

ERASMUS UNIVERSITY ROTTERDAM

Erasmus School of Economics

Bachelor Thesis

International Bachelor Economics and Business Economics – Strategy Economics

The Effect of Educational Attainment on Female Entrepreneurship in Indonesia

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10 July 2024

The views stated in this thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics or Erasmus University Rotterdam

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Abstract

Many women in Indonesia contribute to the household income by starting small to medium enterprises (SMEs). The flexibility that comes with starting a business may be more attractive to women who need to strike a balance between work and household responsibilities. However, these female entrepreneurs often face greater barriers when starting or expanding their businesses, resulting in suboptimal performance. In general, women-owned enterprises generate less profit compared to men-owned enterprises. One of the main reasons for this underperformance is that there is inadequate knowledge and entrepreneurial skills among female entrepreneurs, which limits the growth of women-owned enterprises and discourages women from entering entrepreneurship. Consequently, female entrepreneurs are seen to be less competent. Recently, Indonesia has successfully narrowed the educational gap between genders, which could potentially be a solution to this issue. This study, therefore, examines the effects of educational attainment on female entrepreneurship in Indonesia with insights into education's role in improving entrepreneurship. The findings of this thesis show that while higher educational attainment decreases the probability of becoming an entrepreneur, it significantly enhances the quality of female entrepreneurship by improving individual's cognitive intelligence, entrepreneurial skills and increasing the profitability of women-owned firms.

Introduction

Studies have shown that female entrepreneurship has a significant contribution to the economic growth by enhancing the overall wealth, employment and innovation of a country (Audretsch et al., 2006; Brush et al., 2012). Additionally, it plays an important role in promoting gender equality by providing women with equal opportunities to participate in the economy (Subbarao & Raney, 1995). In an emerging country such as Indonesia, relying solely on the head of the family as primary source of income is no longer sufficient to accommodate the family. As a result, many women are starting their own businesses to help with the family's economy out of necessity. (Tambunan, 2017).

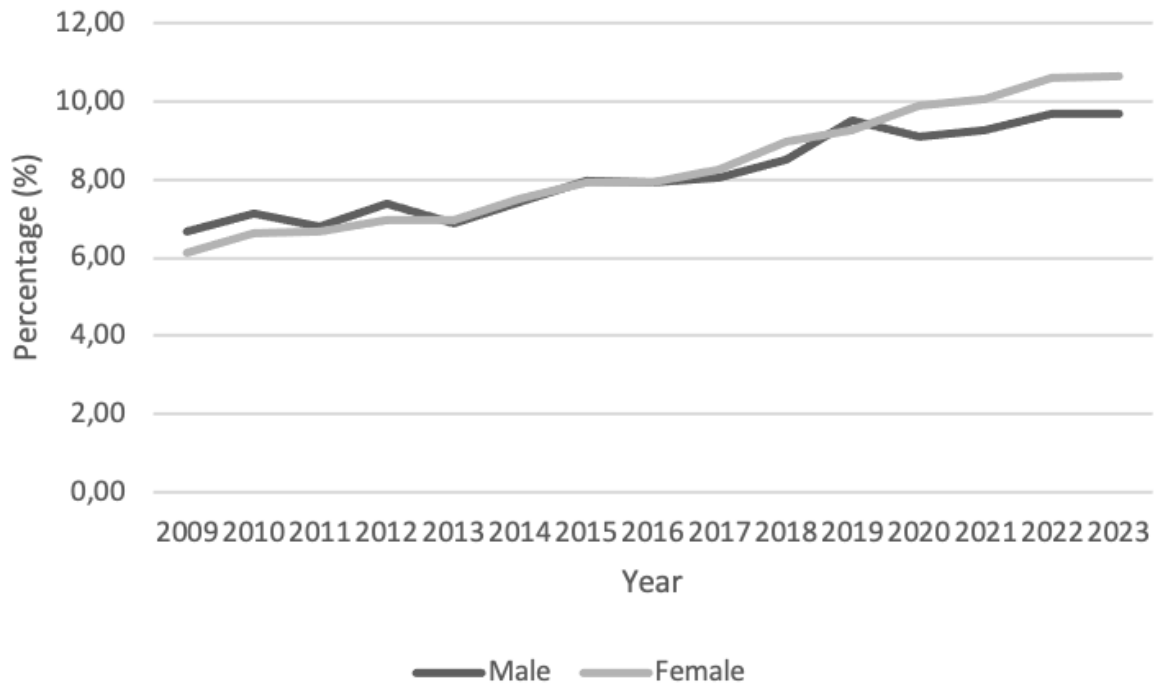
Unfortunately, gender inequalities in many Asian countries act as a barrier to these women who aim to start their own businesses (Debroux, 2010). Cultural norms such as traditional gender roles expectations hinder the development of female entrepreneurship (Bullough, 2022). Due to these cultural constraints, women tend to have lower educational attainment compared to men (Hoffman, 2000), leading to a perception that women are less credible within the entrepreneurial sector (Tambunan, 2009). Consequently, this perception makes it difficult for women to access financial support and creates a fear of failure, both of which often limit women's opportunities to enter entrepreneurship.

Education plays an important role in this matter. According to Jiménez et al. (2015), individuals' educational attainment boosts their confidence, reduces risk perception and improves human capital, resulting in more formal entrepreneurship for both genders. While education may enhance female entrepreneurship, Van der Sluis et al. (2008) claims that individuals with higher educational attainment may be less interested in pursuing a career as entrepreneurs. Higher education provides individuals with more career alternatives with better working conditions and stability, which can make entrepreneurship less appealing.

Over the past few years, Indonesia has successfully narrowed down the educational gap between genders. Figure 1 shows that the percentage of women attaining a university degree has exceeded the percentage of men graduating from university since 2018. While the overall percentage is still relatively low, the increasing trend of women's educational attainment continues to rise in Indonesia (BPS-Statistics Indonesia, 2023).

Figure 1

Percentage of Population Graduating From University (2009-2023)



BPS-Statistics Indonesia. (2023). *Percentage of Population Aged 15 Years and Over by Urban-Rural Classification, Sex, and Highest Education Level, 2009-2023*.

According to World Bank (2016), entrepreneurship in Indonesia is dominated by female entrepreneurs by approximately 60%, in which they mostly operate micro, small and medium enterprises (MSMEs). Women-owned businesses were found to be significantly less profitable and smaller in size compared to those owned by men. (World Bank, 2016). However, with the continuous increase in educational attainment among women, the future trend of female entrepreneurship in Indonesia may be altered. The extent to which educational attainment affects female entrepreneurship in Indonesia still remains unclear. This raises the question of whether policymaker should utilize educational initiatives to promote and enhance female entrepreneurship in the long run.

Therefore, the research question of my thesis is: “To what extent does educational attainment affect female entrepreneurship in Indonesia?”

This thesis examines the relationship between educational attainment and female entrepreneurship in Indonesia, additionally evaluating the effectiveness of focusing on women's educational attainment to further enhance female entrepreneurship. The findings of this thesis can assist policymakers or any interested party in understanding the role of education in improving female entrepreneurship in Indonesia. It is important for policymakers to understand the relationship between educational attainment and female entrepreneurship to design effective policy measures.

While there has been a growing interest on this topic, still very few studies were done. This thesis differs from the existing studies and literatures since it focuses on the effect of educational attainment on female entrepreneurship in Indonesia, providing insights into the importance of education in an emerging economy, specifically in the context of female entrepreneurship.

Theoretical Framework

Role of Educational Attainment on Female Entrepreneurship

According to Jiménez et al. (2015), educational attainment plays a crucial role in the development of entrepreneurship. In many cases, women who are interested in entrepreneurship often hesitate to enter the sector due to lack of knowledge, which often leads to fear of failure and lack of self-confidence, making them seem less credible in obtaining credit and managing businesses (Tambunan, 2009). Attaining higher level of education was found to sharpen individual's entrepreneurial knowledge and skills. Hence, improving individual's critical thinking abilities, problem-solving skills and reducing fear of failure (Jiménez et al., 2015). Higher level of education can therefore equip these women with the necessary skills and knowledge, thereby building self-confidence and credibility of female entrepreneurs in the long run.

Other researches have also emphasized the importance of self-efficacy as a determinant in pursuing entrepreneurship. Entrepreneurial self-efficacy is a social cognitive concept concerning an individual's belief in their ability to fulfil the entrepreneurial role (Hamidi et al., 2008). Individuals who believe they lack the necessary knowledge and skills tend to discourage themselves from pursuing entrepreneurship as a career option (Boyd and Vozikis, 1994; Chen et al., 1998). Hence, building confidence and equipping individuals with more knowledge and skills are important to encourage them to pursue entrepreneurship. This can be achieved through education.

These claims are supported by Hilton et al. (2012), where the authors explained that higher educational attainment is associated with better cognitive skills and the ability to transfer their knowledge onto new problems, making them more successful in facing complex issues as an entrepreneur. Additionally, Hilton et al. (2012) agreed that educational attainment may reduce individual's risk perception due to more knowledge and confidence.

However, these sets of skills can only be achieved through deep learning. While other methods of learning help individual in recalling facts, concepts or procedures, deep learning teaches individuals to think critically, solve non-routine problems, construct and evaluate evidence-based arguments (Hilton et al., 2012). Unfortunately, the Indonesian education system has yet to adopt deep learning methods (Sukmayadi & Yahya, 2020).

While education can enhance female entrepreneurship, higher education can make alternatives more attractive, making entrepreneurship less appealing to some people. Educational attainment brings more career alternatives that may offer better benefits than entrepreneurship. Therefore, individuals with higher educational attainment may prefer working as paid employee rather than starting their own businesses (Van der Sluis et al., 2008). This thesis aims to study the significance of educational attainment on female entrepreneurship in Indonesia, the main hypothesis is therefore stated below:

H1: Educational attainment significantly affects the probability of becoming a female entrepreneur in Indonesia.

Barriers and Performance of Female Enterprises in Indonesia

Societal norm often acts as a barrier that hinders the development of female entrepreneurship in many developing countries (Bullough et al., 2022; Tambunan, 2017). Marlow (2002) argues that due to gender roles expectations, family-related obligations often fall disproportionately on women despite them working the same number of hours as men. This situation makes it difficult for women to balance work and family responsibilities (Gilbert, 1997). In countries where cultural norms are prominent, many women are left with no choice but to quit their jobs or to find work that offers greater flexibility (Babbit et al., 2015; Bullough et al., 2022). Studies have found that female entrepreneurs have a greater preference towards informality due to this issue (Babbit et al., 2015; Bahramitash & Esfahani, 2011).

Working within the informal sector typically allows a more lenient work schedule and easier entry or exit process, which may appear more appealing to many women (Gerxhani, 2004). In cases where unemployment rate is high, informal enterprises may act as a source of employment to many people and creates a safety net to individuals who are relatively vulnerable during an economic downfall (Gerxhani, 2004; Debrah, 2007). However, informal enterprises are often undesirable as they harm the existing formal firms by creating unfair competition within the market. With formal enterprises exiting the market, the government may face loss of revenue.

While Indonesia has recently regained its position in the upper-middle-income group, the social inequality in Indonesia still remains relatively high (World Bank, 2023). To improve the family's economic situation, many women in Indonesia began to start small enterprises, mostly operating home-based enterprises or becoming street vendors (Tambunan, 2017). Marlow and McAdams (2019) stated that female entrepreneurs are often associated with small scale enterprises and underperformance. In general, women-owned enterprises generate less profit compared to men-owned enterprises. However, the poor performance of women-owned enterprises is due to several factors such as lack of time spent on working, lack of financing and limited growth opportunities (Storey & Greene, 2010; Marlow & McAdam, 2019).

Society often unfairly portrays women as less competent compared to men due to the factors mentioned which stemmed from lack of knowledge (Marlow, 2002). This misconception results in difficulties for women in accessing formal credit and financial institutions to start or to grow their businesses (Tambunan, 2009; Parker, 2009). Education could potentially be solution for improving the performance of women-owned enterprises. To support the main hypothesis, a sub-hypothesis is created:

H1a: Educational attainment significantly increases firm's profitability.

The Importance of Entrepreneurial Skills and Intelligence on Entrepreneurship

Boyatzis and Saatchioglu (2008) believe that there are three categories of competencies that create outstanding leaders or entrepreneurs: cognitive intelligence, emotional intelligence and social intelligence. In this context, emotional intelligence refers to the ability to understand and manage the emotion of oneself as well as others while social intelligence is the ability to interact and persuade other people effectively (Côté & Miners, 2006; Sternberg, 2004). The ability to handle stress is one of the examples of emotional intelligence. According to Buttner (1992),

entrepreneurs are more prone to stress compared to managers. Buttner (1992) also mentioned that entrepreneurs who are able to handle stress well tend to have a greater job satisfaction and less stress-related health issues.

Generally, individuals with high cognitive intelligence are best at analyzing situations and finding solutions to unfamiliar complex issues. However, entrepreneurs who only has high cognitive intelligence perform worse than those who has high social intelligence (Sternberg, 2004). This is because individuals with high social intelligence tend to have better communication skills and networking. Thereby, selling their products more effectively (Sternberg, 2004). Additionally, creativity is also a crucial aspect to successful entrepreneurship. Entrepreneurs are constantly pushed to create new innovations and ideas to survive in the market which requires them to always be creative. Combining all of the skills and intelligence could help improve the quality of female entrepreneurship. To see whether the statement is true, the second sub-hypothesis of this thesis is therefore:

H1b: Educational Attainment significantly improves entrepreneurial skills and cognitive intelligence.

Data and Methodology

Data

To estimate the effect of individuals' educational attainment on female entrepreneurship, this study uses individual-level data from the Indonesian Life Family Survey (IFLS). The Indonesian Family Life Survey contains a sample size of over 30,000 individuals and provides a longitudinal survey representing 83% of the Indonesian population. The fifth wave of the Indonesian Family Life Survey (IFLS5) is used in this study. The IFLS5 is the most recent dataset published by RAND and is a collaboration between RAND and Survey Meter, continuing the previous IFLSs by adding the data to 2015. The survey used in this thesis was conducted from 2014 to 2015.

For this study, the sample size is narrowed down to 8,298 individuals. Taking into account of the productivity age range in Indonesia, individuals below the age of 15 and above the age of 65 are excluded from the dataset. According to United Nations Population Fund (n.d.), Indonesia's productive population ranges between the age of 15 to 64. Additionally, data of male individuals are excluded from the dataset.

Table 1 in Appendix shows the descriptive statistics of the data used in this study. On average, 23.1% of respondents are entrepreneurs, with most of them only graduated from senior high school (vocational). The descriptive statistics also indicate that respondents are, on average, 35 years old, married and have children under 15 years old.

Dependent Variables

The main dependent variable of this thesis is a binary variable, *entrepreneur*, which indicates whether an individual is classified as an entrepreneur (1) or non-entrepreneur (0). There is a challenge in distinguishing whether an individual is an *entrepreneur* in Indonesia. The *entrepreneur* variable is generated from the *last job work status* variable in the original dataset, combining self-employment, self-employment with unpaid family members/temporary workers and self-employment with employee/permanent workers. All other job types are categorized as non-entrepreneur. Self-employed individuals working in the agriculture, forestry, fishing and hunting sectors are excluded from the dataset, as they are often not considered entrepreneurs in Indonesia.

To further examine the effect of educational attainment on female entrepreneurship, this study analyses the influence of educational attainment on individuals' cognitive intelligence and their entrepreneurial skills. The survey provided a list of characteristics and respondents were asked to rate the extent to which these characteristics applied to them on the following scale: 1. Disagree strongly, 2. Disagree a little, 3. Neither agree nor disagree, 4. Agree a little, 5. Agree strongly. From 15 characteristics provided by the IFLS5, this research focuses on four key traits identified as essential for successful entrepreneurship: *communication*, *efficiency*, *creativity* and *handling stress well*.

As for cognitive intelligence, respondents were given two types of tests: one assessing individuals' mathematical abilities and the other testing their memorization skills. During the survey, respondents were briefly shown a list of words and were then asked to write down as many words as they could remember. Respondents were also required to complete a mix of basic and complicated sequences of numbers, which aims to assess individuals' mathematical comprehension. The number of correct answers is used to measure individuals' memorization and mathematical abilities. Another dependent variable used in this study is *firm's profit*, derived from individual's monthly net profit measured in Indonesian rupiah.

Independent Variables

To test the main hypothesis of this thesis, educational attainment in the dataset is used as the independent variable, indicating the highest level of education obtained by individuals up to the time of survey. This variable consists 18 different levels of education starting from elementary school to doctoral degree or PhD. In Table 2.2 (Appendix), this research only focuses on the following education levels: elementary school, Islamic elementary school, junior high school (vocational and general), senior high school (vocational and general), bachelor's degree (S1), master's degree (S2) and doctoral degree (S3) as they are the most common types of educational institutions in Indonesia.

Control Variables

To address any potential endogeneity issue in this analysis, control variables are added into the regression. The control variables for the main regression include *age*, *marital status*, *most influential ethnicity*, *family's economic state* and *having children under 15 years old*. These variables are crucial as they may influence the decision to pursue entrepreneurship. When examining the effect of educational attainment on entrepreneurial skills and cognitive intelligence, variables such as *parent's job*, *parent's education*, *age*, *marital status* and *family's economic state* are controlled.

Age. This variable can influence individuals' tendency to engage in entrepreneurial activities. Therefore, adding age into the regression is necessary to account for its effects on the entrepreneur variable. Individuals were required to mention their age during the time the survey took place. Only individuals from the age of 15 to 65 are used in this research.

Most Influential Ethnicity. Ethnicity influences women's mobility outside home and creates a barrier for women to engage in entrepreneurial activities, thereby reflecting the normative expectations within a society. Therefore, ethnicity should be used as a control variable in this study. Instead of using individual's ethnicity, this research uses the most influential ethnicity variable to better illustrate how decisions are altered by cultural norms. In the most recent survey, individuals were asked to identify the ethnical group that primarily influences their daily activities by selecting from a range of options provided by the interviewer.

To simplify this, the Most Influential Ethnicity variable is divided into three categories: Liberal, Moderate, and Strict. Ethnicity groups such as Aceh, Minang, Bugis, Sasak and Banjar

are categorized as having strict cultural norms on women's mobility and responsibilities. Additionally, Madura, Melayu, Komerling, Banten and Gorontalo are categorized as Moderate ethnicities. Other ethnicities such as Javanese, Sunda, Bali and others are classified as liberal ethnicities.

Marital Status, Children Under 15 Years Old and Economic State. Married individuals may have more access to financial resources or networking, which may greatly support female entrepreneurship. One of the greatest challenges for women when starting a business is lack of financing and less knowledge about the entrepreneurial sector (Welsh & Minialai, 2015). Individual's spouse may contribute in providing this financial help and assist them in managing the business. However, being married may also be a constraint to some women. In certain households, a wife is often expected to dedicate their time for the family. In this research, individuals are categorized as married, not married, separated, divorced and widowed.

Individuals who are married often have greater responsibilities than those who do not, especially individuals living with children under the age of 15 under their responsibilities. Under this age, parents are obligated to provide for their children, financially and emotionally. Individuals with children under the age of 15 are denoted as 1, while those who do not have children under the age of 15 are denoted as 0. Economic state may influence the decision of becoming an entrepreneur. This variable shows the importance of financing in starting entrepreneurship. In the survey, respondents were asked to rate from a scale from one to six describing their economic state the day of the survey. One is classified as the poorest and six being the richest.

Parents' Education and Head of Household's Job. When testing the effect of educational attainment on entrepreneurial skills and cognitive intelligence, parents' highest educational attainments and head of household's job are included as control variables. Parents with higher level of education often set higher academic expectations onto their children. Additionally creating an environment that encourages children to impose a critical mindset. During the survey, respondents were asked about the occupation of the main breadwinner, the head of household, when respondents were 12 years old. Similar to the last job work status, this variable consists of the same options. This includes three types of self-employments, governmental occupation, private worker and casual worker. Entrepreneurial skills may be transferred down from parents to children if they are expected to take over the firm in the future (Ward, 2004).

The women community or also known as PKK is used as another control variable in the regression. PKK is a well-known women community that is held in almost all neighbourhoods in Indonesia. The main aim of this community is to empower women and to encourage them to participate more in the development of the country. Through regular events, women within the community shares important information and discuss various topics including education. Individuals who attended any women association program within the past 12 months during the survey is denoted as 1 in the dataset.

Other control variables. To test the effect on profitability, the amount of weeks worked per year, years of experience and hours worked per week are used as control variables. Additionally, the number of workers working in a firm is also added to the regression as these variables may influence the profitability of the firm.

Methodology

Due to the binary nature of the dependent variable (*entrepreneur*), the probit model is an appropriate method to examine the effect and magnitude of educational attainment on the probability of being an entrepreneur. This model assumes that the unobserved factors or error term affecting the probability of being a female entrepreneur are normally distributed. Control variables mentioned in the data section are added to the regression to mitigate the risk of omitted variable bias. To test the main hypothesis, the model follows the equation below:

$$p_i = \text{prob}[Y_i | X] = \phi(\alpha_0 + \beta X_i) \quad (1)$$

$\text{prob}[Y_i | X]$ denotes the probability of whether an individual is an entrepreneur ($Y_i = 1$) or non-entrepreneur ($Y_i = 0$), with α_0 as a constant. X_i consists of the dependent variable, *educational attainment*, and all the control variables including *most influential ethnicity*, *age*, *marital status*, *economic state* and *having children under 15 years old*. The CDF or cumulative density function represented by ϕ , accounts for the error term. The probit model, however, cannot be directly interpreted. Thus, the marginal effects are computed to help understand the change of probability of becoming a female entrepreneur after a unit change of educational attainment while holding other variables constant. The marginal effects of the probit model are calculated as follows:

$$\frac{\partial p_i}{\partial X_{ik}} = \phi'(\alpha_0 + \beta X_i) \cdot \beta_k \quad (2)$$

The $\frac{\partial p_i}{\partial X_{ik}}$ represents the marginal effects of the predictor X_{ik} on the probability p_i , showing the changes in probability of becoming an entrepreneur for a unit-change in X_{ik} , while holding other variables constant. β_k represents the strength and magnitude of the effect of X_{ik} , while ϕ' denotes the probability density function (PDF) used to determine how changes in the independent variables affect the probability p_i being equal to 1 ($p_i = 1$).

To further explain the relationship between educational attainment and female entrepreneurship, another probit regression is conducted in this research, testing which levels of educational attainment are significantly effective in increasing the probability of becoming a female entrepreneur. This regression is used to show the magnitude of the effects for each level of education. Additionally, this research provides an analysis of the impact of educational attainment on entrepreneurial skills and cognitive intelligence, using four levels of education: elementary school, university bachelor (S1), university masters (S2) and university PhD (S3). To test whether educational attainment influences profitability, a linear regression is conducted with firm's monthly profit as the dependent variable. To ensure the reliability of the findings, a logit regression was conducted as a robustness check. The logit model uses the same variables as the probit model shown in equation (1).

Results

Main Probit Regression Analysis

Educational attainment was found to have a negative effect on the probability of becoming a female entrepreneur in Indonesia. Table 2.1 Column (1) displays a negative coefficient of -0.003 and is statistically significant at 0.1% indicating that individuals with higher educational attainment are less likely to be a female entrepreneur. The result of the marginal effect in Column (2) indicates that a unit increase in educational attainment, for example from a bachelor's (S1) to master's degree (S2), decreases the probability of being an entrepreneur by 0.1%, significant at 1% level. While the effect of educational attainment is statistically significant, it is relatively small.

Additionally, individuals whose daily activities are most influenced by moderate ethnicities are less likely to become female entrepreneurs compared to those influenced by liberal ethnicities. The marginal effect shows that being part of moderate ethnicities significantly

decreases the probability of entrepreneurship by 6.1%, holding other factors constant. Age also has a statistically significant effect on the likelihood of being an entrepreneur. As depicted from Table 2.1 column (2), as age increases, there is a 0.024 increase in the likelihood of becoming an entrepreneur. The marginal effect in column (2) shows that the probability of being an entrepreneur increases by 0.7% for one additional year of age. Individuals who are married, divorced or widowed are more likely to engage in entrepreneurial activities compared to married individuals. The results show statistically significant effect of 0.259, 0.508 and 0.323. Being married, divorced or widowed increases the probability of becoming an entrepreneur by 6.9%, 14.8% or 8.8%, respectively.

Moreover, wealth was found to have a strong positive relationship with entrepreneurship. Individuals in the highest economic state are significantly more likely to become entrepreneurs compared to those who are in lower economic status. Being in the richest economic state increases the probability of being an entrepreneur by 21.7%, holding other factors constant. Having children under the age of 15 was also found to have a significant positive relationship with entrepreneurship. The marginal effect in column (2) indicates that having children under the age of 15 increases the probability of becoming a female entrepreneur 5.4%, holding other factors constant.

Table 2.1

Probit Model Regression and Marginal Effects on Entrepreneur

	<i>Coefficients</i>	
	(1)	(2)
Educational Attainment	-0.003*** (0.001)	-0.001*** (0.000)
Most Influential Ethnicity		
Moderate	-0.227** (0.101)	-0.061** (0.025)
Strict	-0.011 (0.042)	-0.003 (0.122)
Age	0.024*** (0.002)	0.007*** (0.001)
Marital Status		
Married	0.259** (0.088)	0.069** (0.021)
Separated	0.193 (0.241)	0.050 (0.067)
Divorced	0.508***	0.148***

	(0.132)	(0.040)
Widowed	0.323**	0.088**
	(0.113)	(0.031)
Economic State		
2: Poorest	0.130	0.036
	(0.087)	(0.023)
3	0.154*	0.043**
	(0.080)	(0.021)
4	0.144*	0.040*
	(0.082)	(0.022)
5	-0.033	-0.009
	(0.120)	(0.031)
6: Richest	0.668***	0.217**
	(0.187)	(-0.066)
8: Don't Know	-0.002	-0.000
	(0.265)	(0.070)
Children Under 15	0.192***	0.054***
	(0.042)	(0.012)
Constant	-2.081***	
	(0.119)	
Number of observation	8,298	8,298

Note. Column (1) represents results of the probit model regression. The marginal effects of model (1) is written down in column (2). Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Effective Levels of Education For Entrepreneurship

There is a positive pattern in Table 2.2 (Appendix) from elementary school to senior high school (general), which is then followed by a negative pattern of coefficients from Senior high school (vocational) to University S2. The coefficient for PhD or University S3 is positive. However, only a few of the results can be interpreted due to the significance of the results. First, individuals who only finished school up to Elementary school or Islamic Elementary School (Madrasah Ibtidaiyah) are more likely to become an entrepreneur. The result of the probit model shows statistically significant positive coefficients of 0.200 and 0.405 respectively. The marginal effect shows that only obtaining a degree from Elementary school increases the probability of becoming an entrepreneur by 6% and 12.1% for those who attended Islamic Elementary School.

Individuals who attained a bachelor's degree or S1 are less likely to become an entrepreneur. This applies for individuals who attained a master's degree (S2). The table shows significant negative coefficients of -0.459 and -0.711, respectively. The marginal effects depicted

from the table indicates that obtaining a degree up to bachelors or masters decreases the probability of becoming an entrepreneur by 13.8% or 21.3%, respectively.

Educational Attainment on Entrepreneurial Skills and Cognitive Intelligence

As expected, the effect of educational attainment is significant on improving individuals' cognitive intelligence such as memorization and mathematical skills. The results from Table 2.3 shows that cognitive intelligence improves as educational attainment increases. Individuals who graduated only up to elementary school has a significant negative association with both of the intelligence indicators, shown in column (5) and (6), with coefficients of -0.059 and -0.104. Bachelor's (S1), Master's (S2) and PhD (S3) graduates show improved cognitive intelligence with significant coefficients of 0.019, 0.038 and 0.038 respectively. However, only Bachelor's (S1) and Mater's (S2) have significant effects on mathematical skills with coefficients of 0.096 and 0.308, significant at 0.1%.

The first column of Table 2.3 shows that Elementary schools graduates are on average less efficient at doing their tasks by 0.134 unit. However, university graduates (S1 and S2) have a significant positive association with efficiency ($\beta=0.113$, $p < 0.001$; $\beta=0.228$, $p < 0.001$). The result indicates that higher educational attainment increase individual's efficiency. Participation of the existing women community (PKK) surprisingly have a significant negative effect on efficiency with a coefficient of -0.018, which may be due to passive participation. Age also has a negative relationship with efficiency by -0.001, significant at 5%. This indicates that as age increases, efficiency decreases. Moreover, the effect of parent's highest level of education is significantly negative by -0.001. Individuals with parents working in the government is positively associated with the improvement of individual's efficiency by 0.098.

The magnitude of the effects in column (2) on creativity is similar with the results for efficiency, indicating that as educational attainment and age increases, individual's creativity is improved. Additionally, communication skills could be improved by attaining a bachelor's ($\beta=0.090$, $p < 0.001$) and master's degree ($\beta=0.255$, $p < 0.05$) as seen in column (4). The effect of participating in a women community (PKK) is significantly negative ($\beta=-0.014$, $p < 0.001$). Thus, communication skill improves as age increases ($\beta=0.003$, $p < 0.001$) and decreases if individuals participated in the existing women community (PKK).

In column (3), only elementary school is significant at 10% ($\beta=-0.044$), indicating that individuals who only graduated from elementary have less ability to handle stress. The same effect comes from participating in the women community (PKK) ($\beta=-0.008$, $p < 0.1$) and having parents working as a casual worker in agriculture ($\beta=-0.126$, $p < 0.001$). Moreover, age has a significant positive effect on individual's ability to handle stress by 0.003.

Educational Attainment on Profitability

The results in Table 2.4 show that educational attainment on average increases firm's monthly profitability by 7026.48 rupiah, significant at 5% level. Moreover, the number of weeks worked per year seems to be significant in increasing firm's profitability by 14984.33 rupiah at 0.1% level of significance. While educational attainment increases profitability, the number of weeks spent on working was found to have greater effect on firm's performance. Both of which are mentioned to be the main limitations for female entrepreneurs.

Table 2.4

Linear Regression on firm's yearly profitability

	Firm's monthly profitability
Educational Attainment	7026.477** (2266.48)
Weeks worked per year	14984.33*** (2646.249)
Hours worked per week	641.829 (761.243)
Experience	755.539 (0.703)
Number of workers	119870.3 (83100.52)
Constant	245672.5 (192066.6)
F(5, 2177)	8.60
Prob > F	0.000
R ²	0.0497
Number of observations	2,183

Note. Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Robustness Check

The results of the logit model are presented in Table 3 in the Appendix. Column (1) represents the results from the probit model and column (2) represents the results from the logit model. Starting with educational attainment, the result of the logit model seems to be consistent with the result of the probit model. Both coefficients are negative and are statistically significant at 0.1%. There is no significant change in coefficients between the two models. Other results such as age, marital status, economic state and having children under 15 years old from the logit model are also consistent with the probit model results. Both models have same the magnitude for each coefficient.

Discussion and Conclusion

The increasing trend of educational attainment among women may alter the future of female entrepreneurship in Indonesia. Therefore, understanding the magnitude of this effect is necessary to successfully improve the entrepreneurial sector in Indonesia. This thesis finds that educational attainment generally has a significant negative effect on the probability of women becoming entrepreneurs in Indonesia, thereby accepting the main hypothesis. This implies that the higher the level of education individuals pursue, the lower the chance is to choose entrepreneurship as a career option. However, this thesis finds that the general effect of educational attainment on female entrepreneurship in Indonesia is relatively small.

The results of this research align with the findings of the existing literature, which suggests that individuals with higher educational attainment tend to prefer employment over self-employment. Elementary graduates have a higher probability of becoming an entrepreneur compared to those who pursue a university degree due to the fact that individuals who only received elementary education are often underqualified for traditional employment role. Additionally, university graduates may find employment more attractive if it offers greater stability and benefits compared to self-employment. Another finding of this research is that financial capital is a crucial driving factor for entrepreneurship. The result shows that women coming from wealthy backgrounds have higher chance of becoming an entrepreneur.

Indonesian entrepreneurship is currently still dominated by female entrepreneurs, with majority operating within the informal sector. These female enterprises often generate less profit and have slower firm growth compared to enterprises owned by men. Lack of knowledge and self-

efficacy among these women results in hesitance for improvements and fear of entering entrepreneurship. While these informal enterprises offer various social well-being advantages, they also lead to loss of government revenue and create an unfair competition within the market, which potentially drive formal enterprises out of the market.

Education can therefore be utilized as an incentivizing tool to improve the quality of female entrepreneurship in Indonesia. This thesis proves that higher educational attainment significantly enhances individuals' entrepreneurial skills and cognitive intelligence. Hence accepting the first sub-hypothesis (H1a). As women achieve higher levels of education, they are more likely to be perceived as equally competent as men over time, which could help women easily gain better access to financing and credit in the future.

Entrepreneurship is particularly important for women as it provides the flexibility needed to balance their professional and family-related responsibilities. The result indicates that women living under strict ethnic influences tend to have lower probability to become an entrepreneur due to their limited mobility. Moreover, those who have children under the age of 15, as well as those who are married, divorced or widowed, are more likely to become entrepreneurs. These results shows that normative constraints play a significant role in the decision of becoming an entrepreneur.

While the general effect of educational attainment on the probability of becoming a female entrepreneur is small and negative, educational attainment appears to significantly contribute in improving the quality of female entrepreneurship, which potentially helps female entrepreneur to perform better in the long run. The findings of this thesis suggest that educational attainment improves individuals' skills and cognitive intelligence. Additionally, improving firm's profitability. Thus, accepting the second sub-hypothesis of this thesis (H1b).

Focusing solely on education to promote entrepreneurship is not enough. Normative constraints and other factors such as childcare responsibilities, cultural expectations, marital status, age and economic condition were found to have greater influences on the probability of becoming female entrepreneurs. Therefore, policymakers should use education as a tool to improve the quality of female entrepreneurship in Indonesia. However, it is important to focus on providing support to female entrepreneurs such as easing the process of obtaining credit or financing and ensuring accessible childcare services in each area. Creating a supportive environment for these women is important and should be prioritized to improve female entrepreneurship in Indonesia.

Another approach is to create effective entrepreneurial programs for these women that teach necessary entrepreneurial knowledge.

Limitations

This thesis has several limitations. First, the data used for this research may not be up to date with the current trends and economic state of the country. Due to the availability, only data from 2014-2015 is used for this study. This may affect the results of the regressions. Therefore, for further researches, using a more recent data would be recommended to better reflect the true effect of educational attainment on today's female entrepreneurship. Second, the answers from the survey may not be fully accurate since respondents could lie about their answers. Hence, creating a survey would be more reliable for further researches.

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APPENDIX

Table 1*Descriptive Statistics*

Variable	Obs	Mean	SD	Min	Max
Entrepreneur	8,298	0.231	0.421	0	1
Educational attainment	8,298	6.797	6.035	1	18
Most Influential Ethnicity	8,298	1.369	0.757	1	3
Age	8,298	35.698	11.769	15	64
Marital status	8,298	2.087	0.781	1	6
Economic state	8,298	3.151	0.941	1	7
Having children under 15 years old	8,298	0.639	0.480	0	1
Sex	8,298	1	0	1	1

Table 2.2

Probit Regression of Educational Attainment on The Probability of Being a Female Entrepreneur

	<i>Coefficients</i>	
	(1)	(2)
Educational Attainment		
Elementary school	0.200*** (0.051)	0.060*** (0.015)
Islamic Elementary School (Madrasah Ibtidaiyah)	0.405*** (0.134)	0.121** (0.040)
Junior high general	0.071 (0.055)	0.021 (0.017)
Junior high vocational	0.157 (0.226)	0.047 (0.068)
Senior high general	0.088 (0.053)	0.027* (0.016)
Senior high vocational	-0.083 (0.059)	-0.025 (0.016)
University S1	-0.459*** (0.064)	-0.138*** (0.019)
University S2	-0.711*** (0.230)	-0.213** (0.069)
University S3	0.072 (0.683)	0.022 (0.205)
Constant	-0.746*** (0.040)	
Number of observations	8301	8301

Note. Column (1) represents results of the probit model regression. The marginal effects of the Probit model is written down in column (2). Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 2.3*Linear Regression on Skills and Cognitive Intelligence*

	<i>Entrepreneurial Skills and Cognitive Intelligence</i>					
	<i>Efficiency</i> (1)	<i>Creativity</i> (2)	<i>Handling Stress</i> (3)	<i>Communication</i> (4)	<i>Memorization</i> (5)	<i>Mathematics</i> (6)
Educational Attainment						
Elementary	-0.134*** (0.028)	-0.184*** (0.030)	-0.044* (0.024)	-0.018 (0.019)	-0.059*** (0.008)	-0.104*** (0.013)
University (S1)	0.113*** (0.025)	0.147*** (0.026)	-0.011 (0.026)	0.090*** (0.021)	0.019*** (0.004)	0.096*** (0.017)
University (S2)	0.228** (0.079)	0.321*** (0.084)	-0.061 (0.095)	0.255** (0.067)	0.038*** (0.005)	0.308*** (0.056)
University (S3)	-0.138 (0.191)	0.009 (0.211)	-0.206 (0.199)	0.088 (0.387)	0.038*** (0.005)	0.374 (0.213)
PKK	-0.018*** (0.005)	-0.014** (0.005)	-0.008* (0.005)	-0.014*** (0.004)	-0.004*** (0.001)	-0.008*** (0.003)
Household's Job						
Self-employed with unpaid family worker/temporary worker	0.034 (0.027)	-0.041 (0.029)	0.181 (0.024)	-0.024 (0.207)	0.005 (0.007)	0.022 (0.014)
Self-employed with permanent worker	0.029 (0.077)	0.071 (0.085)	0.035 (0.072)	0.035 (0.059)	0.015 (0.018)	0.038 (0.046)
Government worker	(0.098)** (0.030)	0.066** (0.033)	0.020 (0.029)	0.006 (0.024)	0.024*** (0.007)	0.031 (0.018)
Private worker	(0.037) (0.030)	-0.025 (0.032)	0.030 (0.027)	0.006 (0.022)	0.008 (0.007)	0.011 (0.017)
Unpaid family worker	0.131 (0.335)	0.230 (0.331)	0.145 (0.361)	0.002 (0.035)	0.049*** (0.016)	0.018 (0.157)
Casual worker in agriculture	0.023 (0.052)	-0.044 (0.057)	-0.126** (0.050)	0.002 (0.035)	-0.003 (0.014)	-0.003 (0.026)
Casual worker not in agriculture	0.012 (0.043)	-0.146** (0.049)	0.029 (0.039)	-0.009 (0.031)	-0.008 (0.012)	0.008 (0.023)

Transfer	-0.147 (0.111)	0.022 (0.108)	0.114 (0.079)	0.014 (0.087)	0.018 (0.020)	-0.012 (0.057)
Pension	-0.081 (0.096)	0.008 (0.095)	-0.031 (0.093)	-0.034 (0.078)	-0.002 (0.024)	-0.054 (0.053)
Parent's Highest Level of Education	-0.001** (0.000)	-0.001** (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Age	0.007*** (0.001)	0.002* (0.001)	0.003*** (0.001)	0.003*** (0.001)	-0.002*** (0.000)	-0.002*** (0.001)
Married	-0.002 (0.026)	-0.001 (0.029)	0.016 (0.025)	-0.016 (0.021)	0.009 (0.007)	0.006 (0.015)
Economic State	0.018 (0.011)	0.039** (0.012)	0.030** (0.010)	0.008 (0.008)	-0.001 (0.003)	0.005 (0.006)
Constant	3.551*** (0.059)	3.557*** (0.064)	3.700*** (0.056)	4.084*** (0.046)	1.023*** (0.014)	0.434*** (0.032)
Number of observations	8,301	8,301	8,301	8,301	8,300	8,300

Note. Column (1) represents results of the probit model regression. The marginal effects of model (1) is written down in column (2). Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table 3*Robustness Check*

	<i>Coefficients</i>	
	<i>(1)</i>	<i>(2)</i>
Educational Attainment	-0.003*** (0.001)	-0.005*** (0.001)
Most Influential Ethnicity		
Moderate	-0.227** (0.101)	-0.385** (0.180)
Strict	-0.011 (0.042)	-0.018 (0.072)
Age	0.024*** (0.002)	0.040*** (0.003)
Marital Status		
Married	0.259** (0.088)	0.514*** (0.168)
Separated	0.193 (0.241)	0.398 (0.419)
Divorced	0.508*** (0.132)	0.932*** (0.233)
Widowed	0.323** (0.113)	0.613*** (0.204)
Economic State		
2	0.130 (0.087)	0.212 (0.150)
3	0.154* (0.080)	0.260 (0.138)
4	0.144* (0.082)	0.243 (0.142)
5	-0.033 (0.120)	-0.065 (0.209)
6: Richest	0.668*** (0.187)	1.117*** (0.306)
7: Don't Know	-0.002 (0.265)	-0.004 (0.457)
Children Under 15	0.192*** (0.042)	0.323*** (0.073)
Constant	-2.081*** (0.119)	-3.534*** (0.216)
Number of observation	8,298	8298

Note. Column (1) represents results of the probit model regression. The marginal effects of model (1) is written down in column (2). Standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.