not homogeneously cause the number of ATMs, with a Zbar-Stat value of 2.610 and a p-value of 0.060. The W-Stat value of 3.906 and Zbar-Stat value of 3.567 suggest that outstanding deposits from commercial banks as a percentage of GDP may homogeneously cause the HDI, with a very low p-value of 0.0004. However, the test implies that the HDI does not homogeneously cause outstanding deposits from commercial banks as a percentage of GDP, with a Zbar-Stat value of 1.563 and a p-value of 0.605. The W-Stat value of 1.575 and Zbar-Stat value of 0.531 suggest that outstanding loans from commercial banks as a percentage of GDP do not homogeneously cause HDI, with a p-value of 0.594. Similarly, the test implies that the HDI does not homogeneously cause outstanding loans from commercial banks as a percentage of GDP, with a Zbar-Stat value of 2.147 and a p-value of 0.201.

As a conclusion, the pairwise Dumiterescu and Hurlin panel causality test implies that there is a unidirectional relationship between outstanding deposits from commercial banks as a percentage of GDP (ODCB) and human development (HDI)

in South Asia. The statistically significant results suggest that the level of outstanding deposits from commercial banks has a notable influence on the Human Development Index in South Asia. This finding implies that an increase in the level of deposits within the banking system positively affects economic development. It could indicate that a higher level of savings and investment facilitated by the banking sector has a direct correlation with improvements in human development indicators, such as education, healthcare, and standard of living. The other three variables—the number of commercial bank branches per 100,000 adults (NCBB), the number of ATMs per 100,000 adults (NOA), and the amount of loans from commercial banks as a percentage of GDP (OLCB)—are not significant at the 5% level and do not show a link between them and economic growth.

The Pairwise Dumitrescu Hurlin Panel Causality test results now allow for a revisit of the second hypothesis, as shown below.

H_1 – There is a causal relationship between financial inclusion and economic development in South Asian countries.

The findings from the Dumitrescu-Hurlin Panel Causality Test support a nuanced conclusion. It's not clear that the number of commercial bank branches, ATMs, and outstanding loans all have the same Granger causality relationship with economic growth. However, outstanding deposits are a big factor that affects long-term economic growth. That means out of four financial inclusion variables, three variables are not Granger-caused by human development in South Asia.

Therefore, since there is insufficient evidence to support the alternative hypothesis, we accept the null hypothesis. That means there is no causal relationship between financial inclusion and economic development in South Asian countries. This result is consistent with other scholars who found there is no causal relationship between financial inclusion and economic development (Asmalidar and Pratomo, 2021).

4.7 Discussion

4.7.1 Limitations

Despite the efforts to provide a comprehensive analysis, the study has certain limitations that should be acknowledged. The sample of this research includes six South Asian countries, and Bhutan and Nepal couldn’t be included because of a lack of data availability. The study covers the period from 2004 to 2021 because more recent data for 2022 and 2023 have not been officially released yet. The study focused on the South Asian region, and therefore, the findings may not be directly applicable to other regions. Each region has its own socio-economic and cultural context that can influence the relationship between financial inclusion and economic development. Data availability and quality may vary across countries, potentially impacting the accuracy and generalizability of the results. Future studies should aim to gather more consistent and detailed data to enhance the robustness of the analysis. The study mostly used quantitative methods. To get a fuller picture of what's going on, it would be helpful to get qualitative feedback from people who have a stake in

the issue, such as people and businesses who are affected by policies that promote financial inclusion.

4.7. 2 Suggestions for Future Studies

To further advance understanding in the field, future research can consider the following avenues: Future research can conduct in-depth qualitative studies to delve into the experiences and perceptions of individuals and businesses about financial inclusion policies. Future research can conduct in-depth qualitative studies to delve into the experiences and perceptions of individuals and businesses about financial inclusion policies. Comparative analyses between South Asian countries can identify variations in the impact of financial inclusion on economic development. Understanding these differences can guide more targeted and tailored interventions. Longitudinal studies track the evolution of financial inclusion policies and their impact over time. This can help identify trends, successes, and areas that may require policy adjustments. Future studies can be aimed to explore the role of technological innovations, such as blockchain and digital currencies, in enhancing financial inclusion and their specific impact on economic development in the South Asian context.

5. CONCLUSION

In conclusion, this research provides valuable insights into the complex relationship between financial inclusion and economic development in South Asian countries. The study employed a comprehensive analysis of various financial inclusion indicators and their impact on the Human Development Index over a period from 2004 to 2021. The findings reveal a nuanced relationship, with certain financial inclusion variables demonstrating both short-run and long-run connections with economic development. The descriptive statistics provided a comprehensive overview of key variables, highlighting the diversity in financial inclusion metrics across the region. The unit root test results affirmed the stability of the Human Development Index and financial inclusion measures over time.

The panel ARDL co-integration tests with the Mean Group and Dynamic Fixed Effects estimator showed a strong long-term link between financial inclusion and economic growth. The Hausman test showed that the MG estimator was more accurate. In the long run, the study found a positive relationship between the number of commercial bank branches per 100,000 adults and economic development, while the number of ATMs per 100,000 adults exhibited a negative relationship. However, the statistical significance of these relationships was inconclusive. Outstanding deposits and loans as a percentage of GDP showed positive relationships, but again, lacked statistical significance. The Dumitrescu-Hurlin Panel Causality Test showed that there is a one-way link between outstanding deposits and HDI. This means that more deposits are good for South Asia's long-term economic growth. However, other financial inclusion variables did not exhibit causality with economic development.

In conclusion, there is evidence that financial inclusion and economic growth are linked over the long term. However, the exact effects of different indicators of

financial inclusion are still unclear and need more research. And there is evidence that there is no causal relationship between financial inclusion and economic development in South Asian countries. Policymakers should consider these insights for targeted measures to enhance financial inclusion and promote responsible financial behavior in the region. The research findings have several implications for policymakers, financial institutions, and development organizations in South Asian countries. Firstly, the positive short-run impact suggests that targeted interventions to enhance banking accessibility can lead to immediate economic benefits. Policymakers should focus on initiatives that improve banking infrastructure and promote financial literacy to facilitate responsible credit utilization. The emphasis on outstanding deposits as a key factor influencing long-term economic development implies the need for policies that encourage savings within the banking system. Promoting financial education and incentivizing savings can contribute to positive developments in human development indicators. The non-uniform impact of financial inclusion indicators emphasizes the importance of tailored and adaptive policy frameworks. Policymakers should recognize the diverse financial behaviors and preferences across the region and design interventions that consider the unique characteristics of each country.

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