







## The determinants of the financial inclusion of Indonesian female entrepreneurs

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### ABSTRACT

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This study intends to handle the latter gap: different results of the determinants of financial inclusion, i.e., financial literacy, age, income, and education. Furthermore, it applies the quantitative design, examining the statistical hypotheses. Additionally, the snowball sampling method chose the population of female entrepreneurs in Indonesia. Through the survey in 2022, this study effectively obtained one hundred and fifty-two samples and their responses. Furthermore, the logistic regression model and classification matrix analyze the obtained data. According to this study's measurements of access, savings, and credit accounts (AA, SA, and CA), financial literacy effectively increases the financial inclusion of female entrepreneurs. At the same time, demographic features, i.e., age, income, and education, have a positive effect on these accounts. The classification accuracy of financial literacy towards AA, SA, and CA is 94.1%, 80.3%, and 95.4%, respectively. For age, the accuracy is 72.4% for AA, 81.6% for SA, and 67.1% for CA. For income, the accuracy is 89.5% for AA, 85.5% for SA, and 96.1% for CA. For education, the accuracy is 88.2% for AA, 78.3% for SA, and 94.7% for CA. Considering this evidence, businesswomen must have the financial knowledge to choose access, savings, and credit accounts to sustain and grow their business scope. For this purpose, central and local government support is still vital to assist them.

**Contribution/Originality:** This study successfully closes the gap between the impact of financial literacy, age, income, and education on financial inclusion by locating the estimating model with a positive sign. Therefore, it strengthens the earlier research with the same propensity. Besides, the classification accuracy of three account ownerships based on each determinant is between 72.4% and 96.1%.

## 1. INTRODUCTION

For citizens, financial inclusion is essential to officially accessing primary services in the economic sectors (Ozili, 2022). Banks usually provide these services for their customers, like borrowing, saving, and making payments (Wang & Luo, 2022), both responsibly and sustainably (Khatib, Hendrawaty, Bazhair, Rahma, & Al Amosh, 2022). Moreover, this inclusion covers three aspects: access, availability, and usage (Erlando, Riyanto, & Masakazu, 2020). Furthermore, Erlando et al. (2020) explain that access is the spread of financial services into society. Availability refers to banking infrastructure and facilities ready for customers to apply, and usage refers to using banking products. According to Churchill and Marisetty (2020) and Khatib et al. (2022), this inclusion can grow the economy and decrease poverty.

In line with this situation, the entrepreneur's business aims to reduce unemployment and promote economic growth (Surya et al., 2021). Therefore, businesspeople should manage well. Indeed, they need money to survive their business (Weihrich, Cannice, & Koontz, 2019). When females become leaders, they tend to hear the opinions of their subordinates through meetings and intuitively think about making the decision (Minasyan & Tovmasyan, 2020). Unfortunately, women are lower than men in financial inclusion, especially in utilizing formal accounts, having savings accounts, and employing credit accounts (Susilowati & Leonnard, 2019).

Similarly, women becoming entrepreneurs are problematic for getting credit from banks because of stereotypes and discrimination (Zogning, 2023). This stereotype appears because females are less ambitious than males in their actions (Jennings & Tonoyan, 2022). Besides, banks set strict rules and set higher interest rates to discriminate against females (Singh & Dash, 2021). Henceforth, women depend on self-financing to run their businesses; these matters are challenging for their financial inclusion (Zogning, 2023).

Generally, numerous studies try to associate financial inclusion with literacy, where literacy becomes its determinant. They come from Indonesia (Arafat & Leon, 2020; Goenadi, Murhadi, & Ernawati, 2022; Irman, Budiyo, & Suwito, 2021), Pakistan (Affandi & Malik, 2020; Liu et al., 2021), Uganda (Bongomin, Ntayi, & Malinga, 2020; Kasozi & Makina, 2021), and South Africa (Akande, Hosu, Kabiti, Ndhleve, & Garidzirai, 2023). However, their study result is still contrary. In their research, Affandi and Malik (2020), Bongomin et al. (2020), Kasozi and Makina (2021), Irman et al. (2021), Goenadi et al. (2022), and Akande et al. (2023) demonstrate a positive tendency. Conversely, Liu et al. (2021) exhibit a negative propensity, and Arafat and Leon (2020) do not prove this effect. Besides, demographical features like age, income, and education can determine financial inclusion (FI). The research reporting this effect of age on the FI comes from Zimbabwe (Barugahara, 2021), Indonesia (Aulia & Priyadi, 2023; Susilowati & Leonnard, 2019), and 47 countries (Xu, 2020). Unfortunately, the related scholars present conflicting results. Susilowati and Leonnard (2019) locate a positive effect of age on the financial inclusion of credit accounts but an insignificant effect in formal and savings accounts. Barugahara (2021) exhibits the quadratic function relationship. Meanwhile, Aulia and Priyadi (2023) declare a positive association between life and FI. Inversely, Xu (2020) displays a negative tendency towards age on the economic inclusion index.

The research discussing the relationship between income and financial inclusion (FI) comes from Indonesia (Susilowati & Leonnard, 2019), 47 countries (Xu, 2020), Bangladesh (Hasan, Le, & Hoque, 2021), and India (Vaid, Singh, & Sethi, 2020). Unfortunately, varying results exist. Susilowati and Leonnard (2019) find a positive effect of income on the financial inclusion of formal accounts but an insignificant effect of income on saving and credit accounts. Xu (2020) declares a positive relationship between income and the financial inclusion index. Similarly, Vaid et al. (2020) document this positive association. Meanwhile, Hasan et al. (2021) confirm a positive relationship between income and FI occurs in banking and fintech accounts. Nevertheless, no association exists in microfinance accounts.

The investigations focusing on the association of education with financial inclusion (FI) are from 49 countries (Xu, 2020), Bangladesh (Hasan et al., 2021), Zimbabwe (Barugahara, 2021), and Indonesia (Aulia & Priyadi, 2023; Susilowati & Leonnard, 2019). Unfortunately, the results are mixed. Susilowati and Leonnard (2019) display the meaningless effect of all educational levels on formal and credit accounts and the positive influence of the primary level on saving accounts. Meanwhile, secondary and tertiary schools do not affect these accounts. Xu (2020) locates a positive tendency for education on the financial inclusive index. Hasan et al. (2021) use banking, microfinance, and fintech accounts to measure FI in their research. For banking and fintech accounts, a positive relationship between education and FI happens; however, this education negatively affects FI as measured by microfinance accounts. Meanwhile, Barugahara (2021) and Aulia and Priyadi (2023) exhibit that schooling level positively affects FI.

Considering the inconsistent proofs, this study aims to close them by examining the financial inclusion determinants: financial literacy, age, income, and education, by utilizing female business owners in Indonesia as the population and samples, where the formal, saving, and credit accounts quantify this inclusion.

## 2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

### 2.1. Financial Inclusion in Indonesia

With financial inclusion, individuals and businesspersons can access economic goods and services, such as transactions, payments, savings, credits, and insurance. This access accomplishes their daily needs and helps their family and business organize the plan from long-term goals to emergent situations. Hence, nationally, this inclusion becomes the prime factor in diminishing poverty and elevating wealth (Ika, 2021). The Indonesian Financial Service Authority has surveyed Indonesians about financial literacy and inclusion since 2013. Until 2019, these indexes had increased. For financial literacy, the index in 2013, 2016, and 2019 was 21.8%, 29.7%, and 38.3%. For financial inclusion, the index in 2013, 2016, and 2019 was 59.7%, 67.8%, and 76.19%, respectively (Iman, 2022).

### 2.2. Financial Literacy and Inclusion

In its report, the Presidential Advisory Council on Financial Literacy explains this literacy as the capability to utilize information and skills to organize financial resources effectively for achieving economic wellness (Akande et al., 2023). After employing poor Ugandans in rural areas as the samples and analyzing their data, Bongomin et al. (2020) conclude that the more literate the people, the more significant their financial inclusion. Equally, Affandi and Malik (2020) and Irman et al. (2021) affirm this positive association based on their investigations in Pakistan and Indonesia, respectively. Additionally, studies conducted on Indonesians, Ugandans, and South Africans by Goenadi et al. (2022), Kasozi and Makina (2021), and Akande et al. (2023) support this evidence. Based on this evidence, this study formulates the first hypothesis like this:

*H<sub>1</sub>: Financial literacy positively influences its inclusion.*

### 2.3. Demographical Features and Financial Inclusion

#### 2.3.1. Age and Financial Inclusion

Age reflects the number of years passed by someone and relates to the bravery of the businessperson to take risks (Zhao, O'Connor, Wu, & Lumpkin, 2021). Based on their investigation in Indonesia, Susilowati and Leonard (2019) locate that the more mature the businesspeople, the more financial inclusion of savings accounts they have. After checking the public perception of Shariah products and services in Bima, Indonesia, Aulia and Priyadi (2023) confirm a similar inclination. By denoting these facts, this study formulates the second hypothesis like this:

*H<sub>2</sub>: Age positively influences financial inclusion.*

#### 2.3.2. Income and Financial Inclusion

Susilowati and Leonard (2019) find a positive effect of income on the financial inclusion of formal accounts. Hasan et al. (2021) exhibit a positive relationship between income and FI when their respondents utilize banking and fintech accounts. Vaid et al. (2020) affirm this relationship between income and FI in their study. Xu (2020) declares a positive association between income and the financial inclusion index. Similarly, Vaid et al. (2020) document this positive association. By denoting these facts, this study formulates the third hypothesis:

*H<sub>3</sub>: Income positively influences financial inclusion.*

#### 2.3.3. Education and Financial Inclusion

Susilowati and Leonard (2019) locate the positive influence of the primary level on saving accounts. Xu (2020) locates a positive tendency for education on the financial inclusive index. Hasan et al. (2021) exhibit a positive relationship between education and FI for banking and fintech accounts. Aulia and Priyadi (2023) document a positive tendency of schooling level on the single FI measurement. Equally, Barugahara (2021) exhibits that schooling level positively affects FI. By denoting these facts, this study formulates the fourth hypothesis:

*H<sub>1</sub>: Education positively influences financial inclusion.*

### 3. RESEARCH METHODS

#### 3.1. Research Variables

The first independent variable in this study is financial literacy. Furthermore, the correct answers to the fundamental and advanced questions from Lusardi and Mitchell, cited by Anita, Njotoprajitno, and Hadianto (2022), are utilized to obtain this literacy score. The five basic questions (BQ) measure the ability to answer the numerical problem (BQ1), compound interest (BQ2), inflation (BQ3), and the time value of money (BQ4). The complex question (CQ) aims to know the capability to answer eight items: capital market function (CQ1), mutual fund comprehension (CQ2), conceptual relationship between interest rate and bond price (CQ3), the judgment of the safer asset (CQ4), the determination of the risky investment (CQ5), assets having the highest return based on their length (CQ6), assets having the highest return mentioning the highest fluctuation (CQ7), and risk diversification (CQ8).

The second, third, and fourth independent variables are age, income, and education. Additionally, a ratio scale directly measures age. Moreover, to respect respondent privacy, the monthly revenue is classified based on the four ordinary scales: (1) below IDR 3 million, coded by zero; (2) between IDR 3 and 6 million, coded by one; (3) between IDR 6 and 9 million, coded by two; and (4) above IDR 9 million, coded by three. Similarly, the last formal education is categorized into four levels of ordinary scale: (1) uneducated, (2) elementary school, (3) junior high school, (3) senior high school, and (4) higher education.

On the other hand, financial inclusion becomes the dependent variable. Following Susilowati and Leonard (2019), this study utilizes three conditions to measure this inclusion: the ownership of financial access accounts, saving deposit accounts, and credit accounts. If the respondent has it, it is worth one; otherwise, it is worth zero.

#### 3.2. Population and Sampling Method

The population in this study is made up of businesswomen from micro, small, and medium firms in Indonesia. This study employs a snowball sampling technique, as Pandjaitan, Mahrinasari, and Hadianto (2021) conducted, because of the total unidentified population. Through this technique, we ask the respondents to join the survey. After that, we ask them to distribute this questionnaire to their friends or colleagues. Fortunately, 152 respondents were obtainable as samples in this way.

#### 3.3. The Method for Analyzing the Data

Three account ownerships: AA, SA, and CA measure the dependent variable, financial inclusion. Meanwhile, the independent has a ratio scale for financial literacy score and age, and an ordinal scale for income and education. Regarding Hair, Black, Babin, and Anderson (2019), the logistic regression model suits this condition.

According to Hair et al. (2019), logistic regression is a regression with a binary explained variable and the ability to assess predictive precision. Also, it provides the Wald statistic and probability to examine the coefficient. This model is available in Equations 1, 2, and 3.

$$AA = \log \left( \frac{p}{1-p} \right) = \beta_{0i} + \beta_i X_i + \varepsilon_{1i} \quad (1)$$

$$SA = \log \left( \frac{p}{1-p} \right) = \gamma_{0i} + \gamma_i X_i + \varepsilon_{2i} \quad (2)$$

$$CA = \log \left( \frac{p}{1-p} \right) = \theta_{0i} + \theta_i X_i + \varepsilon_{3i} \quad (3)$$

Notes: AA = Access account, SA = Saving account, CA = Credit account.  $i = 1$  for FL,  $2$  for age,  $3$  for income, and  $4$  for education.

Additionally, this model does not require the assumption of normality (Ghozali, 2021) and needs to achieve goodness of fit (Gujarati, Porter, & Pal, 2019). Therefore, to prove them, this study uses the Jarque-Bera and the Chi-square statistical probability based on an additional independent variable (Gujarati et al., 2019). Though utilizing the same logistic regression model, the previous studies did not apply the classification matrix result to reveal predictive precision (Barugahara, 2021; Hasan et al., 2021; Xu, 2020). Accordingly, this research employs it as the difference by following Hair et al. (2019); Susilowati and Leonnard (2019); Kasozi and Makina (2021), and Aulia and Priyadi (2023).

## 4. RESULTS AND DISCUSSION

### 4.1. Respondent Profiles

This survey was executed from August to September 2022 and effectively got 152 female respondents. This total is classified based on their profiles, like age, income, last formal education, and business duration, and the results are in Table 1.

**Table 1.** The respondent profile according to age, income, last formal education, and business duration.

Profile	Description	Total	Portion
Age	Between 17 and 25 (Teen)	13	8.55%
	Between 26 and 45 (Adult)	16	10.53%
	Between 46 and 65 (Elderly)	66	43.42%
Monthly income	Below IDR 3 million	7	4.61%
	Between the above IDR 3 and 6 million	24	15.79%
	Between the above IDR 6 and 9 million	53	34.87%
	Above IDR 9 million	68	44.74%
Last formal education	No schooling	19	12.50%
	Elementary school (ES)	24	15.79%
	Junior high school (JHS)	29	19.08%
	Senior high school (SHS)	36	23.68%
	Higher education (HE)	44	28.95%
Business duration	Under one year	11	7.24%
	Between one year and five years	38	25.00%
	Between five and ten years	49	32.24%
	Above ten years	54	35.53%

### 4.2. The Preliminary Testing Result of the Logistic Regression Model

Table 2 exhibits the normality testing result based on the residuals from the difference between the observed and predicted chance for each model. Furthermore, the Chi-square statistical probability of Jarque-Bera for the residuals of access, saving, and credit accounts ranges from 0.000000 to 0.000321. Because these values are more significant than 5%, the normality of residuals is rejected. Hence, the residuals are not normally distributed, supporting the logistic model statistical assumption, as Ghozali (2021) described. Additionally, all models estimating the regression coefficient achieve vigorous goodness, reflected by the probability of the Chi-square for the log-likelihood ratio being less than 5%, between 0.000 and 0.0055.

Table 3 presents that the probability of the Wald statistic to verify the positive effect of financial literacy on financial inclusion, measured by the ownership of access, saving, and credit accounts, is below a 5% significance level of 0.000; therefore, the first hypothesis is suitable. For age, the probability of access, saving, and credit, this value is lower than 5%: 0.013, 0.000, and 0.0039, with a positive coefficient sign; hence, the second hypothesis is acknowledged. Equally, the Wald statistical probability of verifying the positive influence of income and education on financial inclusion, quantified by the ownership of access, saving, and credit accounts, is below a 5% significance level of 0.000; thus, the third and fourth hypotheses are acceptable.

Table 2. The preliminary testing result of the logistic regression model: normality and fit goodness.

Model	The testing result for			
	Normality		The fit goodness	
	Jarque-Bera	Probability of Chi-square	Log likelihood ratio	Probability of Chi-square
AA = f(FL)	233.095	0.000	115.151	0.000
SA = f(FL)	29.718	0.000	38.219	0.000
CA = f(FL)	203.183	0.000	117.768	0.000
AA = f(Age)	26.224	0.000	7.716	0.006
SA = f(Age)	41.037	0.000	14.338	0.000
CA = f(Age)	24.298	0.000	4.822	0.028
AA = f(Income)	71.436	0.000	85.168	0.000
SA = f(Income)	59.810	0.000	57.503	0.000
CA = f(Income)	1685.549	0.000	125.143	0.000
AA = f(Education)	16.086	0.000	72.629	0.000
SA = f(Education)	21.339	0.000	35.771	0.000
CA = f(Education)	201.060	0.000	101.282	0.000

Table 3. The estimation result of the logistic regression model.

Hypothesis	Causal relationship	Coefficient	Standard error	Wald statistic	Probability	Classification accuracy
One	FL → AA	1.709	0.319	28.661	0.000	94.1%
	FL → SA	0.562	0.111	25.653	0.000	80.3%
	FL → CA	1.522	0.270	31.797	0.000	95.4%
Two	Age → AA	-3.536	1.080	10.726	0.013	72.4%
	Age → SA	0.060	0.016	13.747	0.000	81.6%
	Age → CA	0.035	0.017	4.251	0.039	67.1%
Three	Income → AA	3.417	0.528	41.901	0.000	89.5%
	Income → SA	2.208	0.393	31.626	0.000	85.5%
	Income → CA	4.685	0.669	48.984	0.000	96.1%
Four	Education → AA	2.064	0.375	30.290	0.000	88.2%
	Education → SA	0.953	0.184	26.862	0.000	78.3%
	Education → CA	2.645	0.443	35.579	0.000	94.7%

4.3. Discussion

Based on the perceptions of female entrepreneurs, this study confirms the positive effect of financial literacy on financial inclusion, as the first hypothesis declares. Their knowledge of finance becomes vital capital for them to enter the financial system. Well-educated businesswomen can more confidently determine and choose suitable access, savings, and credit accounts to develop their businesses. Consequently, the more they use these accounts, the greater the intermediating function of the related financial institutions. With this positive tendency, this study supports Affandi and Malik (2020), Bongomin et al. (2020), Kasozi and Makina (2021), Irman et al. (2021), Goenadi et al. (2022), and Akande et al. (2023).

Furthermore, this study acknowledges the second hypothesis, demonstrating a positive influence of age on financial inclusion. It means the older the female entrepreneur, the more business management experience she has, and the higher the possibility of having and utilizing these three accounts. Thus, this evidence confirms Susilowati and Leonnard (2019), locating a positive relationship between age and the ownership of savings, and Aulia and Priyadi (2023), affirming a positive tendency of age on financial inclusion.

Then, this study receives the third hypothesis, which declares a positive impact of income on financial inclusion. This tendency happens because the mean rank for access, saving, and credit accounts increases from the lowest to the highest income categories: below IDR3 million, from IDR3 to 6 million, from IDR6 to 9 million, and above IDR9 million. It also gets verified by the asymptotic significance of Chi-square for three accounts below 5%: 0.000, 0.000, and 0.000 based on the Kruskal-Wallis testing result (see Table 4). This positive propensity of income for

financial inclusion is confirmed by Susilowati and Leonard (2019) when measuring this inclusion based on formal accounts and Hasan et al. (2021) when measuring this inclusion based on banking and fintech accounts. Additionally, this positive tendency supports Vaid et al. (2020) and Xu (2020), declaring a positive association between income and the FI.

Table 4. The Kruskal Wallis testing result: The account differences based on income category.

Panel A. Descriptive statistics						
Income category	Access account		Saving account		Credit Account	
	N	Mean rank	N	Mean rank	N	Mean rank
Below IDR3 million	9	55.50	9	16.50	9	51.50
Between IDR3 and 6 million	31	57.95	31	53.27	31	56.40
Between IDR6 and 9 million	64	60.25	64	86.56	64	53.88
Above IDR9 million	48	114.08	48	89.33	48	124.33
Panel B. Kruskal Wallis statistical testing result						
Description	Access account		Saving account		Credit account	
Chi-square	85.438		65.719		125.235	
Df	3		3		3	
Asymptotic significance	0.000		0.003		0.000	

Finally, this study receives the fourth hypothesis, which declares a positive impact of education on financial inclusion. This tendency happens because the mean rank for access accounts increases from uneducated, elementary school, junior high school, senior high school, and higher education as the lowest to the highest formal categories. It also gets verified by the asymptotic significance of Chi-square for three accounts below 5%: 0.000, based on the Kruskal-Wallis testing result (see Table 5).

Also, the fourth hypothesis is still acceptable for financial inclusion as measured by saving and credit accounts (SA and CA). Although the mean rank for elementary school (34.60 for SA and 51.50 for CA) is lower than that of the uneducated (56.50 for SA and 56.21 for CA), the other mean ranks still elevate from junior high school to higher education levels (84.28, 89.20, and 89.80 for SA and 55.61, 58.74, and 124.33 for CA). Based on the Kruskal-Wallis testing result, the asymptotic significance of Chi-square for these two accounts is below 5%: 0.000 (see Table 5).

Table 5. The Kruskal Wallis testing result: The account differences based on the last formal educational category.

Panel A. Descriptive statistics						
The last formal educational category	Access account		Saving account		Credit account	
	N	Mean rank	N	Mean rank	N	Mean rank
Uneducated	19	55.50	19	56.50	19	56.21
Elementary school	21	59.12	21	34.60	21	51.50
Junior high school	29	60.74	29	84.28	29	55.61
Senior high school	37	63.72	37	89.20	37	58.74
Higher education	46	113.33	46	89.88	46	124.33
Panel B. Kruskal Wallis statistical testing result						
Description	Access account		Saving account		Credit account	
Chi-square	77.715		61.389		117.353	
Df	4		4		4	
Asymptotic significance	0.000		0.000		0.000	

Based on this evidence for testing the fourth hypothesis, this study backs up what Susilowati and Leonard (2019) found: that the primary level has a positive effect on savings accounts, and Hasan et al. (2021) found the same thing happens when banking and fintech accounts are used as the FI measurement. Besides, it aligns with Xu (2020), who declares a positive tendency towards education on the financial inclusive index. Equally, it affirms Barugahara (2021) and Aulia and Priyadi (2023) exhibiting a positive effect of schooling levels on FI.

## 5. CONCLUSION

This research aims to close the gap between the inconsistent determinants of financial inclusion: financial literacy, age, income, and education, based on the perceptions of Indonesian female entrepreneurs. Based on the data testing result, it effectively proves a positive tendency for these four relationships to be included. Therefore, this study recommends that the local Indonesian governments and financial institutions, especially banks, give ease to female entrepreneurs in micro, small, and medium sizes to get access to credits with affordable interest. Also, the government needs to compensate for the tax payment and provide training projects in financial literacy. Moreover, these projects can involve lecturers in the local higher education institutions to realize the services to community-associated activities.

## 6. LIMITATIONS AND UPCOMING RESEARCH SUGGESTIONS

The limitations of this study are in the employed determinant number and the scope of the research object. Therefore, the subsequent scholars need to use other financial inclusion factors, such as marital status, business type, self-efficacy, self-control, social network, and internal control locus, and combine foreign and domestic businesspeople in the different countries as their sample to overcome these conditions.

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