



## Financial Inclusion, Aggregate Income, and Poverty: Districts/Cities in Indonesia

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### Abstract

This study aims to empirically explore the condition of financial inclusion and relation between financial services sector development, real sector growth, and poverty alleviation. This study focuses on 334 Indonesian districts and cities in 2021. Financial inclusion measured by the penetration, availability, and utilization of banking services, which accumulate into a financial inclusion index. To examine the direct and indirect effects of financial inclusion on poverty through aggregate income, the Hayes Process Macro bootstrapping technique was used. In 2021 Central Jakarta has the highest level of financial inclusion in Indonesia, with an index of 0.8. The main form of financial inclusion is the availability of commercial bank offices and rural banks, while bank account ownership and the use of deposit and loan products in the formal financial services sector play a smaller role in the financial inclusion of Indonesian districts and cities in 2021. The findings indicate that financial inclusion has a positive and significant effect on aggregate income, a negative and significant effect on poverty, and aggregate income can mediate the relationship between financial inclusion and poverty.

**Keywords:** Financial Inclusion, Aggregate Income, Poverty

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### INTRODUCTION

Since the 2008 economic crisis, the World Bank, G20, Asian Development Bank, and Central Banks in several nations have focused on

the importance of access to financial services. To pursue financial inclusion goals, many global institutions have emerged, including the International Finance Corporation (IFC), the

Alliance for Financial Inclusion (AFI), and the Consultative Group to Assist the Poor (CGAP). This problem especially affected low-income neighborhoods, isolated inhabitants, people with physical impairments, workers without legal identity, and disadvantaged communities. The bulk of these settlements are referred to as "unbanked," or communities without bank accounts (Widyastuti et al. 2019).

Accessibility to formal financial services is a problem that frequently arises worldwide, particularly in emerging nations like Indonesia. The Global Findex Database 2021 indicates that not all people equitable access to financial services. According to the data, 97.7 million residents of Indonesia, or 48% of the country's population, were classified as "unbanked" in 2021; Indonesia was placed fourth globally for the greatest proportion of adult non-bank account holders (Demirgüç-Kunt et al. 2022).

Obstacles to gaining access to formal financial services may occur from both banking service providers (supply side) and the community as banking service consumers (demand side) (BI, 2022). Furthermore, geographical circumstances and infrastructure may prevent access to formal financial services, making it harder for populations in distant, border, and outer islands to obtain formal financial services (Nurizki et al., 2022).

These obstacles have an influence on communities' restricted access to financial instruments, forcing them to miss out on opportunities to enhance their quality of life. In this sense, financial inclusion refers to an endeavor to guarantee that formal financial services are freely accessible, available, and valuable to all parts of society in the economy (Sarma 2008).

The Indonesian government has been working on a nationwide financial inclusion agenda since 2011. As part of its commitment to enhancing inclusive and fair access to formal financial services, the government has reprinted Presidential Regulation No. 114 of 2020 on the National Strategy for Inclusive Finance (SNKI).

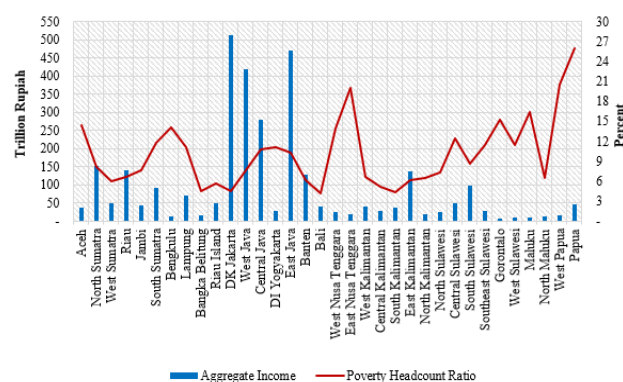
This strategy seeks to improve social well-being by increasing aggregate income, alleviating poverty, promoting income equality among people and regions, and fostering financial system stability (Ministry of State Secretariat of the Republic of Indonesia, 2020).

Empirical research shows the influence of financial inclusion on economic development and societal well-being. Financial inclusion has a direct influence on aggregate income (Kaluge & Nirwana 2020; Ouechtati 2020; Thathsarani, Wei & Samaraweera 2021; Nasution et al. 2022; Tsouli 2022).

There is a correlation between financial inclusion and aggregate income, which has the potential to affect poverty (Ouechtati 2020; Andrian et al. 2021; Anindyntha, Susilowati and Kurniawati 2021; Rhamaand i 2021; Thathsarani et al. 2021) and an inclusive financial system can decrease income inequality Rahma and Fakhrunnas, 2022; Ummah et al., 2015). Several studies explain that the relationship between financial inclusion and aggregate income can have an impact on poverty (Almasah and Sirait, 2023; Omar and Inaba, 2020).

The study on the development of the financial sector, real growth sector, and the phenomenon of poverty is interesting when related to the conditions in Indonesia. There is a substantial disparity in the facts in Indonesian areas when evaluating financial inclusion, poverty, and total income in 2023. Figure 1

summarizes the state of poverty and total income in Indonesian regions in 2023:



**Figure 1.** Trends in Indonesia's Poverty (Percentage) and Aggregate Income (Trillion IDR) in 2023

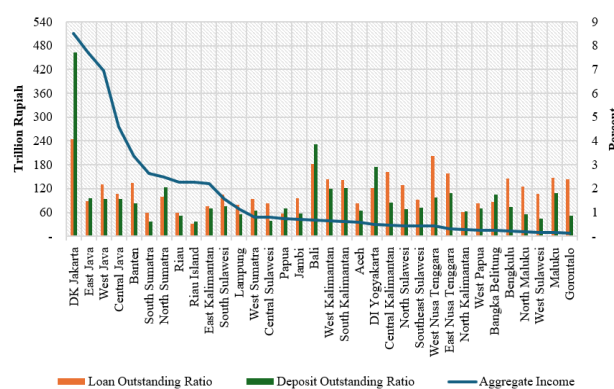
Source: (BPS 2023a; BPS 2023b)

With high aggregate income and low rates of poverty, the provinces of DKI Jakarta, West Java, and East Java appear to have reasonably strong economic conditions in Indonesia in 2023, as seen by Figure 1. In the meanwhile, compared to other provinces, Papua, West Papua, East Nusa Tenggara, and Maluku provinces continue to have more serious poverty problems.

High rates of poverty suggest that, in comparison to those in other provinces, residents in such places may find it difficult to achieve their basic necessities. According to certain research, poverty in Indonesia is positively correlated with aggregate income (Badu, Canon and Akib 2020; Sihite 2021).

In accordance with Todaro and Smith (2012), argue that aggregate income can reduce poverty if its benefits reach the lowest-income segments of society. The findings of the study by Farida et al., (2022); Feriyanto et al., (2020), argue that aggregate income has a negative impact on poverty in Indonesia. It is necessary to

strive for a combination of pro-poor growth economic policies and inclusive growth to enhance the participation of low-income population groups in the economy (Primadianti and Sugiyanto, 2020).



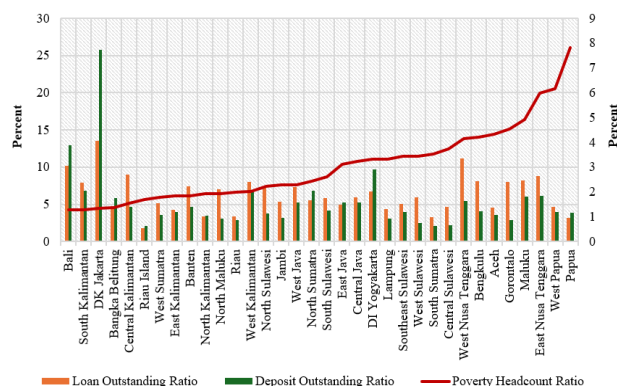
**Figure 2.** Trends in Indonesia's Aggregate Income (Trillion IDR) with the Savings Ratio and Credit Ratio (Percentage) in 2023

Source: (BI, 2023; BPS, 2023b)

Figure 2 shows that DKI Jakarta, which also has the largest aggregate income, is the province with the highest ratios of credit and savings to total income. Conversely, Aceh has the lowest credit ratio to total income in Indonesia in 2023, while West Sulawesi has the lowest savings ratio of any province in the country.

A direct correlation between the growth rate and the size of the capital stock is explained by the endogenous growth model (Baroroh 2012) and the Harrod-Domar model (Hidayati 2009), explaining a direct relationship between the growth rate and the size of the capital stock. The accumulation of capital stock requires the mobilization of savings through the financial sector, which can provide funding for the increase in capital stock (investment). Fund providers have more opportunities to invest in

technology, human capital, and physical capital when savings rates are higher. In the end, this can increase population productivity and aggregate revenue.



**Figure 3.** Trends in Indonesia's Credit and Savings Ratios to Poverty in 2023 (Percentage)  
Source: (BI, 2023b; BPS, 2023a)

Based on Figure 3, it can be observed that the magnitude of the savings ratio and credit ratio to aggregate income is followed by low levels of poverty in some regions. This suggests that credit and savings directed toward people or companies build up capital that can influence the growth of job opportunities for the populace, as well as opportunities for small, medium, and large enterprises and investments in human capital, all of which can contribute to the reduction of poverty in an area (Sukomo and Prawiranegara, 2019).

Regions with low savings and credit ratios to aggregate income, such as in the eastern part of Indonesia, experience relatively high poverty rates, around 25%. This suggests the need to improve access to formal financial services that can be reached by the public and encourage individuals to engage in savings and loans through formal financial services, as it will have a positive impact on poverty in those areas (Thathsarani et al., 2021).

Financial inclusion is a multidimensional concept that cannot be described by a single indicator (Cámara and Tuesta, 2017). Therefore, other important aspects need to be considered to comprehensively understand the development of formal financial service activities in a region, namely the dimensions of bank penetration and availability.

The bank penetration dimension is related to the number of users of financial services, which can be indicated by the number of account ownership. The ability to have transaction accounts provides broader opportunities for people to engage in financial transactions with formal financial institutions.

The development of financial services can also be seen from the availability dimension. This dimension relates to how formal financial institutions can be accessed by the public through physical facilities such as bank branches and ATMs established throughout Indonesia (Sarma 2008).

All individuals have equal access to financial services due to the physical locations of official financial institutions. In Indonesia, access to formal financial services has not been equally distributed across these three dimensions. In comparison to financial inclusion in regions with comparatively lower economies, high access to formal financial services is found in those with substantially more developed economies.

There is a suspected correlation between the condition of access to formal financial services with aggregate income and poverty in Indonesia in 2021. If access to formal financial services can be optimized to reach groups excluded from formal financial services in Indonesia, aggregate income can grow, and poverty levels can decrease. However, this

assumption needs to be empirically proven regarding the nature of the relationship and the magnitude of the impact of financial inclusion on poverty through aggregate income in Indonesia in 2021.

Financial inclusion plays a key role by providing formal financial services as affordable sources of financing or loans to overcome the capital limitations of the population (Erlando, Riyanto and Masakazu 2020). Individuals and small enterprises are able more easily acquire capital that was previously difficult to obtain by having increased access to banks, financial institutions, or digital financial services. The population can use accessible capital for productive activities, such as more capital for individuals or entrepreneurs desire to start or expand their own businesses.

This option could increase business owners' earnings, productivity, and investment, providing chances for the creation of new jobs. In this context, without access to financial services to obtain financing, individuals and small business owners can contribute to improving living standards and economic well-being (Pramaswara and Athoillah, 2023). Many earlier studies have proven the direct impact of financial inclusion on aggregate income and poverty.

However, there are still few researchers who have proven the indirect impact of financial inclusion on poverty through aggregate income. In order to determine how financial inclusion affects poverty through aggregate income in Indonesian regencies and cities in 2021, this study will analyze the state of financial inclusion and validate theories or findings from earlier research. It is hoped that this research can contribute knowledge and serve as a reference in the development of

science related to the phenomenon addressed in this study.

## RESEARCH METHODS

This study is a quantitative descriptive research, and the data used are secondary data sourced from Indonesia central bank and the Central Bureau of Statistics. The data collected from these sources is used to construct the financial inclusion index, such as the number of savings accounts from commercial banks and Rural Credit Banks (BPR), the number of banking institutions, the position of savings and loans in commercial banks and BPR, the projected adult population, aggregate income, and the percentage of the population in poverty.

The data utilized in this study are appropriate for analysis because they have been modified in accordance with accepted theories and earlier research, taking into account the data's accessibility and significance in recording the conditions of each variable and indicator used

The scope of this research includes 334 districts/cities in Indonesia in 2021. Through this research, it can provide an understanding of how financial inclusion contributed to economic recovery during the Covid-19 pandemic crisis and in reducing socio-economic inequalities that arise between individuals and between regions.

This study aims to examine the state of financial inclusion in Indonesian cities and districts in 2021. Financial inclusion is determined by the Financial Inclusion Index calculated using the method proposed by (Sarma 2016).

Financial Inclusion Index includes three dimensions: banking penetration, availability of banking services, and usage of banking services. The Financial Inclusion Index can be calculated

once the index values for each dimension have been determined. The index for each dimension can be calculated using the following equations (Sarma 2016):

$$d_i = w_i \frac{A_i - m_i}{M_i - m_i}$$

In the formula, it can be explained that  $d_i$  is the index value of dimension  $i$  ( $d_1$  for penetration,  $d_2$  for availability,  $d_3$  for usage).  $w_i$  is the weight assigned to dimension  $i$ .  $A_i$  is the actual value of dimension.  $m_i$  is the minimum value of dimension  $i$ .  $M_i$  is the maximum value of dimension  $i$ .

The value of  $d_i$  will be between 0 and 1 or the weight assigned to each dimension. The weight values are determined based on how much each dimension can influence the financial inclusion of a region. If the  $d_i$  value approaches 1, the more successful the achievement of a region in dimension  $i$ .

The determination of the weight values for each dimension can represent the financial inclusion of regencies/cities with point  $X$  ( $d_1, d_2, d_3$ ) in a three-dimensional space.  $d_1, d_2, d_3$  are sub-indices of dimensions for regencies/cities calculated using formula (1).

In addition to determining the weights, calculating each sub-index dimension of financial inclusion requires upper and lower limits. The lower limit ( $m_i$ ) and upper limit ( $M_i$ ) are determined based on the distribution of data for each dimension (Ummah et al. 2015).

The calculation of this financial inclusion index uses the simple average of normalized Euclidean distances between point  $O$  ( $0,0,0$ ) with the achievement dimension point  $X$  ( $d_1, d_2, d_3$ ) denoted as  $X_1$  in formula (2) and the inverse normalized.

Euclidean distance between the ideal achievement or point  $W$  ( $w_1, w_2, w_3$ ) with the achievement dimension point  $X$  ( $d_1, d_2, d_3$ ) denoted as  $X_2$  in formula (3). The formulas for the values of  $X_1$  and  $1 - X_2$  are as follows (Sarma 2016):

$$X_1 = \frac{\sqrt{d_1^2 + d_2^2 + \dots + d_i^2}}{\sqrt{n}}$$

$$1 - X_2 = 1 - \frac{\sqrt{(1-d_1)^2 + (1-d_2)^2 + \dots + (1-d_i)^2}}{\sqrt{n}}$$

So, the value of the financial inclusion index is the average of both (Sarma 2016).

$$IHK = \frac{1}{2} [X_1 + X_2]$$

The financial inclusion index is between 0 and 1. If a financial inclusion index of 1 is obtained, it indicates that the regency/city has the best financial inclusion condition among other regencies/cities. Meanwhile, a score of 0 indicates that the regency/city has the worst financial inclusion condition. As explained earlier, the dimensions of financial inclusion that will be measured consist of three main dimensions.

The first dimension is banking penetration, which depicts the number of banking service users. The indicator representing this dimension is the number of third party fund accounts, including current accounts, time deposits, and savings accounts, in commercial banks and BPR per 1,000 adults in each regency/city in Indonesia.

The second dimension of financial inclusion is availability, which illustrates the reach of banking. The indicator representing this dimension is the number of the presence of

commercial banks and BPR per 100,000 adults for each regency/city.

The third dimension of financial inclusion is usability, which describes the perceived benefits of banking services by the community. Indicators used to represent this dimension can include number of savings, credit, remittances, insurance, and other services offered by banks (Ummah et al. 2015).

For ease of calculation, the indicators used in this study are approximated from the total savings ratio and credit ratio disbursed by commercial banks and BPR in each regency/city divided by the aggregate income of that regency/city. The use of these indicators provides a more comprehensive overview of financial inclusion in a region (Sarma and Pais, 2011).

Furthermore, this study used path analysis to analyze the influence of financial inclusion on poverty both directly and indirectly through aggregate income as intervening variables. The data processing technique applied is the bootstrapping technique using the Hayes Process Macro in SPSS 25.

Abu-Bader and Jones (2021); Ghazali (2019) proposes the bootstrapping technique, which is robust to small and non-normal data through the Hayes Process Macro in SPSS. It is an alternative approach to test the significance of mediation.

The advantage of using the bootstrapping technique is that it provides higher study power and reduces the risk of false rejection of the null hypothesis (Abu-Bader and Jones, 2021). As the result regression model in this study encounters heteroskedasticity issues, so the study employs this method to obtain output estimates with corrected residual variance using a robust standard error estimation model.

The variables used in this study have different units. The financial inclusion variable is in index units, the aggregate income variable is in nominal IDR units, and the poverty variable is in percent units. To fulfill the regression analysis of cross section data, it is necessary to change the form of aggregate income variable data into the form of natural logarithms. The use of natural logarithms is to minimize the scale of data variables, because it will reduce the occurrence of disturbances from one of the classical assumptions, namely heteroscedasticity (Gujarati and Porter, 2012). The regression equations can be formulated as follows (Abu-Bader and Jones, 2021; Ghazali, 2019):

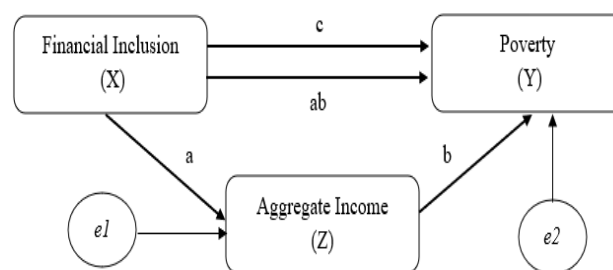
Structural Model Equation 1

$$LPAGR_i = \beta_0 + \beta_1 IIK_i + e_{1i}$$

Structural Model Equation 2

$$POV_i = \beta_0 - \beta_1 IIK_i - \beta_2 LPAGR_i + e_{2i}$$

Where *POV* represents poverty in percent, *LPAGR* represents natural logarithm of aggregate income and *IIK* represents index financial inclusion.  $\beta_0$  is the regression constant, while  $\beta_1$  and  $\beta_2$  are the path coefficients in estimating structural equations 1 and 2. *e* represents the residual variable. *i* denotes the *i*-th regency/city in the year 2021.



**Figure 4.** Path Model Diagram

Source: Data Processed, 2023

Figure 4 shows the path diagram of structural equation models 1 and 2. According to Abu-Bader and Jones (2021), the path diagram of this model can be explained as follows:

[a] represents the path coefficient of the direct effect of financial inclusion (X) on aggregate income (Z). Furthermore, [b] represents the path coefficient of the direct effect of aggregate income (Z) on poverty (Y) and [c] represents the regression coefficient of the direct effect of financial inclusion (X) on poverty (Y).

[ab] can represent the coefficient of the indirect effect of financial inclusion (X) on poverty (Y) through aggregate income (Z). The magnitude of the indirect effect [ab] is obtained by multiplying the value of the path coefficient [a] by the value of the path coefficient [b].

The total effect of financial inclusion (X) on poverty (Y) through aggregate income (Z) is calculated by summing the value of the path coefficient [c] with the indirect effect coefficient [ab].

As for  $e$  is the residual variable which states other variables outside the exogenous variables that are not included in the model or  $e$  is a measurement error (Sanusi, 2012). The residual variable value of each equation can be calculated by the formula:

$$e = \sqrt{1 - R^2} \quad (7)$$

The steps of hypothesis testing through the Process Macro method in this study are as follows:

First, select the Analyze, then Regression, and then Process v4.2 by Andre F. Hayes. Second, The Y Variable column is filled with Poverty (POV), the X Variable is filled with Financial Inclusion (IIK), and the Mediator (s) M

is filled with the Aggregate Income variable (LPAGR). Third, Next, select model 4 for analyzes a simple mediator with 1 mediator variable in the model number column. This is adjusted to the hypothesized conceptual diagram (Hayes A.F., 2022)

Fourth, Select options, then check the Show total effect model, Pairwise contrast of indirect effect, and Effect size. Lastly, Select OK to get the Process analysis output.

## RESULTS AND DISCUSSION

Based on Table 1, the variable representing poverty proxied by the percentage of the poor population (POV) has the smallest value, which is 2.38, and the largest value, which is 40.59. The average value of POV in the 334 districts/cities is 13.31. The standard deviation value of POV is 8.28 (below average), indicating that the poverty variable has a low level of data variability.

**Table 1.** Descriptive Statistics

	Min.	Max.	Mean	Std. deviation
Poor Population	2.38	40.59	13.31	8.28
Aggregate Income	147	460,02	23,05	52,65
Financial Inclusion Index	0.02	0.82	0.19	0.11
Banking Penetration Dimension	0.00	1	0.10	0.11
Availability Dimension	0.01	1	0.27	0.17
Usability Dimension	0.01	1	0.18	0.13

Source: tabled secondary data, 2023



Table 1 shows that the variable of aggregate income (LPAGR) has the smallest value, which is 147, and the largest value, which is 460,024. The average value of LPAGR obtained is 23.48. The standard deviation value of LPAGR is 52,653 (above average), meaning that the aggregate income variable has a high level of data variability.

The financial inclusion variable, proxied by the financial inclusion index, has the smallest value of 0.02 and the largest value of 0.82. The average financial inclusion obtained is 0.19, while the standard deviation of this variable is 0.11 (below average), indicating that the financial inclusion index variable has a low level of data variability.

Table 1 also shows the data description of the variables forming the financial inclusion index in this study. With a sample size of 334 districts/cities, the minimum values for all three dimensions are 0 and 0.01. The maximum values for all three dimensions are 1. The average values for the penetration dimension are 0.10, availability dimension is 0.27, and usability dimension is 0.18. The standard deviation values obtained for the penetration dimension are 0.11, availability dimension is 0.17, and usability dimension is 0.13.

The penetration dimension of banks, proxied by the number of third parties fund accounts, is a dimension that needs attention in financial inclusion in Indonesia because based on table 1, the average index of this dimension is lower than the others. This indicates that the barriers to financial inclusion come from formal financial institutions and the government, which have not been able to reach individuals or groups who have not yet accessed formal financial services such as banks or the unbanked population in Indonesia.

The categories of the financial inclusion index for districts/cities in 2021 based on zones can be observed in Table 2. The level of financial inclusion for districts/cities is divided into three categories of financial inclusion indices: (i) districts/cities with low IIK have an IIK value  $< 0.3$ ; (ii) districts/cities with moderate IIK have an index when  $0.3 \leq \text{IIK} < 0.6$ ; and (iii) districts/cities with high IIK if the district/city has an index of  $0.6 \leq \text{IIK} \leq 1$  (Bozkurt, Karakuş and Yildiz 2018).

The results of the financial inclusion index show that the average financial inclusion index for 334 districts/cities in Indonesia in 2021 is 0.19. This means that the majority of financial inclusion in districts/cities in Indonesia falls into the low category in 2021. This result is consistent with (Ummah et al. 2015; Fauzan, Firdaus and Sahara 2020; Hidayat and Sari 2022), who also state that financial inclusion in various regions of Indonesia is generally low.

In aggregate, there are 260 districts/cities, including those with low financial inclusion, 70 in the medium category, and 3 in the high category, which are the districts/cities in the Java zone, including Central Jakarta, South Jakarta, and Magelang City. This can be influenced by significant regional aggregate income, a substantial proportion of the workforce, and diverse industrial sectors supporting financial services demand (Yuningsih 2019).

According to Table 2 in Sumatra, Aceh Province has the highest Financial Inclusion Index (IIK) area, which is Banda Aceh City with an IIK of 0.44. West Sumatra Province has the highest IIK area, which is Bukittinggi City with an IIK of 0.54. Riau Province has the highest IIK area, which is Pekanbaru City with an IIK of 0.35. South Sumatra Province has the highest IIK

area, which is Lubuklinggau City with an IIK of 0.29.

Bengkulu Province has the highest IIK area, which is South Bengkulu Regency with an IIK of 0.27. Bangka Belitung Islands Province has the highest IIK area, which is Pangkal Pinang

City with an IIK of 0.35. Riau Islands Province has the highest IIK area, which is Tanjung Pinang City with an IIK of 0.35. Meanwhile, Tanjung Pinang Regency is the area with the lowest IIK in Sumatra with an IIK of 0.05.

**Table 2.** Financial Inclusion Categories for Districts/Cities Indonesia in 2021

Province	High	Moderate	Low	Total of Districts/Cities
Aceh	0	1	21	22
West Sumatra	0	5	14	19
Riau	0	1	11	12
South Sumatra	0	0	16	16
Bengkulu	0	0	9	9
Bangka Belitung Island	0	1	6	7
Riau Island	0	1	6	7
DK Jakarta	2	2	2	6
West Java	0	8	19	27
Central of Java	1	5	29	35
Banten	0	1	7	8
East Nusa Tenggara	0	1	21	22
West Kalimantan	0	2	12	14
Central Kalimantan	0	2	12	14
East Kalimantan	0	2	8	10
North Kalimantan	0	0	5	5
Central Sulawesi	0	2	11	13
Southeast Sulawesi	0	1	14	15
Gorontalo	0	1	5	6
West Sulawesi	0	0	6	6
Maluku	0	1	10	11
North Maluku	0	0	9	9
West Papua	0	2	11	13
Papua	0	8	20	28
<b>Total</b>	<b>3</b>	<b>47</b>	<b>284</b>	<b>334</b>

Source: Processed secondary data, 2023

According to Andaiyani et al. (2022), the varying geographical conditions in a province in the Sumatra Zone pose challenges in

establishing branch offices of banks. Additionally, stringent and challenging requirements, time-consuming and complex

processes, as well as high formality levels can be obstacles for the community in accessing banking services. Table 2 indicates the IIK levels for Java Island. Jakarta Special Capital Region (DKI Jakarta) has the highest financial inclusion achievement in Indonesia in 2021, particularly in Central Jakarta with an index of 0.82. Cirebon City with an IIK of 0.45 has the highest IIK in West Java Province. Magelang City with an IIK of 0.62 has the highest IIK in Central Java Province. Tangerang City with an IIK of 0.32 has the highest IIK in Banten Province. Meanwhile, Pandeglang Regency is the area with the lowest IIK in Java with an IIK of 0.09.

Table 2 also shows the IIK levels for Kalimantan Island. Pontianak City with an index of 0.44 has the highest financial inclusion in West Kalimantan Province. Palangka Raya City with an index of 0.36 has the highest IIK in Central Kalimantan Province. Samarinda City with an index of 0.33 has the highest IIK in East Kalimantan Province. Tana Tidung Regency with an index of 0.25 has the highest IIK in North Kalimantan Province. Meanwhile, Seruyan Regency is the area with the lowest IIK in Kalimantan with an IIK of 0.09.

Table 2 reveals the IIK levels for Sulawesi Island. Palu City with an index of 0.38 has the highest IIK in Central Sulawesi Province. Kendari City with an index of 0.41 has the highest IIK in Southeast Sulawesi Province. Gorontalo City with an index of 0.34 has the highest IIK in Gorontalo Province. Mamuju City with an index of 0.19 has the highest IIK in West Sulawesi Province. Meanwhile, Sigi Regency is the area with the lowest IIK in Sulawesi with an IIK of 0.04.

Table 2 also shows the IIK levels for Maluku and Papua Islands. Ambon City with an IIK of 0.30 has the highest IIK in Maluku Province.

Ternate City with an index of 0.25 has the highest IIK in North Maluku Province.

Manokwari Regency with an index of 0.40 has the highest IIK in West Papua Province. Keerom Regency with an index of 0.43 has the highest IIK in Papua Province. Meanwhile, Lanny Regency is the area with the lowest IIK in Indonesia in 2021 with an IIK of 0.02.

Based on the previous discussion, high financial inclusion mostly occurs only in the Java Zone, with only a small number outside the Java Zone. This indicates uneven economic development in Indonesia. Stronger economic development in the Java Zone compared to other zones can strengthen financial inclusion, while other zones still face development challenges.

There is an indication of a gap between urban and rural areas. Urban areas have better infrastructure compared to rural areas, making it easier for urban residents to access formal financial institutions (Ratri 2021). According to a survey by the Financial Services Authority (OJK), the level of financial literacy in urban areas tends to be higher than in rural areas (OJK 2022). Individuals or groups with high financial literacy are more aware of products, benefits, and risks, leading to a tendency to access formal financial services (Nugraha and Tulung, 2021).

Furthermore, the results of the path regression analysis from structural equation 1 in tabel 3 yield a coefficient of determination value of 0.084, meaning financial inclusion can explain 0.08% of aggregate income, and the remaining 99.92% is explained by variables outside the model. Furthermore, the obtained residual variable ( $\epsilon_1$ ) is 0.95, derived from  $\sqrt{1 - 0.084}$ .

Subsequently, an f-Statistic value of 21.688 is obtained, which is greater than the f-table (0.05,3), and the probability value of the f-Statistic is less than the significance level (0.05).

Thus, all independent variables in equation 1 have a significant effect on aggregate income. Table 3 regression output for structural equation 1 produces the following model:

$$LPAGR = 29.0376 + 3.6141 \cdot IIK$$

From the structural equation 1, the constant value is obtained as 29.0376, meaning that if financial inclusion is considered constant, aggregate income is 29 percent. The coefficient value of financial inclusion is 3.6141. This implies that if financial inclusion increases by one percent, aggregate income will increase by 3 percent, assuming other variables remain constant. Based on Table 3, the regression results show that the regression coefficient of financial inclusion has a positive and significant effect on aggregate income.

The obtained probability value is 0, which is less than the significance level (0.05), the t-statistic value is 4.6471, greater than the t-table (1.96713), and there is no "zero" in the 95% confidence interval (2.0875 to 5.1406),  $H_0$  is rejected.

This means that the financial inclusion regression model significantly affects aggregate income. Thus, the hypothesis stating "It is suspected that financial inclusion has a positive and significant effect on aggregate income in regencies/cities in Indonesia in 2021" is proven.

These findings are similar to the research by (Kaluge and Nirwana 2020), which proves that financial inclusion has a positive and significant effect on aggregate income in all regencies/cities in East Nusa from 2015 to 2019. This research supports growth models by Harrod-Domar and Solow, which emphasize

savings and investment as the formation of capital, one of the factors in determining the aggregate income of a region.

The effectiveness of increasing domestic savings affects private sector investment, which plays a role in achieving higher aggregate income (Supartoyo et al., 2018). An inclusive financial service system can be a factor in increasing aggregate income in Indonesia because the more Indonesian citizens have access to formal financial services, the faster and increasing transaction accumulation can contribute to aggregate income (Fitriah and Ichwanudin, 2020).

Financial inclusion also encourages development of an inclusive financial system by technology to reach groups or individuals who were previously not reached by formal financial services, facilitating access to formal financial services for every layer of society, and developing financial products and services that are in line with community needs, which positively impact the aggregate income of a region (Srouji, 2020); (Nasution et al., 2022).

The results of the path regression analysis from structural equation 2 in Tabel 4 yield a coefficient of determination value of 0.385, meaning financial inclusion can explain 38% of aggregate income, and the remaining 62% is explained by variables outside the model. Furthermore, the obtained residual variable ( $e_2$ ) is 0.78, derived from  $\sqrt{1 - 0.385}$ . Subsequently, an f-Statistic value of 21.688 is obtained, which is greater than the f-table (0.05,3), and the probability value of the f-Statistic is less than the significance level (0.05). Thus, all independent variables in equation 2 have a significant effect on poverty.

**Table 3.** Regression Output for Structural Equation 1

	Coeff.	t-Statistic	Prob.	95% Confidence Interval	
				Lower Limit	Upper Limit
Constant	29.0376	187.1531	0	28.7321	29.3428
Financial Inclusion (IIK)	3.6141	4.6571	0	2.0875	5.1406
Adjusted R-Squared					0.0840
F-Statistic					21.6884
Prob. F-Statistic					0

Source: Processed data in SPSS 25, 2023

Table 4 regression output for structural equation 2 produces the following model:

$$POV = 114.3460 - 13.1428 * IIK - 3.3144 * LPAGR$$

Based on the model equation above, the constant value obtained is 114.3460. This means that if the independent variable is considered constant, poverty is 114 percent. The coefficient value of the relationship between financial inclusion and poverty is -13.1428, which means that if financial inclusion increases by one percent, poverty will decrease by 13 percent, assuming other variables remain constant.

Partially, the regression output structural equation 2 shows the coefficient value of financial inclusion has a positive and significant effect on poverty. The probability value of 0.0019 is less than the significance level (0.05), the t-statistic value of -3.1314 > t-table (1.9671), and there is no "zero" in the 95% confidence interval (-21.3993 to -4.8864),  $H_0$  is rejected. Thus, the hypothesis stating "It is suspected that financial inclusion has a negative and significant effect on poverty in regencies/cities in Indonesia in 2021" is proven.

This research finding is consistent with the study by Almasah and Sirait (2023) stating that financial inclusion has a negative impact on poverty in 33 provinces of Indonesia in the

period 2011-2021. Sari et al. (2022) also state the same, that financial inclusion in Indonesia reduces poverty in the period 2010-2019.

Financial inclusion has the potential to help the poor escape the vicious cycle of poverty through a culture of saving, thrift, cheap loans, and the creation of efficient and low-cost payment mechanisms (Dixit and Ghosh, 2013 in Dienillah and Anggraeni, 2016). According to Sukomo and Prawiranegara (2019), through the distribution of banking credit, whether working capital credit, investment credit, or consumer credit, can reduce poverty as well, as seen in West Java.

One form of the government's commitment to reaching the poor excluded from financial services in Indonesia is through the distribution of social assistance using the banking system (Habibullah 2019). *Program Keluarga Harapan* (PKH) and *Program Bantuan Pangan Non-Tunai* (BPNT) through *Kartu Keluarga Sejahtera* (KKS). KKS is a payment instrument with electronic money and ATM card features that can be used by beneficiaries in receiving social assistance. Thus, beneficiaries who have not had access to bank institutions have changed their status to bankable.

Based on the regression output structural equation 2 in Table 4, the coefficient value of the relationship between aggregate income and

poverty is -3.3144. This means that if aggregate income increases by one percent, poverty will decrease by 3 percent, assuming other variables remain constant. The coefficient value of aggregate income is negative and significant to poverty. The probability value obtained is  $0 \leq$  significance (0.05), the t-statistic value is -

11.1849 > t-table (1.96716), and there is no "zero" in the 95% confidence interval (-3.8973 to -2.7314), so  $H_0$  is rejected. Thus, the hypothesis stating "It is suspected that aggregate income has a negative and significant effect on poverty in regencies/cities in Indonesia in 2021" is proven.

**Table 4.** Regression Output for Structural Equation 2

	Coeff.	t-Statistic	Prob.	95% Confidence Interval	
				Lower Limit	Upper Limit
Constant	114.3460	12.8349	0	96.8026	131.8713
Financial Inclusion (IIK)	-13.1428	-3.1314	0.019	-21.3993	-4.8864
Aggregate Income (LPAGR)	-3.3144	-11.1849	0	-3.8973	-2.7314
Adjusted R-Squared					0.3850
F-Statistic					72.8318
Prob. F-Statistic					0

Source: Processed data SPSS 25, 2023

This research result is in line with Feriyanto et al. (2020) stating that aggregate income at constant prices has a negative and significant impact on poverty in Indonesia in the period 2010-2019. Abdullah and Astuti (2023) also state that there is a significant negative relationship between aggregate income and poverty in East Java province from 2013 to 2022.

Similarly, at the regency/city level, Farida et al. (2022) in their study state that regional aggregate income significantly reduces poverty in regencies/cities in Indonesia. Although the aggregate income of each region in Indonesia has quite sharp differences, poverty can be reduced in 2021.

This can be proven by the estimation results of this study. The growth of regional aggregate income in 334 regencies/cities in Indonesia in 2021 is accompanied by a reduction in poverty, supporting the statement that the

poor participate in economic development (Primadianti and Sugiyanto, 2020). This occurs when aggregate income drives labor-intensive investment sectors or stimulates real sector growth, poverty rates also decrease through the creation of quality jobs in various regions of Indonesia and the expansion of job opportunities for the poor to increase their income (Dewi et al. 2018).

The determination of the influence of financial inclusion, both directly, indirectly, and the total effect on poverty can be explained in the table 5.

Based on the results of the bootstrapping estimation in Table 5, the probability value of the direct impact of financial inclusion on poverty, i.e., 0.0019, is less than the significance level (0.05). The t-statistic value of -3.1314 is greater than the t-table value (1.96713), and there is no "zero" in the 95% confidence

interval (-21.3993 to -4.8864), indicating the rejection of the null hypothesis ( $H_0$ ). In other words, financial inclusion can directly reduce

poverty in 334 districts/cities in Indonesia in 2021.

**Table 5.** Direct, Indirect, and Total Effects

Effect	Coeff.	SE (HC2)	t-Statistic	Prob.	95% Confidence Interval	
					Lower Limit	Upper Limit
Direct	-13.1428	4.1971	-3.1314	0.0019	-21.3993	-4.8864
Indirect	-11.9783	2.6423			-16.9697	-6.5923
Total Effects	-25.1211	4.3155	-5.8212	0.0000	-33.6102	-16.6320

Source: Processed data SPSS 25, 2023

The research obtained a coefficient of the indirect effect of -11.9783 with a bootstrap 95% confidence interval between -16.9697 and -6.5923. Since "zero" is not included in the 95% confidence interval,  $H_0$  is rejected. In other words, there is a significant negative mediating effect on the indirect influence of financial inclusion on poverty through aggregate income.

The mediating effect indicates that financial inclusion can reduce poverty by 11 percent if financial inclusion can increase aggregate income by 3 units. Because the coefficient of the indirect effect is smaller than the coefficient of the direct effect of financial inclusion on poverty through aggregate income, it can be called partial mediation. Thus, the hypothesis stating "It is suspected that aggregate income can mediate the relationship between financial inclusion and poverty in districts/cities in Indonesia in 2021" is proven.

It can be said that the findings of this research support the concept of the banking sector's role as an intermediary institution that provides payment traffic, gathers funds from the public, and channels them back in the form of

productive credit, thus supporting the economy. This research aligns with Nasution et al. (2022) indicating that financial inclusion and fintech significantly affect aggregate income in Indonesia compared to other ASEAN countries. The indication that financial inclusion has a positive effect on aggregate income, followed by a reduction in poverty, also occurred in the eastern part of Indonesia during the period 2014-2018 (Andrian et al. 2021).

Strong aggregate income creates demand for labor, increases real wages for low-skilled jobs, improves living standards, and generates a positive cycle of prosperity and opportunities in developing countries. This leads to the development of an efficient and inclusive financial system that encourages participatory investment and financial risk management from poor households, ultimately helping to reduce poverty (Omar and Inaba, 2020).

## CONCLUSION

The results of the financial inclusion index calculation show that the ownership of Third-Party Fund accounts in Indonesia is very low. This indicates that the number of adults without a bank account is still high in 334 districts/cities

in Indonesia in 2021. The low ownership of accounts makes it difficult for the community to access formal financial products and services such as savings, loans, funding sources, insurance, and so on.

The average financial inclusion index is classified as low, namely 0.19, in most districts/cities in Indonesia in 2021. Areas with less developed economic, geographic, social, and cultural conditions show lower financial inclusion compared to other more developed areas.

Financial inclusion has a positive and significant impact on aggregate income. When access to formal financial services can be reached and utilized by the community appropriately, aggregate income increases in 334 districts/cities in Indonesia in 2021. Aggregate income has a negative and significant impact on poverty. When aggregate income increases, poverty decreases in 334 districts/cities in Indonesia in 2021.

Financial inclusion has a negative and significant impact on poverty. When access to formal financial services can be reached and utilized by the community appropriately, poverty decreases in 334 districts/cities in Indonesia in 2021. There is a significant negative partial mediating effect on the influence of financial inclusion on poverty through aggregate income.

Increasing financial inclusion, both directly and indirectly, on poverty through aggregate income can be achieved through the development of infrastructure, innovation, and formal financial services according to the needs and capabilities of the community. For example, providing or offering easy access to loans and financing to businesses (MSMEs), providing

working capital assistance to people who want to start or improve their skills.

This is expected to provide job opportunities, increase community productivity and income, thus impacting the reduction of unemployment, income inequality, and poverty. Suggestions for future researchers include incorporating other variables outside the scope of this research that are suspected to affect poverty in districts/cities in Indonesia.

In addition, other indicators and measurement methods for financial inclusion should be considered for comparison with this study. Other research can also focus on specific provinces that have very low levels of financial inclusion.

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