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Revisiting Financial Inclusion and Income Inequality Nexus: Evidences from Selected Economies in Asia

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Abstract

This study aims to measure financial inclusion and examine its impact on income inequality in a panel of 18 Asian countries over the period 1997–2017. Two alternative approaches for developing financial inclusion index are used: one approach following the methodology of Sarma (2008), while the other is the Dynamic Factor Model (DFM)-based index. The impact of individual indicators and index of financial inclusion on inequality in income is analyzed. The Generalized Method of Moment (GMM) approach is used for empirical analysis. The results indicate that micro-level financial inclusion has a weak negative and statistically significant impact on income inequality. Macro-level index and all individual indicators of financial inclusion do not affect income inequality in the selected sample of economies. The income inequality issues have different natures and cannot be fixed by financial inclusion only. It needs holistic structural reforms to enable fair distribution of income and make an equitable financial system. Financial inclusion is a relatively less important intervention tool regarding fixing the issue of income inequality. This is one of the first studies that used the DFM method for financial inclusion indices construction.

Keywords: Financial Inclusion, Income Inequality, Dynamic Factor Model

JEL Classification Code: D6, B26, E44

1. Introduction

Financial inclusion refers to a financial system that makes financial services available to all stakeholders, such as households and enterprises, at a reasonable cost, regardless of their size or market worth. Financial inclusion

has received a lot of attention on the global development agenda, with international financial organizations like the Asian Development Bank and the World Bank seeing it as critical for long-term growth. By promoting economic activity, access to finance has the potential to play a critical role in economic development and enhancing people's well-being. Several other empirical evidence such as Beck et al. (2007), World Bank (2008), Kim et al. (2018), and Ali and Khan (2020), showed that financial access can significantly improve the well-being of the people.

Financial inclusion does not always have a similar impact on poverty and income distribution in different parts of the world (Roodman, 2012). This work adds to the body of knowledge in several ways. It examines the influence of financial inclusion on income inequality using a form of the Cobb-Douglas production function, as proposed by Yorulmaz (2018) and Kim et al. (2018) while controlling for trade openness, government spending, and employment. Existing research combines multiple indicators of financial inclusion into a single equation, resulting in a multicollinearity problem. To address this issue, we created a micro-level financial inclusion index and a macro-level financial inclusion index based on Pina's work (2018).

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Second, we looked at the impact of financial inclusion on income distribution in selected economies after evaluating the amount of financial inclusion. We also looked at the influence of financial inclusion indices and financial inclusion indicators. It allows us to have a better understanding of how financial inclusion affects income disparity. Third, this study's modeling technique is more complete since it distinguishes between micro- and macro-financial inclusion and provides a detailed examination of the influence of micro- and macro-financial inclusion on income inequality.

We used DFM and methodology of Sarma (2008) to create financial inclusion indices to test the robustness of results in terms of micro- and macro-level analyses of financial inclusion. We used the system GMM estimator to control for the possibility of endogeneity. We can learn a lot about many facets of financial inclusion and how it affects income distribution using these tools.

2. Literature Review

Financial inclusion and its impact have been discussed in various studies from different perspectives over the past three decades. Greenwood and Jovanovic (1990) found a nonlinear relationship between financial access and income disparity, in which the distributional influence of the financial sector is dependent on economic progress. Due to the high cost of joining and the need for some financial assets in the early phases of financial sector development, the rich receive comparatively large benefits of financial services, resulting in a widening of income disparity.

Private credit expansion, according to Rajan and Zingales (2003) and Beck et al. (2007), acts as a stimulus to increase the income of the poorest quintiles and reduce level income disparities. According to Beck et al. (2007), 60% of financial development benefits the poorest lowest quintile, but it also reduces income inequality by 40%. The effect of private credit on the rise of the Gini coefficient was negative. Access to finance reduces income disparity by boosting the income of the poor, hence reducing poverty.

Some studies emphasize the importance of financial institutions and financial sector changes. Financial reforms deepen the financial system rather than broadening and easing access, and as a result, a small fraction of the elites reap the majority of the advantages. Liberalization of the financial system was intended to enhance access, but in fact it has a tendency to raise inequality, fragility, and political opposition to economic changes. As a result, if financial reforms are combined with supervision mechanisms, they can be effective and successful. According to Nguyen et al. (2021), institutional quality plays an important role in financial inclusion, which can lead to a reduction in economic inequality in ASEAN.

De Haan and Sturm (2017) discovered the threshold effect while researching factors that affect income disparity in an economy. The effects of liberalization, financial development, and banking sector crises on income distribution are examined using data from 121 economies from 1975–2005. Financial liberalization, financial development, and banking sector crises all raise income inequality, according to the study. The influence of liberalization on income disparities was determined by the degree of financial sector development and the quality of institutions. Bolarinwa et al. (2021) found that financial development leads to improvement in social well-being when it achieves a certain threshold.

However, some evidence suggests that unequal financial accessibility adds to income inequality by allowing certain people to benefit from financial services while others are left behind. A selective increase in the availability of financial services, according to Demircuc-Kunt et al. (2008), could exacerbate economic inequality. According to Kappel (2010), the financial sector's development in industrialized countries helps to close the income gap. Kappel (2010) discovered contradictory findings, suggesting that financial sector development improves disparities in developed nations but does not benefit emerging economies.

The relationship between financial development and wealth disparities, according to Bahmani-Oskoe and Zhang (2015), has conflicting evidence. However, Jauch and Watzka (2016) found that the financial sector's development promotes income inequality. In an aggregate sample of 177 economies, Park and Mercado (2015) found that access to finance is associated with a reduction in poverty and a decrease in income disparity, but the linkages between access to finance and income inequality were missing in the Asian sample.

Zhang and Naceur (2019) revealed that four financial development indicators (depth, access to finance, efficiency, and stability) can decrease poverty and income inequality. However, the impact of financial liberalization on poverty and income disparity was statistically insignificant. Ratnawati (2020) showed that financial inclusion positively affecting income inequality, but all variables do not have a significant effect on income inequality. Gravina and Lanzafame (2021) argued that in emerging economies financial development leads to an increase in income inequalities. The research on the finance-income inequality nexus shows mixed results; one group of studies found actual evidence that access to finance reduces income disparity, while others found the opposite and found that financial accessibility had a negative impact on income inequality. Some research shows that the impact of financial inclusion is based on institutional structure and financial reforms, while others suggest that the impact of financial inclusion is based on institutional structure and

financial reforms. Therefore, there is a need to investigate finance and inequality nexus in-depth due to contradicting evidence and the importance of the Asia area.

3. Model and Methodology

In panel data, researchers most of the time facing the problem of unobserved heterogeneity. The issue of unobserved heterogeneity can be fixed by converting the static panel models to dynamic panel models. In our dynamic panel approach, we have closely followed Arellano and Bond (1991) and Arellano and Bover (1995). The dynamic GMM estimator is used for controlling country-specific and simultaneity arise which arise as a result of endogeneity among independent variables.

We have used the following theoretical model for analyzing the impact of financial inclusion on poverty;

$$GINI = +\beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 \dots \dots \dots + \beta_n X_n + \varepsilon \quad (1)$$

Where, GINI is the dependent variable which represents poverty headcount, while X_1, X_2, X_3, X_4 shows independent variable and $\beta_1, \beta_2, \beta_3, \beta_4$ indicate their parameters, ε reflects error term.

To examine the impact of both micro-level and macro-level financial inclusion on income inequality and to deal with unobserved variation and heterogeneity of socio-economic variables in the selected sample, we used the Dynamic Panel Generalize Method of Movement (GMM) methodology.

3.1. Econometric Specifications

In the present study, the Gini coefficient is used for showing inequality following Park and Mercado (2015). We have specified the following empirical model to examine the impact of micro-level and macro-level financial inclusion with some control variables on inequality;

$$GINI_{it} = \alpha + \beta_1 FII_{it} + \beta_2 GDP_{it} + \beta_3 GSY_{it} + \beta_4 INF_{it} + \beta_5 E_{it} + \beta_6 EMP_{it} + \beta_7 GE_{it} + v_i + \varepsilon_{it} \quad (2)$$

Where Gini coefficient ($GINI_{it}$) is used as the dependent variable representing income distribution.

We have used a two-step process: in the first step, we have investigated impact of financial inclusion indices on inequality. We use micro-level and macro-level financial inclusion indices in investigating their impact on income distribution. In the second step, we examine impact of individual components (indicators) of financial inclusion on income inequality.

This study, taking lead from Park and Mercado (2015), specified dynamic model which is as follow:

$$GINI_{it} = \alpha + \beta_1 GINI_{it-1} + \beta_2 FII_{it} + \beta_3 GDP_{it} + \beta_4 GSY_{it} + \beta_5 INF_{it} + \beta_6 E_{it} + \beta_7 EMP_{it} + \beta_8 GE_{it} + v_i + \omega_{it} \quad (3)$$

To examine the relationship and impact of each indicator of financial inclusion on income inequality, we used the following dynamic model;

$$GINI_{it} = \alpha + \beta_1 GINI_{it-1} + \beta_2 FII_{it} + \beta_3 GDP_{it} + \beta_4 GSY_{it} + \beta_5 INF_{it} + \beta_6 E_{it} + \beta_7 EMP_{it} + \beta_8 GE_{it} + \sum_{i=1}^6 \gamma_i \{LBN_{it}, LDA_{it}, LBA_{it}, LIP_{it}, LFS_{it}, LPC_{it}\} + v_i + \omega_{it} \quad (4)$$

The variables used in this paper along with their definition as well as data sources are given in Table 1.

3.2. Data

Data for different sets of variables are extracted from, International Monetary Fund's International Financial Statistics (IFS), World Bank's World Development Indicators (WDI), World Bank's World Governance Indicator, United Nation Educational, Scientific and Cultural Organization (UNESCO), United Nations Development Program (UNDP), World Database of Oxford University, Central Banks and Statistical Departments of respective countries. The sampled countries are taken from four regions of Asia.¹ The countries under consideration were selected based on data availability from 1997 to 2017.

3.3. Sampling

Based on the availability of data from 1997 to 2017, we chose 18 economies. Because the economies of China and Japan were causing outliers in the sample, they were removed from the study. Another reason could be that, in comparison to the other sampled countries, the dynamics of financial inclusion in China and Japan are considerably different. For example, the Chinese government discourages the opening of several bank accounts by a single person, whereas the Japanese government encourages the opening of multiple bank accounts by people. As a result, the number of bank accounts in Japan is excessively high, while it is comparatively modest in China. After analyzing the trend of different variables, we have excluded China and Japan from the analysis.

Table 1: Definition and Data Source of Variables

Variables	Symbol	Definition	Source
GINI coefficient	$GINI_{it}$	Gini coefficient measures the deviation of income from perfectly equal distribution. Its value lies between 0–1, 0 indicates perfect equality while 1 reflects perfect inequality in income distribution	Standardized World Income Inequality Database (SWIID) by Solt (2016)
Inflation	INF_{it}	Consumer Price Index (CPI) shows the changes in the average price which consumers pay for acquiring a basket of goods and services	WDI
Government effectiveness	GE_{it}	Perception of quality of public services and credibility of the government Its value ranges from 2.5 to –2.5	World Governance Indicators
Employment	EMP_{it}	The employment rate measures the number of people actively working as a percentage of the labor force	International Labor Organization
School enrolment	E_{it}	Net primary enrollment is the ratio of school-age children are enrolled in school and the population of official school age	UNESCO Institute of Statistics
Government spending to GDP	GSY_{it}	Total government spending with respect of GDP, Government spending excludes military expenditure	WDI
Deposit Accounts/100000	DA_{it}	Number of deposit accounts with commercial banks per 100000 population	IMF/WDI and Central Bank and Statistics Department
Borrower accounts/100000	BA_{it}	Number of borrower accounts with commercial banks per 100000 of population	As above
No of banks/100000	BN_{it}	Number of commercial banks per 100000 population	As above
Private Credit to GDP	PC_{it}	Total credit to as a percentage of GDP	WDI/IMF
Financial system deposits to GDP	FSD_{it}	Total time, demand, and saving deposits with banks and financial institutions as a percentage of GDP	International Financial Statistics (IFS)
Insurance premium to GDP	IP_{it}	Total life and non-life insurance premium as a percentage of GDP	World Bank

4. Results

4.1. Construction of Micro and Macro-Financial Inclusion Indices

Bandiera et al. (2000) established the financial liberalization index by including different variables of financial liberalization and found that the components of financial inclusion are associated with each other and have the issue of multi-dimensionality. Their findings laid the groundwork for the creation of a financial inclusion index. Khan and Qayyum (2007) developed a financial development index based on four financial metrics. Sarma (2008) proposed building a financial inclusion index by combining important components and displaying it as a signal measure.

This study divides financial inclusion into two different categories following Pina (2018) and Ali and Khan (2020). Two different approaches have been used for micro-level

and macro-level financial inclusion indices development following Sarma (2008) as well as Stock and Watson (2002).

4.1.1. Index Based on Methodology of Sarma (2008)

Following Sarma (2008), the micro- and macro-level financial inclusion indexes scale the level of financial inclusion (FI) from 0 to 1. The lowest levels of financial inclusion are represented by a score of 0, while the highest degree of financial inclusion is represented by a score of 1.

Figures 1 and 2 show the rankings of micro-and macro-level financial inclusion indices, respectively.

Considering Figure 1, the micro-level financial inclusion reflects the relative position of financial services accessibility in each country. It can be seen from Figure 1 that South Korea secured the highest level of financial accessibility, while the Kyrgyz Republic has the lowest level.

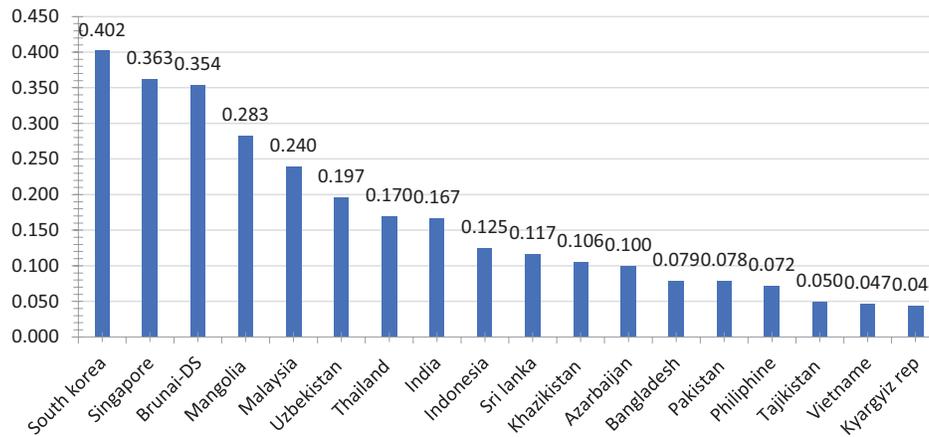


Figure 1: Ranking of Micro-Financial Inclusion Index

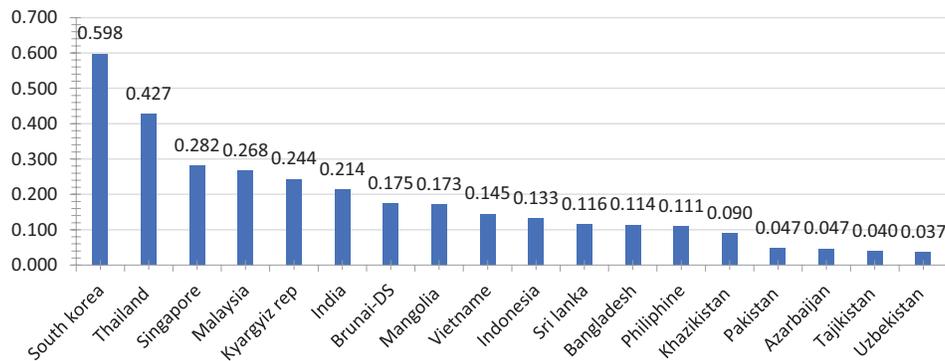


Figure 2: Ranking of Macro-Level Financial Inclusion Index

The ranking of macro-level financial inclusion in Figure 2 reflects the financial development in selected countries with respect to the size of the economy. The graph shows that based on macro-level financial inclusion, South Korea has the highest score, while Pakistan, Azerbaijan, Tajikistan, and Uzbekistan are in the 15th Position. The relative lower financial inclusion is because of an underdeveloped financial system, weak demand from customers, illiteracy, and lack of awareness.

The ranking along with the score of micro-level and macro-level of financial inclusion is presented in Table 2.

4.1.2. Dynamic Factor Model (DFM) Based Indices

Alternatively, the micro-level and macro-level financial inclusion indices based on the DFM approach are depicted in Figure 3.

The DFM-based micro-level financial inclusion index presented in Figure 4.3 shows higher variation across

sampled countries. This suggests that economies with high financial inclusion have higher scores. However, macro-level financial inclusion indicates relatively less variation as compared to the fluctuation associated with micro-level financial inclusion.

After preliminary analysis, we may conclude that the financial inclusion index of Sarma (2008) performs better in accessing the levels of financial inclusion. Therefore, we consider the financial inclusion index based on Sarma (2008), while results on the DFM-based financial inclusion index *c*.

4.2. Impact of Micro and Macro-Financial Inclusion and Income Inequality

We examine the effect of *Micro-FII* and *Macro-FII* on income inequality and Table 3 presents the estimation results.

Table 2: Micro and Macro-Financial Inclusion

Rank	Country	Micro-FII Score	Rank	Country	Macro-FII Score
1	South Korea	0.402	1	South Korea	0.598
2	Singapore	0.363	2	Thailand	0.427
3	Brunei-DS	0.354	3	Singapore	0.282
4	Magnolia	0.283	4	Malaysia	0.268
5	Malaysia	0.240	5	Kyrgyz rep	0.244
6	Uzbekistan	0.197	6	India	0.214
7	Thailand	0.170	7	Brunei-DS	0.175
8	India	0.167	8	Magnolia	0.173
9	Indonesia	0.125	9	Vietnam	0.145
10	Sri Lanka	0.117	10	Indonesia	0.133
11	Khazikistan	0.106	11	Sri Lanka	0.116
12	Azerbaijan	0.100	12	Bangladesh	0.114
13	Bangladesh	0.079	13	Philippine	0.111
14	Pakistan	0.078	14	Khazikistan	0.090
15	Philippine	0.072	15	Pakistan	0.047
16	Tajikistan	0.050	16	Azerbaijan	0.047
17	Vietnam	0.047	17	Tajikistan	0.040
18	Kyrgyz rep	0.044	18	Uzbekistan	0.037

Note: FII denotes financial inclusion index.

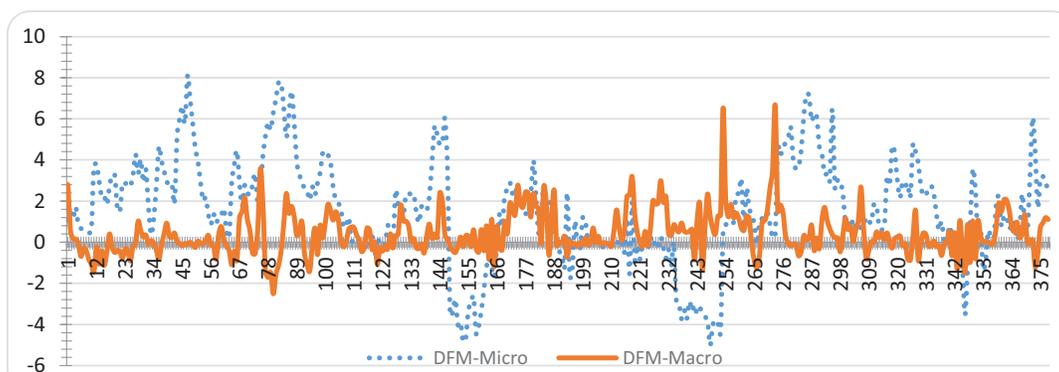


Figure 3: Trends of Macro-Level and Micro-Level Financial Inclusion Indices Based on the Dfm Approach

In Table 3, we have presented estimation results of eight models by considering the GINI coefficient as the dependent variable. In each model, the impact of *Micro-FII* and *Macro-FII* and individual indicators of financial inclusion is analyzed. Positive signs of the coefficients of explanatory variables imply that these variables cause

to increase in income inequality, while the negative sign reveals that these variables decrease the level of income inequality. Model (A) of Table 4.10 presented the impact of *Micro-FII* on income inequality. The coefficient $Micro-FII_{it}$ is -3.0 which is significant at a 10% level of significance. It indicates that that $Micro-FII_{it}$ has a significant impact

Table 3: Micro and Macro-Financial Inclusion and Income Inequality

Dependent Variable: GINI _{it}								
Variables	Model (A)	Model (B)	Model (C)	Model (D)	Model (E)	Model (F)	Model (G)	Model (H)
Micro-FII _{it}	-3.00* (-1.67)	-	-	-	-	-	-	-
Macro-Fii _{it}	-	0.35 (0.30)	-	-	-	-	-	-
LBN _{it}	-	-	0.12** (2.27)	-	-	-	-	-
LDA _{it}	-	-	-	-0.14 (-0.79)	-	-	-	-
LBA _{it}	-	-	-	-	0.02 (0.20)	-	-	-
LPC _{it}	-	-	-	-	-	0.12 (0.71)	-	-
LFSD _{it}	-	-	-	-	-	-	0.007 (0.05)	-
LIP _{it}	-	-	-	-	-	-	-	-0.16 (-1.08)
GINI _{it}	1.10*** (14.30)	1.09*** (15.91)	0.96*** (34.47)	1.10*** (12.37)	1.09*** (12.17)	1.05*** (13.76)	1.09*** (13.51)	1.08*** (13.14)
LGDP _{it}	0.19 (0.69)	0.35 (1.13)	0.01 (0.53)	0.27 (1.05)	0.29 (0.34)	0.37 (0.47)	0.34 (0.40)	0.45 (0.54)
LGSY _{it}	-0.53** (-2.10)	-0.57** (-2.25)	-0.32** (-2.48)	-0.52** (-2.03)	-0.57* (-1.74)	-0.52* (-1.74)	-0.56* (-1.99)	-0.43* (-1.94)
LEMP _{it}	-1.71 (-0.64)	-2.38 (-0.87)	-2.75* (-1.98)	-0.89 (-0.31)	-2.05 (-0.61)	-3.33 (-1.07)	-2.25 (-0.69)	-2.07 (-0.66)
LE _{it}	-0.62 (-0.80)	-0.54 (0.71)	0.73 (1.03)	-0.46 (-0.51)	-0.55 (-0.41)	-0.60 (-0.52)	-0.55 (-0.43)	-0.46 (-0.38)
GE _{it}	-0.63** (-2.17)	-0.69** (2.36)	-0.02 (-0.40)	-0.69** (-2.14)	-0.71*** (-2.96)	-0.61*** (-2.60)	-0.70*** (-3.20)	-0.64*** (-2.68)
No of observation	378	378	378	378	378	378	378	378
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
AR(1)	0.00	0.00	0.00	0.00	0.05	0.04	0.05	0.05
AR(2)	0.99	0.93	0.99	0.97	0.95	0.95	0.95	0.97
Sargen test	0.37	0.43	0.31	0.37	0.42	0.43	0.43	0.47
F state	48642.8***	22.02***	56394.7***	25.3***	19.6***	8.62***	18.82***	12.38***

Note: Values in parentheses are t-stat, *, **, *** respectively indicate significance at 90, 95, and 99% level of significance. The values above parentheses show coefficients.

on the distribution of income in selected economies. It means that $Micro-FII_{it}$ may help in the improvement of income distribution in selected Asian economies, but its impact is weak. The weak impact of $Micro-FII$ on the distribution of income may be due to uneven affordability and availability of financial services. It is a fact that the rich and poor cannot get equal benefits from financial access. Cost of financial services, lack of collateral assets, and information asymmetry are the reasons for uneven utilization and benefits of financial access. The effect of financial inclusion on income distribution depends on the characteristics of a financial structure that how effective it is designed to deal with the issue of income inequality. Our results are similar to the findings of Jauch and Watzka (2016) who advocated that financial inclusion does not always ensure fair income distribution.

In Table 3, model (B) reports the impact of $Macro-FII$ on income inequality. The coefficient of $Macro-FII$ is 0.35 but is statistically insignificant. The main reason for the insignificance of the development-side of financial inclusion may be that high-income groups get more benefits from financial development as compared to poor social class, which in turn further deteriorate income distribution. Jauch $Micro-FII$ and Watzka (2016) highlighted the fact that financial sector development does not always improve income distribution. The cost of financial services, lack of collateral assets, and information asymmetry are the reasons for uneven benefits of financial accessibility. The effect of financial inclusion on income inequality depends on the characteristics of a financial system that how effective it is designed to deal with income distribution.

The results reported in Table 3 (model C) indicate the effect of bank branches (LBN_{it}) on income inequality. The coefficient of LBN_{it} is 0.12 and is significant at the 5% level of significance. This indicates that expansion in bank branches causes to increase in income inequality. The reason may be that bank branches provide loans based on the financial position of individuals rather than based on principles for equality.

In model(s) (D) to (H), the impact of deposit accounts (LDA), borrower accounts (LBA), private credit (LPC), total deposit with financial system (LFSD), and insurance premium (LIP) is analyzed. The results show that all these five indicators of financial inclusion do not have a significant effect on income inequality. It implies that for improving equitable income distribution, there is a need for comprehensive government policy. The financial accessibility and financial services cannot deal with complex issues of the income distribution. It is the government's responsibility to make the socio-economic structure more equitable and design policies for fair income distribution. This indicates that for overcoming income inequality in selected countries, a comprehensive strategic intervention is needed rather than access to banks, deposits, and borrower

facilities. The services of financial institutions are available to everyone and it is evident that the rich peoples get more benefits as compared to poor people's due to information availability, security, and better financial literacy.

The role of quality of financial institutions is important for decreasing income inequality rather than just financial services accessibility. These findings are in line with Beck et al. (2007). Additionally, the lagged GINI coefficient ($GINI_{it-1}$) has a positive and statistically significant impact on the current GINI coefficient. This implies that the past period's income inequality has a strong positive impact on the current income inequality.

With respect to the control variables, the result indicates real GDP ($LGDP_{it}$) exerts a positive impact on the GINI coefficient when compared to the other control variables. However, this variable has a negative impact on income inequality. The fundamental explanation for this could be that when economies grow, income distribution gaps widen because the privileged class benefits from market opportunities far more than the less developed social classes.

The government spending ($LGSY_{it}$) reveals a negative and significant effect on income distribution in all the models. The coefficients of $LGSY_{it}$ range from -0.32 to -0.57 , which implies that an increase in government spending would improve income distribution. Thus, government plays a vital role in income distribution by adopting strategies, effective management, and appropriate allocation of funds. These findings are consistent with Kappel (2010) and Anderson et al. (2017) who highlighted the importance of government spending for equitable income distribution.

In terms of the role of employment ($LEMP_{it}$), this variable is statistically significant only in model C. According to Mehic (2018), employment increases lower quantile income and narrows the income distribution gap. However, because of low salaries and unskilled labor, it may not be an effective technique in some economies.

The findings also suggested that in all models, school enrollment (LE_{it}) has no effect on income disparity. This shows that enrollment in education has no bearing on income distribution. In truth, education has little impact on economic inequality. According to Abdullah et al. (2015), secondary school enrollment has a greater impact on income disparity than primary school enrollment.

The importance of government effectiveness is demonstrated by the results, which show that it is significant across all models except model (C). It has a coefficient of -0.02 to -0.71 . Our findings are consistent with Anderson et al. (2017), who emphasized the importance of government effectiveness in addressing the issue of income disparity.

The results show that there is no issue with serial correlation, as evidenced by the insignificance of AR p -values (2). The Hansen statistic indicates that GMM estimation devices are reliable. At the 99 percent level of significance,

the *F*-statistics suggests that the model fits well. Year dummies were also used to achieve efficient results.

5. Conclusion

The impact analysis of financial inclusion on income inequality shows that the impact of micro-level financial inclusion index (*Micro-FII_{it}*) on income distribution is significant. Although, the effect of *Micro-FII* on income inequality is weak but significant at the 90% level. It indicates that micro-level financial inclusion has a negative impact on income distribution. It implies that micro-level financial inclusion decreases income disparities and shrinks the income inequality gap in Asia. The impact of the macro-level financial inclusion index (*Macro-FII_{it}*) on income distribution is statistically insignificant. This means that macro-level financial inclusion will not be able to address concerns of the unequal income distribution. Individual micro-level financial inclusion components such as bank branches, deposit accounts, and borrower accounts have a statistically insignificant impact on income inequality. It *Micro-FII_{it}* implies that financial inclusion is ineffective as a method for reducing income inequality.

The impact of individual indicators of macro-level financial inclusion indicates private sector credit relative to GDP, total deposits in the financial system relative to GDP, and insurance premium relative to GDP all have an insignificant impact on income inequality. Previous research looked at the impact of financial development on economic growth using private sector credit as a metric of financial sector development.

Individual macro-level financial inclusion indicators show that private sector credit as a percentage of GDP, total deposits in the financial system as a percentage of GDP, and insurance premiums as a percentage of GDP have no impact on income inequality.

5.1. Policy Implication

Empirical results of the study provide some new insights to policymakers for designing appropriate financial products and policies that can potentially reduce income disparity in the Asia region. Based on the finding we have offered the following policy recommendations.

- The level of financial inclusion is represented by the financial inclusion index based on the methodology of Sarma (2008), whereas DFM reflects financial inclusion growth. The DFM approach is beneficial for predicting future financial inclusion trends. Therefore, policymakers can use the approach of Sarma (2008) to assess financial inclusion.
- The result implies that for just and equitable income distribution, there should be some effective government

strategy. Financial inclusion does not work as an effective tool for income distribution. The role of the government in designing effective financial policy for equitable access to financial services to every citizen regardless of their socio-economic status, is very important.

- Based on the findings of the study, we propose that all Asian economies need to develop effective and comprehensive solutions. Financial inclusion will help to stimulate economic growth in the least developed countries, while it will increase the financial depth and make the economy more expensive in developed countries. Small loans at subsidized rates to underprivileged and poor people in remote areas must be provided, enabling them to participate actively in economic activity. Financial institutions should also simplify their products make them more relevant, relax the need for collateral and undertake advertising campaigns.

5.2. Future Research Directions

The impact of financial inclusion on income inequality was also insignificant, insurance premium relative to GDP is the only variable that significantly promotes equitable income inequality. Based on the finding of this study, we recommend the following potential research areas for future research consideration.

In future research, it would be fascinating to look at the effects of financial inclusion on a country-by-country basis using primary data. The studies that are currently accessible are based on secondary data; however, there is a need to study country-specific primary data to get new insights on the extent and impact of financial inclusion in various countries. We will be able to study the cross-country variation, issues, and challenges that financial inclusion faces in different countries using country-specific primary data analysis.

It would be interesting to examine the influence of DFM-based indices in various economies around the world. It will also look at the robustness of DFM-based indices and Sarma's indices in other fields of economics. Furthermore, the discussion over having a perfect model for measuring financial inclusion is still ongoing; different models for accurate financial inclusion measurement must be researched further to arrive at the best possible model for measuring financial inclusion.

Mobile money accounts are a new phenomenon; future research should explore this including electronic money, or mobile money, as it represents a new enabling and driving force for financial inclusion around the world. Mobile money plays an important role in today's technology-based economies, as it promotes financial inclusion by making mobile money outlets easily available and simple to use. We were unable to evaluate data from a relatively short time period due to the unique nature of dynamic

factor model-based indices. Therefore, we were unable to consider the mobile money side because data was only accessible for a short period of time and a few economies.

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Endnote

¹**South East Asian countries:** Malaysia, Indonesia, Brunei Dar-Ul-Salam, Thailand, Vietnam, Singapore, Philippines, **East Asian:** South Korea, Mongolia, **Central Asian:** Azerbaijan, Kyrgyz republic, Tajikistan, Uzbekistan, Kazakhstan, and **South Asian:** Pakistan, India, Sri Lanka, Bangladesh.

Appendix

Table 1A: Impact of DFM Based Indices on Income Inequality

Dependent Variable: GINI _{it}		
Variables	Model (A)	Model (B)
Micro-DFM _{it}	-0.01 (-0.51)	-
Macro-DFM _{it}	-	-0.04 (-1.01)
GINI _{it-1}	1.08*** (15.65)	1.08*** (15.37)
LGD _{it}	0.39 (1.17)	0.29 (0.91)
LGSY _{it}	-0.56** (-2.23)	-0.58** (-2.28)
LEMI _{it}	-2.20 (-0.82)	-1.87 (-0.69)
LE _{it}	-0.46 (-0.59)	-0.52 (-0.69)
GE _{it}	-0.70** (-2.37)	-0.72** (-2.38)
No of observation	378	378
Year Dummy	Yes	Yes
AR-1	0.00	0.00
AR-2	0.96	0.89
Sargan test	0.43	0.45
F state	49533.6***	21.15**

Note: values in parentheses are *t*-stat, *, **, *** respectively indicate significance at 10, 5, and 1% level of significance. The values above parentheses show coefficients.