FINAL REPORT

# DEVELOPING INDONESIAN FINANCIAL LITERACY INDEX

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# DEVELOPING INDONESIAN FINANCIAL LITERACY INDEX

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# DEVELOPING INDONESIAN FINANCIAL LITERACY INDEX

## Background

In the last decade, financial literacy has become one of the policy focuses of government agencies, banking industries, grass-roots consumer and community interest groups, and other organizations. There is a great concern that consumers tend to lack a working knowledge of financial concepts and do not have the tools they need to make decisions most advantageous to their economic well-being. The low level of financial literacy can influence an individual's or family's day-to-day money management and ability to save for long-term goals such as buying a home, seeking higher education, or financing retirement. Ineffective money management can also result in behaviors that make consumers more fragile to severe financial crises (Braunstein and Welch, 2002).

The ability of individuals to make informed financial decisions is crucial to developing sound personal finance. This is expected to contribute to more efficient allocation of financial resources and to greater financial stability at both the micro and macro level. Efforts to improve financial literacy is also an important pathway to increase saving rates and lending to the poorest and most vulnerable consumers, such as those working in informal sectors (Klapper *et al*., 2012).

Cole *et al*. (2010) argue that drawing the individuals and firms working in the informal sectors into the formal financial sector would be one of the fastest ways to foster financial development in emerging markets. This could also be the case for Indonesia where the proportion of middle class keeps growing and the size of informal sector in the financial system is very high.

Nevertheless, the evidence reveals that the level of access to finance in Indonesia is still quite low. This can be observed in terms of the level of access of Indonesian households to savings and debts at the banks. The result of Bank Indonesia's Household Balance Sheet Survey (HBSS) 2011 shows that the number of Indonesian households that possess saving accounts at the banks in 2011 was only 43.57 percent, whereas the number of households that can access debts from the banks in 2011 was only 19.58 percent. As alternatives, a high number of Indonesian households borrows from the non bank financial institutions (such as cooperatives and micro finances) and non financial institutions (such as rotating savings and credit association (RoSCA), families, friends, and neighbors, money lenders, local kiosks, etc).

Cole *et al*. (2010) provide two leading views that may explain the limited demand for formal financial services. First, low income individuals do not demand formal financial services at market prices since these financial services are expensive to provide and involve high fixed costs. Second, there are a high number of individuals with quite high income but they are not familiar or comfortable with the financial products and therefore they will not demand them. This implies that limited financial literacy is one of important barrier to demand for financial services.

The improvement of financial literacy is expected to contribute to a more stable financial system. As Klapper *et al.* (2012) suggest, the improved financial literacy will lead to a more prudent borrower behavior that could reduce financial fragility. Well-informed consumers may also exercise innovation-enhancing demand on the financial sector and play an important role in monitoring the market. This will also help improve transparency and honesty in financial institutions.

The policy makers in Indonesia have been paying an increasing attention to the improvement of financial literacy in the form of financial education programs as a part of the strategy to improve the financial inclusion in Indonesia. One of the examples is the National Strategy for Financial Inclusion (NSFI), one of whose pillars is the financial education.

In the effort to improve the financial literacy, it is crucial to develop a robust methodology to measure the level of financial literacy itself (Xu and Zia, 2012).Developing the methodology will enable policy makersto identify the current state of financial literacy of Indonesian society in order to design a more effective steps and policies suitable to the real condition, including how effective the prior policies in improving the level of financial literacy in Indonesia. In addition, identifying what factors influencing the investment decision of Indonesian society and their financial behaviors are crucial for designing financial education programs.

**Objective of Study**

In order to be able to design effective financial education program to improve the financial literacy, it is crucial to develop a methodology to measure the level of financial literacy. Therefore, this pilot project aims to:

1. Develop a survey methodology to measure the level of financial literacy in Indonesia;
2. Carry out a pilot project to testing the methodology and the financial literacy questionnaire;
3. Develop a Financial Literacy Index (FLI) based on the result of the pilot project.

**Methodology**

This pilot project aimed to develop a methodology to measure the financial literacy of Indonesian households. In achieving the objective, we designed a financial literacy pilot survey to test the methodology and examine the applicability of the methodology to the Indonesian households.Thepilot surveyhad a targettosurvey householdsin 3(three) highly developedcities,i.e.Cityof Medan in NorthSumatera Province, South Jakarta City in Jakarta Province, and Surabaya City in EastJava Province. The pilot survey in each city was conducted in threesub-districts (*kecamatan*), each representing low, medium, and highly developed sub-district. In each sub-district, the pilot survey was conducted in the village (*kelurahan*)where the capital of the sub-district or the sub-district office (*kantor kecamatan*)was located.

The number of respondents for the pilot project was 450 respondents, i.e. 150 respondents for each city. The respondents were selected based on the random sampling method based on Family Cards (C1 or *Kartu Keluarga/*KK) that were available at the village offices. The respondents of this survey were the household members who were responsible for and have a good knowledge regarding their household finance with the age of over 18 and less than 79 years old who were considered mature enough to make financial decisions and to a certain extent had independence in managing their own finances.

The basic concept of financial literacy that was used to develop the financial literacy questionnaire in this project referred to the concept and measurement of financial literacy of Kempson *et al.* (2005), Atkinson *et al.*(2006), van Rooji *et al.* (2007),Lusardi (2008), Stănculescu (2010). Kempson *et al.* (2005) suggest that financial literacy is related to behavior in four domains: (1) managing money; (2) planning ahead; (3) making choices; and (4) getting help. They conclude that financially capable people are: (1) well organized, keep control over their financial resources, make ends meet (resisting pressure to spend or borrow money and budget unexpected expenditure); (2) able to deal with a large fall in income and unexpected events, make provision for long term (save money and plan for retirement), know how and where to seek advice and help; (3) aware, confident and able to choose between the available financial products; (4) able to find and compare information for themselves and know where and when to turn for advice and help from a third party.These four behavior domains are frequently referred by surveys and researches on financial literacy, such as the baseline survey of financial capability in the United Kingdom (Atkinson *et al.*, 2006) and in the Romania (Stănculescu, 2010)

Van Rooij *et al.* (2007) and Lusardi (2008) classify the level of financial literacy into the basic financial literacy and the advanced financial literacy. The basic or fundamental concepts to financial literacy evaluate the knowledge of fundamental economic concepts, competence with basic financial numeracy, and the knowledge of risk diversification as a crucial element of any informed investment decision. Lusardi and Mitchell (2006) measured the basic financial literacy by devising questions such as the working of interest rates, the effects of inflation, and the concept of risk diversification. The advanced financial literacy encompasses the understanding about the relationship between risk and return; how bonds, stocks, and mutual funds work; and basic asset pricing. Most of the questions related to the advanced literacy questions were asked in the Ducth DNB Household Survey (van Rooji *et al.*, 2007).

In constructing financial literacy index (FLI), we carried out four steps, i.e. 1) variable grouping; 2) assigning score for each variable; 3) calculating weight for each variable; and 4) constructing financial literacy index. Each of those processes is briefly explained in the following section. For more complete explanation regarding the methodology to develop the Financial Literacy Index (FLI) in this project, please see the Appendix of this report.

1. Variable Grouping

   In this study, we classified the financial literacy variables into two groups, i.e. basic financial literacy and advanced financial literacy. Basic financial literacy group consisted of 11 variables related to: 1) Knowledge on formal financial product, such as requirement of opening saving account (requirement of ID, minimum amount of money to open bank account, and minimum balance on bank account) and total number deposit guaranteed by government; 2) Numeracy regarding finance such as simple interest, compounded interest, calculate interest on loan; and 3) Basic concept of inflation, discount, time value of money, and money illusion.

   Meanwhile, the advanced financial literacy groups consisted of 10 variables that are related toknowledge about the function of stock market, interest rate and bond price, returns on stock versus bond, risk of bond and stock, the meaning of buying stock, the meaning of buying bond, penalty when selling bond before maturity, which investment give the highest return, which investment produces the highest return fluctuation, and asset diversification.

2. Assigning score for each variable

   For each variables in Table 1 and Table 2, we assigned a score of 1 for correct answer, and 0 for otherwise (including incorrect answer, do not know, and refuse to answer).

3. Calculate Weight to Each Variable

   In assigning weight to each financial literacy variable, there are two main methods widely implemented by various researches. The first approach is the simple weight such as the method employed by Bumcrot, Lin, and Lusardi (2011). They constructed an index of financial literacy based on the number of correct answers provided by each respondent to the five financial literacy questions. Those five financial literacy questions are: (1) interest rates, (2) inflation, (3) the workings of risk diversification, (4) the relationship between bond prices and interest rates, and (5) the relationship between interest payments and maturity in mortgages. An individual answering all five of the questions correctly has a financial literacy index of 5 and an individual answering none of the five questions correctly has a financial literacy index of 0. They basically gave equal weight to each financial literacy question.

   The second approach is the principal components analysis or factor analysis such as carried out by Atkinson *et al*. (2006), van Rooji *et al.*, (2007) and OECD (2008).The questions that measure the financial literacy were analyzed to measure how far an underlying or common factor might be constructed that could best explain the variation that we observed in the replies towards the questions in the questionnaires. The factor analysis method assigns a weight to a variable based on the correlation of the variable to common factors.

   We also calculated Pearson Simple Correlation to measure the correlations among the financial literacy variables. The result of the Pearson Simple Correlation was used to check

whether the variables with higher weight according to the Factor Analysis method had high correlation with other variables.

4. Calculating Financial Literacy Index

For each variable group, the financial Literacy Index for each observation in each variable group was then calculated by summing of the product of the score of each variable and its corresponding weight. The overall score of financial literacy index was calculated as the arithmetic mean of the Basic and Advanced Financial Literacy Index.

**The Socio-Demographic Structure of the Sample**

This section briefly describes the socio-demographic structure of the sample of this survey. The FLI will later be analyzed across different socio-demographic aspects of the respondents.

The respondents of this survey consisted of 69 percent female respondents and 31 percent male respondents. Most of the respondents were married (88.57 percent), 8 percent were widowed, 2.67 percent were single and 0.67 percent were divorced/separated. In terms of employment, 38.84 percent of the respondents were housewives, 24.32 percent were self-employed, 7.8 percent worked at private non-financial institution, 4.17 percent worked as factory labor, 3.99 percent had part-time job, 3.99 percent worked as government employees, 1.81 percent had retired from their job, and 0.36 percent were students and private employees in financial institutions, respectively.

The highest level of education of almost half of the respondents was the senior high school (46.44 percent). Around 20.89 percent finished secondary school, 17.11 percent finished primary school and 6 percent did not complete the primary school. The number of respondents who went to college was very small, i.e. 4.67 percent completed diploma (D1/D2/D3) and 4.44 percent earned bachelor degree or equivalent.

The average household income of the sample was Rp3,030,602 per month. Majority of the households had income within the range of Rp1,000,000 to Rp4,000,000. Specifically, around 38.67 percent respondents had income between Rp1,000,000 to Rp2,000,000 per month and 36.89 percent between Rp2,000,000 to Rp4,000,000 per month. The percentage of the household with monthly income less than Rp1,000,000 was quite high, i.e. 6 percent, while there was only 1.78 percent had income more than Rp10,000,000 per month (Figure 1).

**Figure 1**
**Respondents' Range of Income per Month**
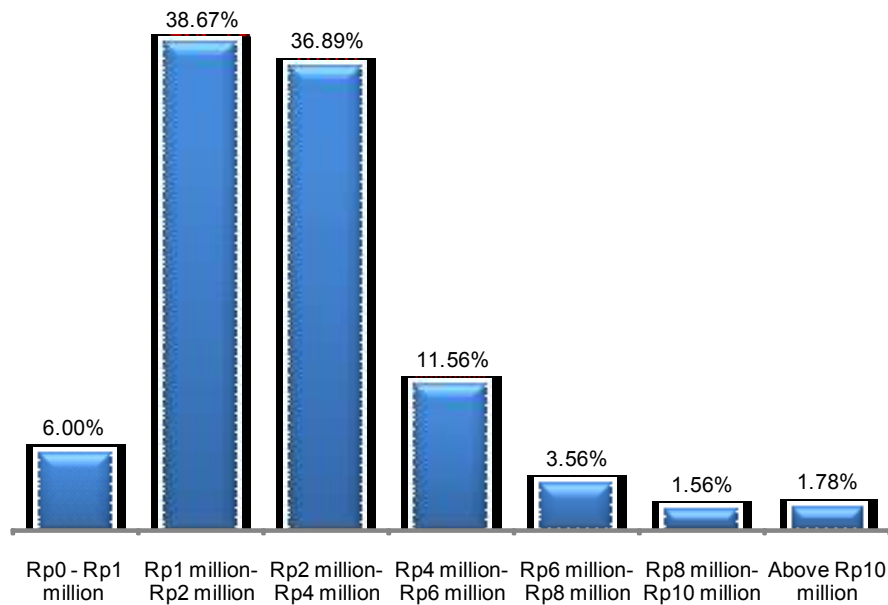


## Analysis and Findings

### 1. The Level of Financial Literacy

Table 1 show the comparison of variable weights resulted from simple weight method and factor analysis method. As can be seen from Table 1 and Table 2, the simple weight formula assigns equal weight to each variable in each group. Meanwhile, the factor analysis produces variable weights in such a way that variables that were highly correlated with the common factor were given higher weights.

We calculated the Pearson Simple Correlation to measure the correlations among the financial literacy variables to check whether the variables with higher weight according to the Factor Analysis method had high correlation with other variables.The result of the Pearson Simple Correlation seems to provide consistent result with the Factor Analysis method where variables with high weight are those having high correlation with other variable. Therefore, to save space and practicality purpose, further analyses of financial literacy index will be based on indices that calculated the variable weights using factor analysis.

The average for both basic financial literacy index and advanced financial literacy index constructed by using the simple weight method was relatively close to those constructed by using the factor analysis method. With the scale from 0 to 100, the average basic financial literacy index based on the simple weight was 62.60, while that based on the factor analysis method was 66.55. Meanwhile, the average advanced financial literacy index based on the simple weight was 16.24, whereas that based on the factor analysis method was 18.47. Overall,

the overall FLI based on the simple weight was 39.42, while that based on the factor analysis method was 42.51. The distribution of the basic financial literacy index, advanced financial literacy index, and total financial literacy index based on those two methods is presented in Figure 2, Figure 3, and Figure 4, respectively.

**Table 1**
**Basic Financial Literacy Variable Weight**

| Variable | Factor Analysis | Simple Weight |
|---|---|---|
| Requirement of ID | 0.159 | 0.091 |
| Minimum amount of money to open saving account | 0.169 | 0.091 |
| Minimum balance on saving account | 0.100 | 0.091 |
| Deposit guaranteed by government | 0.016 | 0.091 |
| Simple interest | 0.098 | 0.091 |
| Compounded interest | 0.094 | 0.091 |
| Calculate interest on loan | 0.183 | 0.091 |
| Inflation | 0.071 | 0.091 |
| Discount | 0.060 | 0.091 |
| Time value of money | 0.022 | 0.091 |
| Money illusion | 0.027 | 0.091 |

**Table 2**
**Advanced Financial Literacy Variable Weight**

| Variable | Factor Analysis | Simple Weight |
|---|---|---|
| Function of stock market | 0.065 | 0.1 |
| Interest rate and bond price | 0.092 | 0.1 |
| Returns on stock versus bond | 0.100 | 0.1 |
| Risk of bond and stock | 0.086 | 0.1 |
| The meaning of buying stock | 0.212 | 0.1 |
| The meaning of buying bond | 0.158 | 0.1 |
| Penalty when selling bond before maturity | 0.112 | 0.1 |
| Which investment give the highest return | 0.026 | 0.1 |
| Which investment produce the highest return fluctuation | 0.082 | 0.1 |
| To put or not to put your investments into one basket | 0.067 | 0.1 |

The results of both approaches indicate similar findings, i.e. the overall financial literacy of the sample was relatively low, less than 50. The basic financial literacy index is quite different across sample (Figure 2), while the advanced financial literacy index tends to be very low for most respondents (Figure 3). Both the total financial literacy index based on simple weight method and factor analysis method show rather normal distribution such as depicted in Figure 4. Nevertheless, the total financial literacy index based on the factor analysis seems to provide a better distribution. This was also confirmed by the normality test by using Jarque-Bera test that shows that the total financial literacy index based on the factor analysis better matches a normal distribution curve.

**Figure 2**
**Basic Financial Literacy Index**

**Simple Weight Method**                    **Factor Analysis Method**
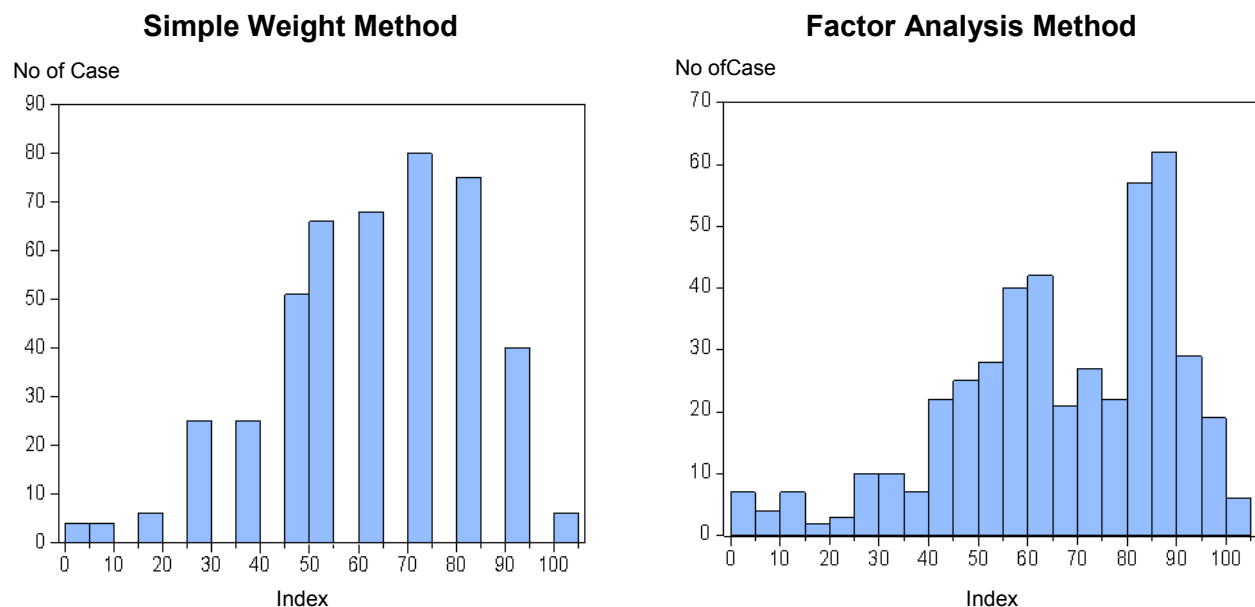
**Figure 3**
**Advanced Financial Literacy Index**

Simple Weight Method

Factor Analysis Method
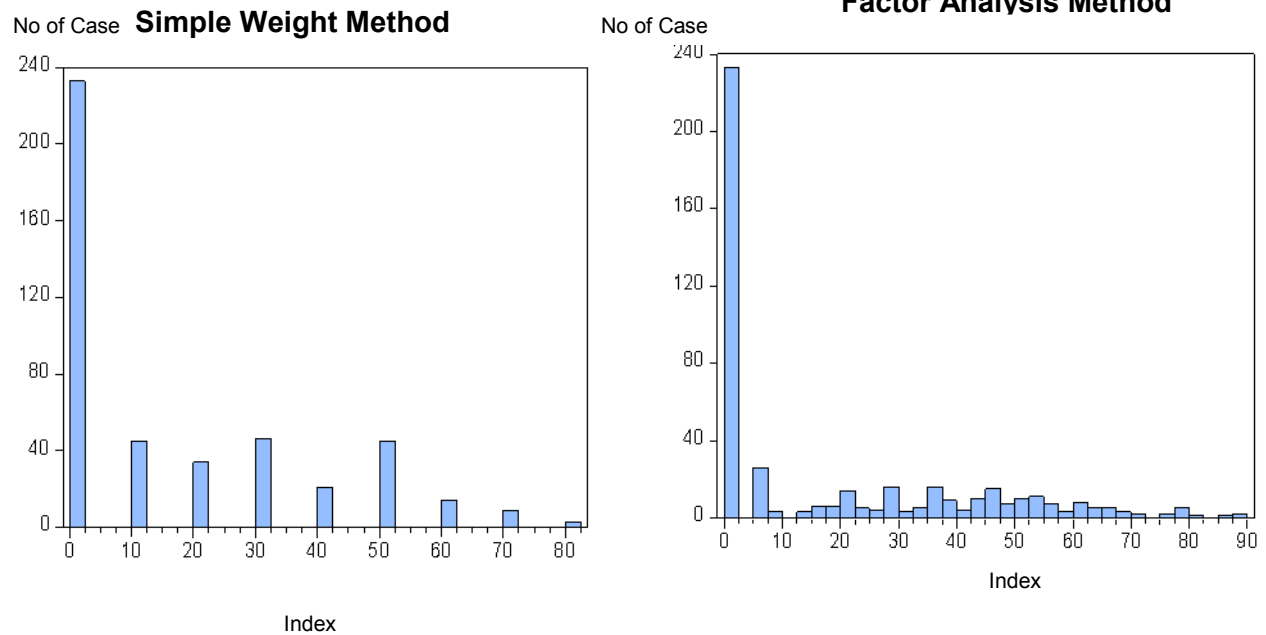
**Figure 4**
**Overall Financial Literacy Index**

Simple Weight Method

Factor Analysis Method

9
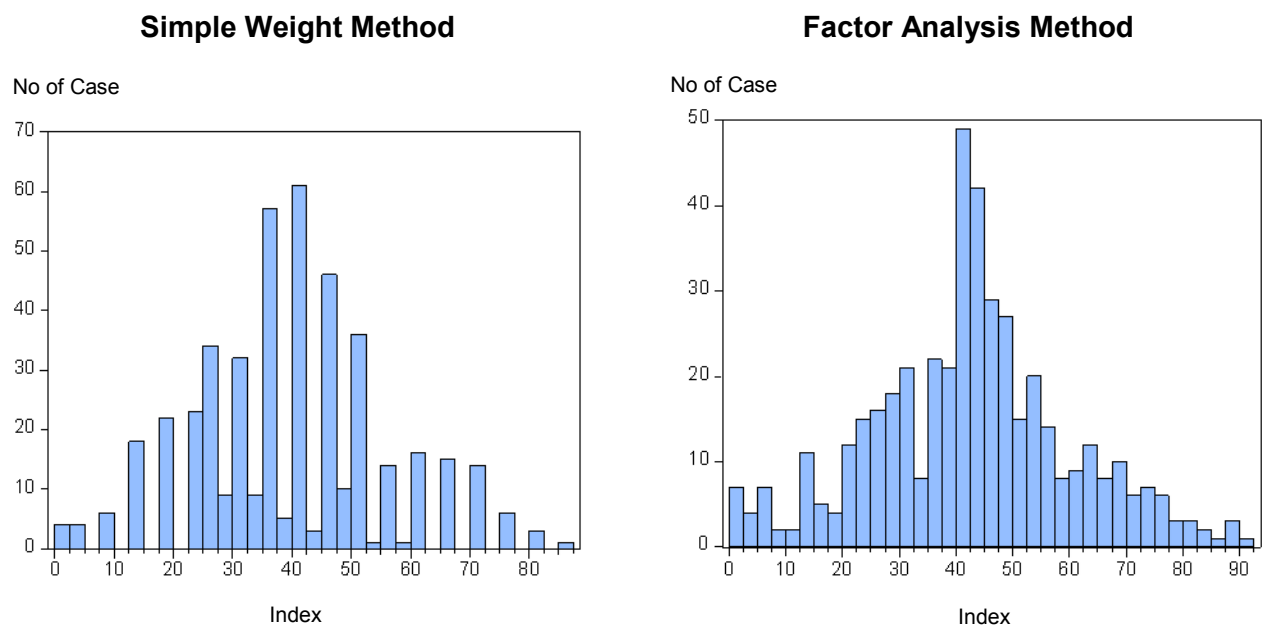
The overall financial literacy scores of all respondents were then categorized into 4 (four) clusters (Figure 5). The objective of this clustering process is to observe commonality across respondents in the same cluster. The clustering process is carried out by adding/extracting standard deviation ($\sigma$) from the mean value ($\mu$) by following Stănculescu (2010) as follows:

1. Cluster I

   Cluster I is classified based on the following formula:

   $$0 \leq FLI \leq \mu - \sigma FLI$$

   Cluster I includes those with very low level of financial literacy, i.e. those with total financial literacy lower than 24.86. This cluster represents about 14 percent of the respondents. The respondents in this cluster possessed around 1.29 financial products, on average. Their knowledge on deposit insurance was very limited where there were only 25.4 percent of the respondents who understood that the deposit in the bank is guaranteed by the government. They also had limited source of information. Their source of information was mostly from TV.

2. Cluster II

   Cluster II is classified based on the following formula:

   $$\mu - \sigma FLI < FLI \leq \mu$$

   Cluster II includes those with quite low level of financial literacy, i.e. those with total financial literacy between 24.86 and 42.51. This cluster represents about 35.78 percent of the respondents. On average, the main source of information of the respondents in Cluster II was TV. The respondents in this cluster used around 1.3 financial products, on average, not very different from those in Cluster 1. The percentage of those who understood that the deposit in the bank is guaranteed by the government was higher than those in Cluster I, i.e. 40.37 percent.

3. Cluster III

   Cluster III is classified based on the following formula:

   $$\mu < FLI \leq \mu + \sigma FLI$$

   The cluster III includes about 34.44 percent of the respondents, which represents approximately 155 respondents. The overall financial literacy of those in this cluster is above average, i.e. between 42.61 – 60.17. Similar to Cluster I and Cluster II, the main source of information of those in this cluster was also from TV. A quite high percentage of the respondents in this cluster understood that the deposit in the bank is guaranteed by the government (59,35 percent). The formal financial products ownership reached 1.82 per household, on average, rather higher than Cluster II.

4. Cluster IV

   Cluster IV is classified based on the following formula:

   $$FLI > \mu + \sigma FLI$$

   We could classify those in this cluster as financial follower. They had the highest total financial literacy index among other respondents in other three clusters, i.e. those with financial literacy index higher than 60.17. This cluster represents 15.78 percent of the respondents, which are approximately 71 respondents. They accessed various sources of information, such as TV and newspaper (both national and local). They also had good understanding and knowledge on the financial issues. Around 63.38 percent of the respondents in this cluster understood that the deposit in the bank is guaranteed by the

government. The ownership of formal financial products is significantly higher in this cluster compared to the other three clusters, i.e. 3.68 financial products, on average.

**Figure 5**
**Overall Financial Literacy Index (FLI) Clustering**



Score of Financial Literacy Index
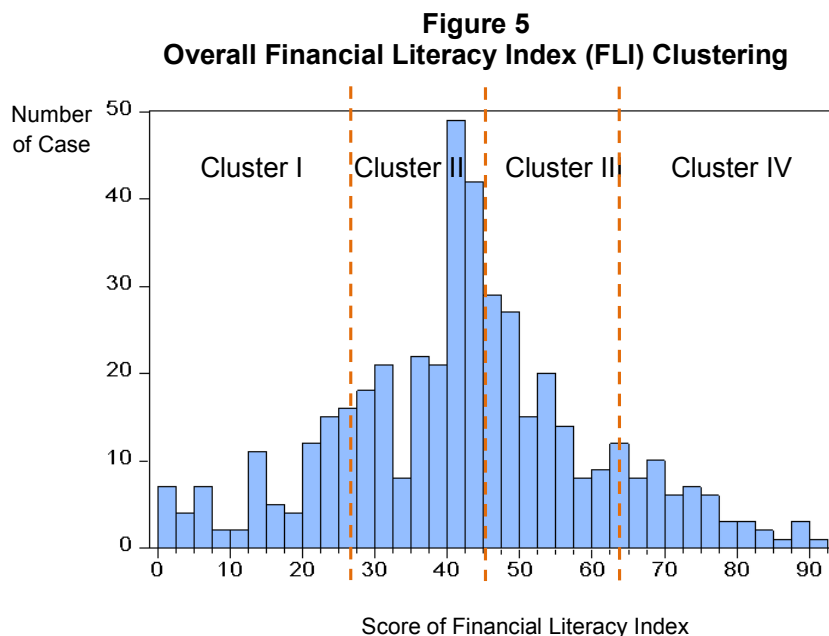
We carried on by categorizing the financial literacy index into three groups according to the following rule:

1. Financial literacy index which is lower than or equal to 60 is categorized as **low** financial literacy index (0 ≤ FLI ≤ 60);

2. Financial literacy index which is higher than 60 and less than or equal to 80 is categorized as **moderate** financial literacy index (60 < FLI ≤ 80);

3. Financial literacy index which is higher than 80 is categorized as **high** financial literacy index (FLI>80).

We analyzed the result by grouping both the basic financial literacy index and the advanced financial literacy index based on the factor analysis method according to the above classification across several socio demographic variables, such as gender, level of education, and level of income. Table 3 and Table 4 show the basic and advanced literacy index according to the level of monthly income, respectively.

Table 3 indicates that the level of financial literacy is positively correlated with the level of income. Most of low income households have low level of basic financial literacy.Meanwhile,most of high income households have high level of basic financial literacy. This is, however, not the case for the advanced financial literacy index where the level of financial literacy is weakly correlated with the level of income. As can be seen in Table 4, most respondents fell into the category of low advanced financial literacy, even those with very high income. This finding is consistent with the result of the study conducted

by Atkinson *et al*. (2006) for the case of the United Kingdom and Stănculescu (2010) for the case of Romania.

**Table 3**
**Basic Financial Literacy by Income Level**

| Income | Low | % | Moderate | % | High | % | Total | Total (%) |
|---|---|---|---|---|---|---|---|---|
| Up to Rp1 million | 19 | **70.37** | 4 | 14.81 | 4 | 14.81 | 27 | 100 |
| Above Rp1 - Rp2 million | 83 | **47.70** | 39 | 22.41 | 52 | 29.89 | 174 | 100 |
| Above Rp2 - Rp4 million | 48 | 28.92 | 47 | 28.31 | 71 | **42.77** | 166 | 100 |
| Above Rp4 - Rp6 million | 11 | 21.15 | 12 | 23.08 | 29 | **55.77** | 52 | 100 |
| Above Rp6 - Rp8 million | 1 | 6.25 | 7 | 43.75 | 8 | **50.00** | 16 | 100 |
| Above Rp8 - Rp10 million | 1 | 14.29 | 2 | 28.57 | 4 | **57.14** | 7 | 100 |
| Above Rp10 million | 2 | 25.00 | 1 | 12.5 | 5 | **62.50** | 8 | 100 |
| | 165 | | 112 | | 173 | | 450 | |

**Table 4**
**Advanced Financial Literacy by Income Level**

| Income | Low | % | Moderate | % | High | % | Total | Total (%) |
|---|---|---|---|---|---|---|---|---|
| Up to Rp1 million | 27 | **100.00** | 0 | 0.00 | 0 | 0.00 | 27 | 100 |
| Above Rp1 - Rp2 million | 168 | **96.55** | 6 | 3.45 | 0 | 0.00 | 174 | 100 |
| Above Rp2 - Rp4 million | 152 | **91.57** | 13 | 7.83 | 1 | 0.60 | 166 | 100 |
| Above Rp4 - Rp6 million | 44 | **84.62** | 7 | 13.46 | 1 | 1.92 | 52 | 100 |
| Above Rp6 - Rp8 million | 13 | **81.25** | 3 | 18.75 | 0 | 0.00 | 16 | 100 |
| Above Rp8 - Rp10 million | 7 | **100.00** | 0 | 0.00 | 0 | 0.00 | 7 | 100 |
| Above Rp10 million | 5 | **62.5** | 1 | 12.5 | 2 | 25.00 | 8 | 100 |
| | 416 | | 30 | | 4 | | 450 | |

**Table 5**
**Basic Financial Literacy by Education Level**

| Education | Low | % | Moderate | % | High | % | Total | Total (%) |
|---|---|---|---|---|---|---|---|---|
| Never attended school | 2 | **100** | 0 | 0 | 0 | 0 | 2 | 100 |
| Does not complete primary school | 21 | **77.78** | 3 | 11.11 | 3 | 11.11 | 27 | 100 |
| Finish Primary school | 41 | **53.25** | 15 | 19.48 | 21 | 27.27 | 77 | 100 |
| Finish Secondary school | 38 | 40.43 | 25 | 26.60 | 31 | 32.98 | 94 | 100 |
| Finish Senior high school | 59 | 28.23 | 60 | 28.71 | 90 | **43.06** | 209 | 100 |
| Finish D1/D2/D3 | 2 | 9.52 | 5 | 23.81 | 14 | **66.67** | 21 | 100 |
| Finish S1 | 2 | 10 | 4 | 20 | 14 | **70.00** | 20 | 100 |
| | 165 | | 112 | | 173 | | 450 | |

The relation between the level of financial literacy and the level of income seems to be also the case for the relation between the level of financial literacy and the level of education. As can be seen in Table 5, the level of financial literacy is also positively correlated with the level of education, where those with higher education tend to have higher level of basic financial literacy, and vice versa. As is also the case when observing the level of advanced financial literacy across the level of income, most respondents tend to have low advanced financial literacy, even those with high level of education (Table 6). As suggested by Stănculescu (2010), financial illiteracy correlates with poor education, whereas high levels of financial literacy correlates with good education.

**Table 6**
**Advanced Financial Literacy by Education Level**

| Education | Low | % | Moderate | % | High | % | Total | Total (%) |
|---|---|---|---|---|---|---|---|---|
| Never attended school | 2 | **100** | 0 | 0 | 0 | 0 | 2 | 100 |
| Does not complete primary school | 26 | **96.30** | 1 | 3.70 | 0 | 0.00 | 27 | 100 |
| Finish Primary school | 76 | **98.70** | 1 | 1.30 | 0 | 0.00 | 77 | 100 |
| Finish Secondary school | 91 | **96.81** | 2 | 2.13 | 1 | 1.06 | 94 | 100 |
| Finish Senior high school | 191 | **91.39** | 16 | 7.66 | 2 | 0.96 | 209 | 100 |
| Finish D1/D2/D3 | 16 | **76.19** | 5 | 23.81 | 0 | 0.00 | 21 | 100 |
| Finish S1 | 14 | **70** | 5 | 25 | 1 | 5.00 | 20 | 100 |
| | 416 | | 30 | | 4 | | 450 | |

In terms of gender, female respondents tend to have lower basic financial literacy compared to male ones. As indicated in Table 7,the percentage of female respondents with low basic financial literacy is relatively higher than the percentage of male respondents in the same category. In contrast, the percentage of female respondents with high basic financial literacy is lower than the percentage of male respondents in the same category. In terms of advanced financial literacy, more than 90 percent of female and male respondents have low level of financial literacy, but with the higher percentage for female respondents (Table 8).

**Table 7**
**Basic Financial Literacy by Gender**

| Gender | Low | % | Moderate | % | High | % | Total | Total (%) |
|---|---|---|---|---|---|---|---|---|
| Male | 46 | 32.62 | 34 | 24.11 | 61 | **43.26** | 141 | 100 |
| Female | 119 | **38.51** | 78 | 25.24 | 112 | 36.25 | 309 | 100 |
| Total | 165 | | 112 | | 173 | | 450 | 100 |

**Table 8**
**Advanced Financial Literacy by Gender**

| Gender | Low | % | Moderate | % | High | % | Total | Total (%) |
|---|---|---|---|---|---|---|---|---|
| Male | 127 | 90.07 | 13 | 9.22 | 1 | 0.71 | 141 | 100 |
| Female | 289 | 93.53 | 17 | 5.50 | 3 | 0.97 | 309 | 100 |
| Total | 416 | | 30 | | 4 | | 450 | 100 |

**Table 9**
**Basic Financial Literacy and the Ownership of Financial Products**

| Financial Products | Low | % | Moderate | % | High | % |
|---|---|---|---|---|---|---|
| Saving account at bank | 62 | 37.58 | 56 | 50.00 | 109 | 63.01 |
| Time-Deposit account at bank | 1 | 0.61 | 0 | 0.00 | 0 | 0.00 |
| Saving account at NBFI | 14 | 8.48 | 10 | 8.93 | 22 | 12.72 |
| Time-Deposit account at NBFI | 1 | 0.61 | 1 | 0.89 | 2 | 1.16 |
| Unit link insurance | 2 | 1.21 | 1 | 0.89 | 6 | 3.47 |
| Credit card | 0 | 0.00 | 3 | 2.68 | 2 | 1.16 |
| Stock | 0 | 0.00 | 1 | 0.89 | 0 | 0.00 |
| Government/state bond (ORI, SUN, SPN) | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Private bond | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Mutual Fund | 0 | 0.00 | 0 | 0.00 | 1 | 0.58 |
| Do not have any financial product | 89 | 53.94 | 48 | 42.86 | 52 | 30.06 |

Notes: One household could have more than one financial product

**Table 10**
**Advanced Financial Literacy and the Ownership of Financial Products**

| Financial Products | Low | % | Moderate | % | High | % |
|---|---|---|---|---|---|---|
| Saving account at bank | 203 | 48.80 | 22 | 73.33 | 2 | 50.00 |
| Time-Deposit account at bank | 1 | 0.24 | 0 | 0.00 | 0 | 0.00 |
| Saving account at NBFI | 41 | 9.86 | 4 | 13.33 | 1 | 25.00 |
| Time-Deposit account at NBFI | 4 | 0.96 | 0 | 0.00 | 0 | 0.00 |
| Unit link insurance | 9 | 2.16 | 0 | 0.00 | 0 | 0.00 |
| Credit card | 4 | 0.96 | 1 | 3.33 | 0 | 0.00 |
| Stock | 1 | 0.24 | 0 | 0.00 | 0 | 0.00 |
| Government/state bond (ORI, SUN, SPN) | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Private bond | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Mutual Fund | 0 | 0.00 | 0 | 0.00 | 1 | 25.00 |
| Do not have any financial product | 180 | 43.27 | 7 | 23.33 | 2 | 50.00 |

Notes: One household could have more than one financial product

The relation between the ownership of financial products and the level of financial literacy was also investigated. Table 9 indicates that the possession of financial product is positively correlated with the level of basic financial literacy. It is also the case for the advanced financial literacy but to a much lesser extent (Table 10). This result is in line with the result of the study conducted by Cole *et al.*(2010) for the case of Indonesia and India. Their study

suggests thatone of the factors that cause limited demand for formal financial services is low level of financial education or literacy.

When we observe the advanced financial literacy level in particular, there were a high percentage of those with low level of advanced financial literacy who did not have any financial product (43.27 percent). This is a bit low for those in the moderate level, and all respondents in the high level had at least one financial product.

It is highly important to note that the ownership of sophisticated financial products is very low. There was only one respondent who had stock and mutual funds, respectively. As has been explained in the methodology section, the advanced financial literacy measures the understanding of the respondents regarding complex financial products. The result of this survey suggests very low advanced financial literacy and it is consistent with the very limited possession of the respondents of those complex financial products.

## 2. Financial Behavior and Financial Literacy

The financial behavior is presumably different across different level of financial literacy. The financial behavior that we investigated in this study is related to how the respondents keep track of their finance (such as how frequent they check their saving account balance and keeping records of household income and expenditures), money management (such as how to financial difficulties)financial planning (provision for pension funds), making choice of different types of insurances, and type of information they access to stay informed.

In the following section, some of the financial behavior is analyzed across different level of basic financial literacy. This is due to the findings that the basic financial literacy differs across respondents, while the advanced financial literacy tends to be low in almost all respondents, as has been discussed in the previous section.

## 2.1. Keep Track of Household Finance

For some types of people, it is absolutely important that they know the details of their day-to-day finances. For others, it is not absolutely necessary and they are only interested in monitoring the big figure of their funds. According to Financial Service Authority (2006), some people spend more time in keeping track of their finance and it would be an excellent place to start and could make the difference between making ends meet or not. For others, extra time might be much better spent on planning ahead or choosing products.

The behavior in keeping track is also influenced by how tightly people are living within their income. The result of the survey conducted by the Financial Service Authority (2006) in the United Kingdom suggest that the people who are best at keeping track of their money tend to be those with low income, since they need to keep track to avoid going over budget.

The result of this pilot project shows rather different result. In terms of the frequency of checking the balance account before withdrawing money, those with high basic financial

literacy tend to check their balance account before withdrawing money more frequently compared to those with lower financial literacy index. This might due to the fact that those with higher financial literacy have more income and financial products, including saving accounts, and more frequently carry out financial transactions compared to those with lower financial literacy index. They might also have better information and knowledge on different methods and media in carrying out financial transaction, such as through internet banking and SMS banking.

**Table 11**
**Frequency of Checking the Balance Account before Withdrawing Money**

|  | Low | % | Moderate | % | High | % | Total |
|---|---|---|---|---|---|---|---|
| Always | 18 | 24.00 | 22 | **36.67** | 47 | **39.17** | 87 |
| Most of the time | 17 | 22.67 | 15 | 25.00 | 22 | 18.33 | 54 |
| Sometimes | 25 | **33.33** | 14 | 23.33 | 28 | 23.33 | 67 |
| Hardly ever | 5 | 6.67 | 5 | 8.33 | 5 | 4.17 | 15 |
| Never | 10 | 13.33 | 4 | 6.67 | 18 | 15.00 | 32 |
|  | 75 | 100.00 | 60 | 100.00 | 120 | 100.00 | 255 |

There is no strong pattern, however, regarding the behavior of the respondents in keeping records of their income and expenditures with the level of financial literacy (Table 12). In all three category of financial literacy level, more than 50 percent of the respondents mentioned that they did not keep records all of income and expenditures, but they knew in general how much money they received and spent during a month. Nevertheless, the percentage of respondents who did not keep records all of income and expenditures and did not know how much money they received and spent during a month in low level of financial literacy (32.12 percent) tends to be higher than that in the moderate level of financial literacy (28.57 percent) and the high level of financial literacy(23.7 percent).

Although the number of respondents who kept records of income and expenditure was quite low in all three categories of financial literacy level, Table 12 seems to show that the higher level of financial literacy was higher, the higher the percentage of respondents who kept records of income and expenditure. The percentage of respondents in the low financial literacy level who did so was 9.09 percent, in the moderate financial literacy level was 11.61 percent. and in the high financial literacy level was 18.50 percent.

**Table 12**
**Keeping Record of Income and Expenditure**

|  | Low | % | Moderate | % | High | % | Total |
|---|---|---|---|---|---|---|---|
| Yes | 15 | 9.09 | 13 | 11.61 | 32 | 18.50 | 60 |
| No, we don't keep records all of income and expenditures, but we know in general how much money is received and spent during a month | 94 | **56.97** | 67 | **59.82** | 100 | **57.80** | 261 |
| No, we don't keep records all of income and expenditures, and we do not know how much money is received and spent during a month | 53 | **32.12** | 32 | **28.57** | 41 | **23.70** | 126 |
| Others | 3 | 1.82 | 0 | 0.00 | 0 | 0.00 | 3 |
|  | 165 | 100.00 | 112 | 100.00 | 173 | 100.00 | 450 |

## 2.2. Money Management and Planning Ahead

The result of this survey shows that out of 114 respondents who had household business (self-employed), around 66 percent had experienced difficulties in financing their business. In managing the business financial difficulties, 32.72 percent borrowed from non-financial institutions (such as relatives, friends, neighbors, or rotating saving and credit association/RoSCA), 21.6 percent cut down their business expenses, 12.35 percent withdrew their saving and time deposit, and only 11.11 percent borrowed from bank (Figure 6). A small portion of the respondent borrowed from the money lenders, went to pawn shop, and sold their household assets.

The behavior in managing business financial difficulties show different pattern across level of basic financial literacy (Table 13). Those with low and moderate level of financial literacy preferred to cut down their business expenses and borrowed from non-financial institutions. Meanwhile, those with high level of financial literacy preferred to borrow from bank, borrow from non-bank financial institution, and cut down their business expenses. This result indicates that there was a tendency to start moving to formal financial institution in financing business difficulties when the respondents had high financial literacy.

**Figure 6**
**Methods to Solve Business Financing Difficulties**
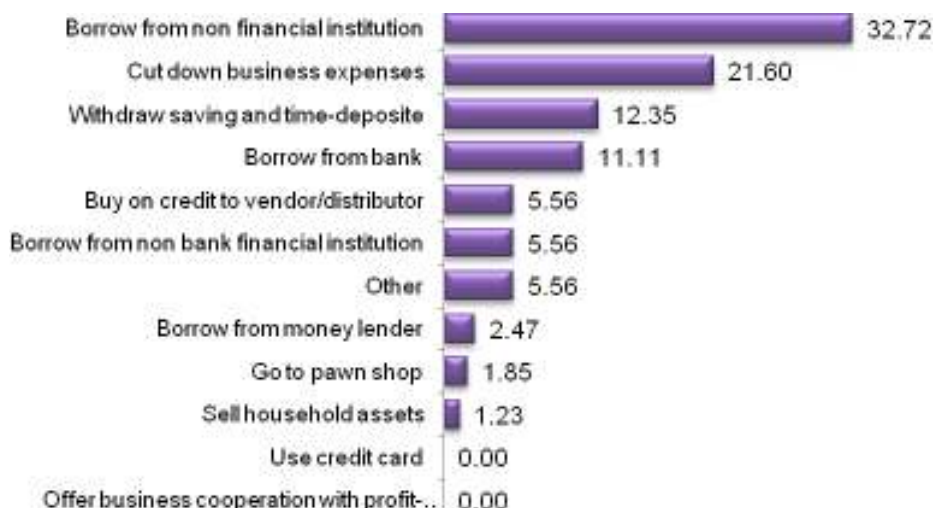


This finding is quite consistent with the case of Romania, studied by Stănculescu (2010). Stănculescu (2010) found that the three main strategies used to manage the running short of money are cut down expenditures, borrow money (with no interest) from relatives and friends, and buy informally (on credit) from the shops.

**Table 13**
**Methods to Solve Business Financing Difficulties across Different**
**Financial Literacy Level**

|  | Low | % | Moderate | % | High | % |
|---|---|---|---|---|---|---|
| Cut down business expenses | 11 | **26.83** | 8 | **22.86** | 7 | **18.92** |
| Borrow from bank | 3 | 7.32 | 2 | 5.71 | 10 | **27.03** |
| Borrow from non bank financial institution (cooperatives, BMT, LPD, BKK) | 0 | 0.00 | 0 | 0.00 | 4 | 10.81 |
| Borrow from family, friends, employer/office, neighbor, or RoSCA | 10 | **24.39** | 18 | **51.43** | 9 | **24.32** |
| Borrow from money lender | 0 | 0.00 | 1 | 2.86 | 1 | 2.70 |
| Withdraw saving and time-deposit, sell stock/bond | 5 | 12.20 | 5 | 14.29 | 3 | 8.11 |
| Sell household assets | 0 | 0.00 | 0 | 0.00 | 1 | 2.70 |
| Go to pawn shop | 1 | 2.44 | 0 | 0.00 | 1 | 2.70 |
| Offer business cooperation with profit-sharing scheme to friends/relatives/others | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Use credit card | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Buy on credit to vendor/distributor | 6 | 14.63 | 0 | 0.00 | 0 | 0.00 |
| Others | 5 | 12.20 | 1 | 2.86 | 1 | 2.70 |
|  | 41 | 100.00 | 35 | 100 | 37 | 100 |

**Figure 7**
**Methods to Solve Daily Financing Difficulties**

| | |
|---|---|
| Borrow from non financial institution | 29.64 |
| Cut down expenses | 28.96 |
| Withdraw saving and time-deposit | 8.52 |
| Buy on credit in store or small shop | 6.98 |
| Borrow from non bank financial institution | 6.47 |
| Take additional jobs | 5.11 |
| Other | 4.43 |
| Go to pawnshop | 2.56 |
| Sell household assets | 2.21 |
| Borrow from bank | 2.04 |
| Increase the working time | 1.53 |
| Borrow from money lender | 1.53 |
| Use credit card | 0.00 |
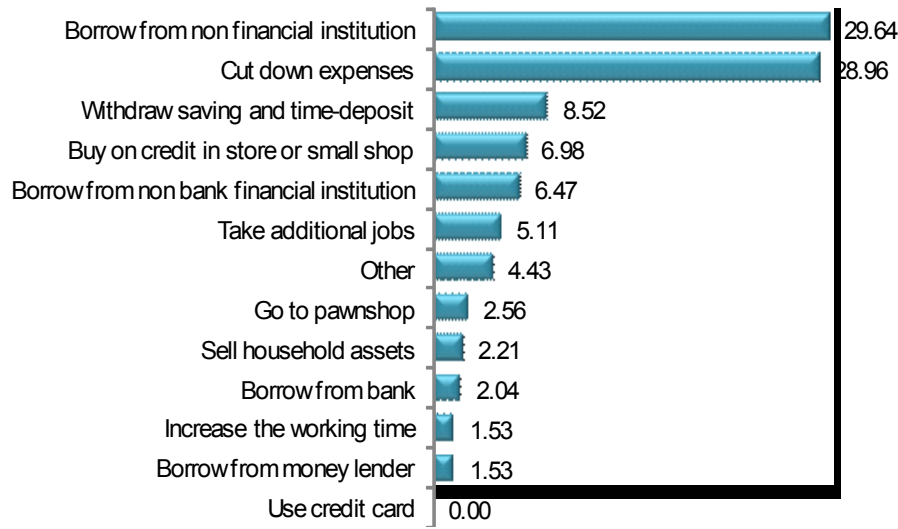
Out of 450 respondents, 351 respondents (78 percent) had experienced difficulties in financing their daily expenditures. Rather similar to the way the respondents managed the difficulties in business financing, the respondents also tended to borrow from non-financial institutions (29.64 percent) and cut down their daily expenses (28.96). Other methods but to a lesser percentage are withdrew saving and time-deposit, bought on credit in store or small shop, borrowed from non-bank financial institution and took additional jobs (Figure 7).

Rather different to the behavior of respondents in managing business financial difficulties, the behavior of respondents in managing daily financial difficulties show similar pattern across level of basic financial literacy (Table 14). Respondents in three categories tended to cut down their daily expenses and borrowed from non-financial institutions. It is important to note those with high financial literacy had put the formal institutions (banks) as the main source of business finance, but when it comes to the difficulties in daily expenditures they still preferred to cut down their expenses and borrow from non-financial institutions.
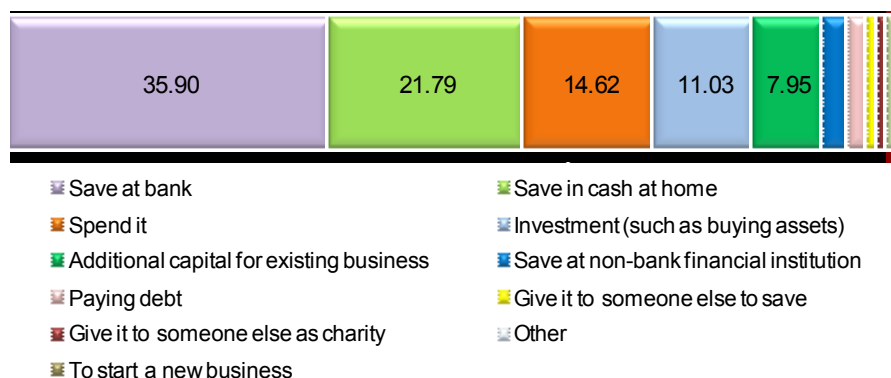
**Table 14**
**Methods to Solve Daily Financing Difficulties across Different Financial**
**Literacy Level**

| | Low | % | Moderate | % | High | % |
|---|---|---|---|---|---|---|
| Cut down expenses | 53 | 36.30 | 28 | 31.11 | 43 | 37.39 |
| Borrow from bank | 0 | 0.00 | 0 | 0.00 | 4 | 3.48 |
| Borrow from non-bank financial institution (cooperatives, BMT, LPD, BKK) | 8 | 5.48 | 4 | 4.44 | 13 | 11.30 |
| Borrow from non-financial institution | 53 | 36.30 | 30 | 33.33 | 28 | 24.35 |
| Borrow from money lender | 2 | 1.37 | 0 | 0.00 | 2 | 1.74 |
| Withdraw saving and time-deposit, sell stock/bond | 8 | 5.48 | 9 | 10.00 | 4 | 3.48 |
| Sell household assets | 5 | 3.42 | 0 | 0.00 | 1 | 0.87 |
| Go to pawnshop | 2 | 1.37 | 2 | 2.22 | 4 | 3.48 |
| Buy on credit in store or small shop | 5 | 3.42 | 6 | 6.67 | 7 | 6.09 |
| Use credit card | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Increase the working time | 0 | 0.00 | 0 | 0.00 | 2 | 1.74 |
| Take additional jobs | 4 | 2.74 | 4 | 4.44 | 4 | 3.48 |
| Others | 6 | 4.11 | 7 | 7.78 | 3 | 2.61 |
| | 146 | 100.00 | 90 | 100.00 | 115 | 100.00 |

Although a high percentage of the respondents did have experience difficulties in financing their daily expenditures in some point of their lives within the past 12 months, it does not mean that they experienced financial difficulties all the times. Instead, around 58 percent respondents mentioned that they hadextra/spare money from their incomes. When it comes to allocating the extra money, the respondents seemed to prefer to save at banks (35.9 percent) but a quite high proportion still kept the money in cash at home (21.79 percent). In addition, around 14.62 percent chose to spend the extra money, 11.03 percent chose to buy household assets as an investment, and 7/95 percent used it as additional capital for their existing household business (Figure 8).

This finding is quite in line with the case of Romania (Stănculescu, 2010) where 35 percent of the population remains with unspent money from month to month. Most of them (75 percent) keep the spare money in cash at home, 25 percent deposit them in a bank account, 7 percent invest in a business and less than 2 percent invest in the capital market.

**Figure 8**
**Methods to Allocate Extra Money**



| | |
|---|---|
| ▦ Save at bank | ▦ Save in cash at home |
| ▦ Spend it | ▦ Investment (such as buying assets) |
| ▦ Additional capital for existing business | ▦ Save at non-bank financial institution |
| ▦ Paying debt | ▦ Give it to someone else to save |
| ▦ Give it to someone else as charity | ▦ Other |
| ▦ To start a new business | |

**Table 15**
**The Possession of Pension Funds**

| Category | Have Pension Funds | Do Not Have Pension Funds | Total |
|---|---|---|---|
| Low | 9 | 156 | 165 |
| % | 5.45% | 94.55% | 100% |
| Moderate | 14 | 98 | 112 |
| % | 12.50% | 87.50% | 100% |
| High | 21 | 152 | 173 |
| % | 12.14% | 87.86% | 100% |

The stipulation of the civil service pension law in 1969 and the introduction of tax incentive for pensions through Law No 7/1983 created interests among social organizations and state owned enterprises to provide pensions to their employees. Nevertheless, a large portion of the population is still not covered by the current pension arrangements. Only about 12 percent of the total labor force is covered and much of the formal sector and the entire informal sector are not covered (Bapepam LK, 2012).

The result of this survey also indicate similar finding, where the possession of the pension fund is very low, even for those with moderate and high financial literacy (Table 15). This is particularly worse for those with low financial literacy, where there wereonly 5.45 percent respondents who already had pension funds.

Out of 406 respondents who did not have any pension funds, around 55.71 percent mentioned the lack of funds to pay the premium as the main reason for not having any pension funds. A high percentage also said that they did not understand about the pension funds (18.72 percent), 7.99 percent were not interested to have any pension funds, and 3.88 percent perceived that they did not need it yet (Figure 9). This is consistent with the result of a survey conducted in Indonesia and India by Cole *et al.* (2010) who found that the main reason for not having any pension fund is the lack of

money and do not understand the products or do not see any advantages. Despite the fact that the lack of money is the main reason for the respondents to not having any pension funds, this result suggests that there is a large room for the government to improve the knowledge of Indonesian society and their awareness regarding the high importance of having pension funds for their future.

**Figure 9**
**Reasons for not Having Pension Funds**



| Reason | Percent |
|---|---|
| Do not have money to pay the premium | 55.71 |
| Do not understand the products/do not see any advantages | 18.72 |
| Not interested in the product | 7.99 |
| Other | 7.99 |
| Do not need it yet | 3.88 |
| My office does not provide the product | 2.51 |
| The registration procedure is too complicated | 1.37 |
| It is difficult to file an insurance claim | 0.91 |
| Do not trust to the product | 0.91 |
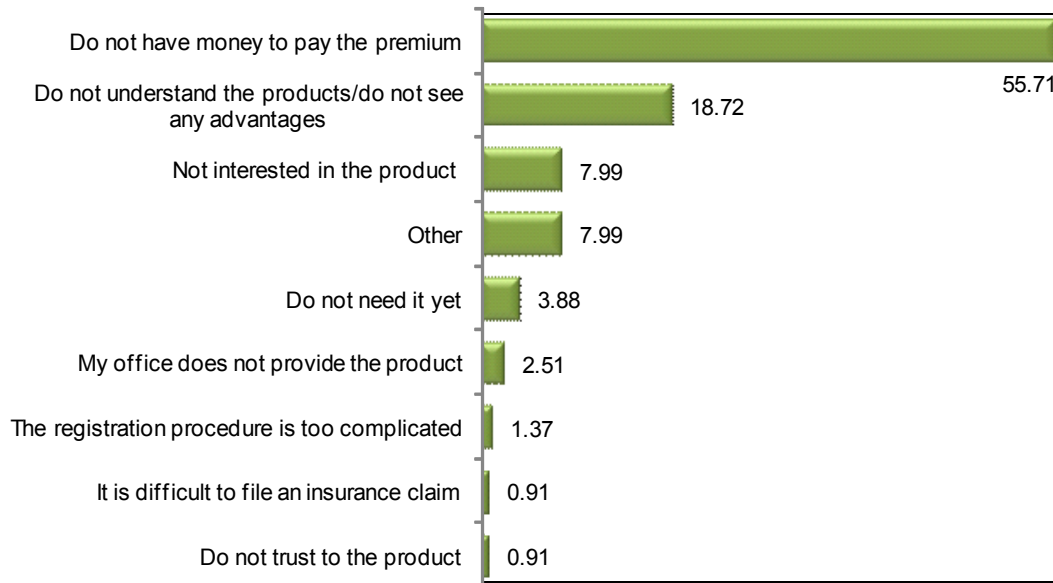
## 2.3. Making Choice

In choosing financial products, the financial institution reputation was the main important aspect considered by 32.69 percent of 294 respondent having formal financial products. A rather lesser percentage considered the suggestion from their friends, relatives, and colleagues (19.82 percent), the way the bank's staff treat them (17.01 percent), and the administration fee (14.35 percent), such as depicted in Figure 10.

**Figure 10**
**Factor of Consideration when Choosing Financial Product by Providers**



| | |
|---|---|
| Financial institution reputation | 32.69 |
| Suggestion from friends/relatives/colleague | 19.82 |
| The way bank's staff treat you | 17.01 |
| Administrastration fee | 14.35 |
| Interest rate | 6.51 |
| Other | 5.33 |
| Gift | 2.07 |
| The condition of financial institution building | 1.63 |
| Advertisement | 0.59 |
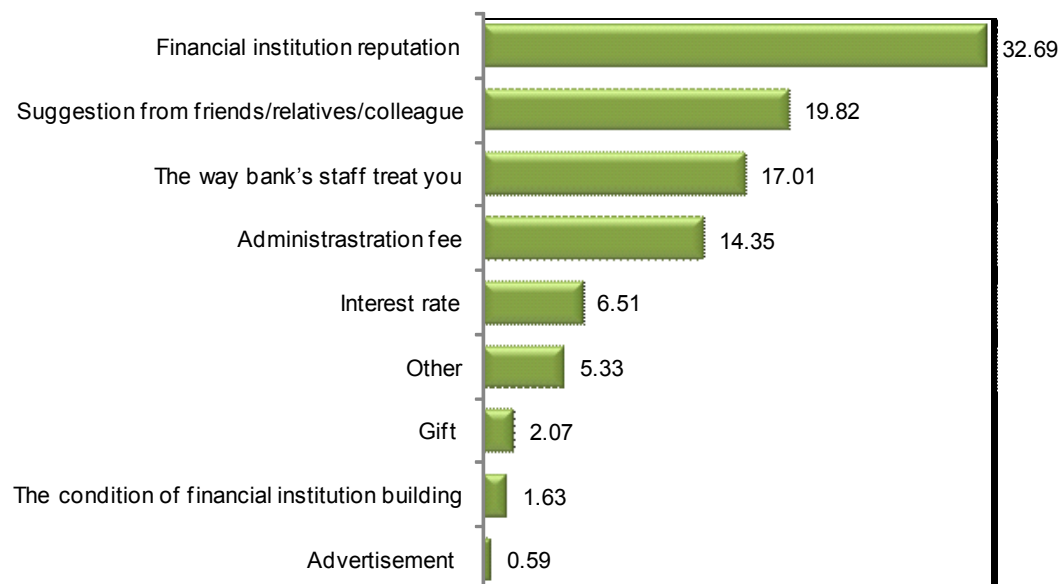
**Table 16**
**The Possession of Financial Products**

| Financial Products | No. Respondents | % |
|---|---|---|
| Saving account at bank | 227 | 50.44 |
| Time-Deposit account at bank | 1 | 0.22 |
| Saving account at NBFI | 46 | 10.22 |
| Time-Deposit account at NBFI | 4 | 0.89 |
| Unit link insurance | 9 | 2.00 |
| Credit card | 5 | 1.11 |
| Stock | 1 | 0.22 |
| Government/state bond (ORI, SUN, SPN) | 0 | 0.00 |
| Private bond | 0 | 0.00 |
| Mutual Fund | 1 | 0.22 |
| Do not have any financial product | 189 | 42.00 |

Saving account was the most common financial products owned by the respondents of this pilot survey. As presented in Table 16, the percentage of respondents having saving account at the bank and non-bank financial institution was 50.44 percent and 10.22 percent, respectively. A very small percentage of the respondents owned unit-link insurance, credit card, time deposit, stock, and mutual funds.

While the survey was conducted in three comparatively big cities in Indonesia, Table 16 also indicates a quite low financial inclusion in terms of the possession of financial products where the number of respondents without any financial products was 42 percent. This number might be much higher in rural areas. As has been discussed in previous section (Table 9 and Table 10), the possession of these financial products is positively related with the level of financial literacy.

**Table 17**
**The Possession of Insurances and Pension Funds**

| Insurance and Pension Fund | Low | % | Moderate | % | High | % |
|---|---|---|---|---|---|---|
| Life Insurance | 5 | 13.51 | 9 | 15.25 | 15 | 12.50 |
| Accident Insurance | 3 | 8.11 | 4 | 6.78 | 7 | 5.83 |
| Health Insurance | 13 | 35.14 | 20 | 33.90 | 47 | 39.17 |
| House Insurance | 0 | 0.00 | 0 | 0.00 | 4 | 3.33 |
| Jewelry Insurance | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Car Insurance | 2 | 5.41 | 11 | 18.64 | 20 | 16.67 |
| Agricultural Insurance | 0 | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Educational Insurance | 5 | 13.51 | 1 | 1.69 | 6 | 5.00 |
| Pension Fund | 9 | 24.32 | 14 | 23.73 | 21 | 17.50 |
| Total | | 100.00 | | 100.00 | | 100.00 |

We also take a closer look at the behavior of the household in choosing types of insurances and pension funds in particular (Table 17). The ownership of several types of insurances and pension funds shows rather similar pattern among levels of basic financial literacy. In all three categories of financial literacy, respondents tended to own health insurance, pension funds, and life insurance. A quite high percentage of those in the moderate and high level of financial literacy also possessed car insurances. Those who owned car insurances suggest that they had quite high income. This is consistent with the previous conclusion that the level of basic financial literacy is positively correlated with the level of income. The study of Stănculescu (2010) confirms similar finding. Stănculescu (2010) concluded that the higher a person's level of financial literacy, the higher his/her probability to hold insurance product.

**2.4. Staying Informed**

Television is the main source of information for most respondents in this survey, as has been discussed in earlier section. Regarding the type of information followed by the respondents, 91.11 percent respondents followed entertainment programs (such as films, soap opera, music), 79.33 percent followed celebrity lives, and 74.89 percent followed criminal information. Nevertheless, Table 18 shows that those with low financial literacy tended to prefer those three types of programs at a higher extent compared to those in the moderate and high level of financial literacy. In particular, those with high financial literacy also find it necessary to also follow economy and finance, politics, and social news.

**Table 18**
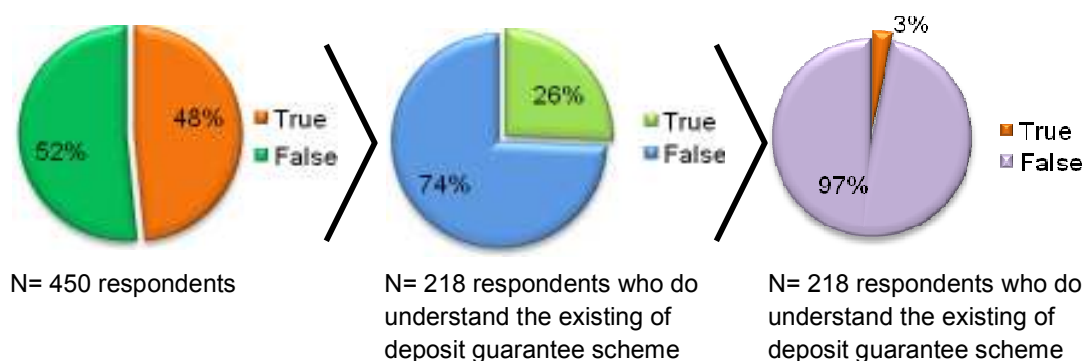**Types of Information Followed by Respondent**

|  | Low | % | Moderate | % | High | % | Total |
|---|---|---|---|---|---|---|---|
| Economy and finance | 71 | 10.41 | 58 | **11.39** | **109** | **13.44** | 238 |
| Politics | 61 | 8.94 | 54 | 10.61 | 98 | **12.08** | 213 |
| Social | 70 | 10.26 | 59 | **11.59** | 95 | **11.71** | 224 |
| Custom/Culture | 71 | 10.41 | 60 | **11.79** | 82 | 10.11 | 213 |
| Celebrity lives | 125 | **18.33** | 83 | **16.31** | 129 | **15.91** | 337 |
| Entertainment/ film/ soap opera/ music | 152 | **22.29** | 98 | **19.25** | 160 | **19.73** | 410 |
| Criminal information | 130 | **19.06** | 96 | **18.86** | 131 | **16.15** | 357 |
| Other | 2 | 0.29 | 1 | 0.20 | 7 | 0.86 | 10 |
|  |  | 100 |  | 100 |  | 100 |  |

## 3. Knowledge on Deposit Guarantee Scheme

This pilot project also tried to identify how familiar the respondents with the system of deposit guarantee in Indonesia. A specific section in the questionnaire asked each respondent whether they know that bank deposits are guaranteed by the government. For those who answered yes, we asked whether they knew what institution responsible for providing the deposit guarantee and the maximum amount of the bank deposit that is guaranteed.

The pilot survey suggests very striking findings. First, out of 450 respondents, there was only 48 percent (218 respondents) who knew that the bank deposit is guaranteed by the government. Second, out of the 218 respondents, there was only 26 percent who could identify the institution that is responsible for guaranteeing the bank deposit and only 3 percent who could mention the exact maximum amount of bank deposit that is guaranteed (Figure 11).

**Figure 11**
**Respondents Knowledge on Deposit Guarantee Scheme**



N= 450 respondents

N= 218 respondents who do understand the existing of deposit guarantee scheme

N= 218 respondents who do understand the existing of deposit guarantee scheme

## Conclusion and Policy Recommendation

The main purpose of developing Indonesian financial literacy index is to test the methodology in constructing financial literacy index that is practical to be implemented in Indonesia and comparable to the FLI in other countries and is expected to be used further by related stakeholders. The methodology constructed in this pilot project shows robust result and well tested. The use of the methodology developed by using the factor analysis is therefore strongly recommended. Although the survey was only conducted in three cities and limited number of respondents, the survey results seem to provide findings which are consistent with several other surveys and prove several general assumptions associated with the level of financial literacy of a society.

The results of the survey highlight a modest financial knowledge among sample respondents in the sample areas. The basic financial literacy was quite diverse across respondents, according to the level of education, level of income, and gender, but the advanced financial literacy of most respondents was very low. In general, the higher the education and income level, the higher the basic financial literacy. Male respondents in general have higher basic financial literacy compared to female ones. The result of the survey also shows the correlation between very low ownership of complex financial products such as stocks, bonds, and mutual funds, with the also very low advanced financial literacy.

The findings of this pilot survey have important policy implications. This pilot project suggests that there is a large room for improvement in influencing the financial behavior and financial knowledge of the Indonesian population, which is expected to further improve their financial literacy. The improved financial literacy is expected to improve the capability of the population in managing their finance and their productive activities and income. The improved income will enable them to save more, improve their well-being and their participation in formal financial market. A more inclusive financial market will contribute significantly to the economic growth. The financial market will be more self reliance with the increased domestic financial sources. The economy will be more resilient and less vulnerable to external funding shocks.

The effort to improve the level of financial literacy could follow a systematic path. In order to formulate effective financial education programs, the stakeholders are suggested to carry out

baseline survey and calculate the FLI using the developed FLI methodology in this pilot project. The result of baseline survey could serve as a basis for setting the targets to achieve and what programs to be implemented for each segment of society (that could be based on their level of financial literacy). The result of the pilot project suggests that financial education programs are likely to be more effective when targeted to specific groups of the population. The methodology developed in this pilot project could also be used as a tool to monitor the progress of the financial education programs. Therefore, follow-up surveys should also be conducted to measure the effectiveness of the programs and to measure whether the targets could be achieved. Should this pattern is followed and the measurement is conducted regularly, the financial education programs in Indonesia will be more well-planned, effective and well-structured.

Although the respondents have low level of education and financial literacy, they still have the potential to acquire various formal financial product and sophisticated investment instrument. This is because their financial decision might also be influenced by other household members, who could possibly have higher level of education and financial literacy.

In designing the survey, it is suggested to focus on the households, and not on individual level. This is due to the nature of household in Indonesia where there is burden sharing among the household members, including in the household finance. Therefore, although each household member might have different level of financial literacy, the financial decision of a household is more likely to be influenced not only influenced by an individual in the household but also by other household members.

In disseminating important financial education, the stakeholders could use the channel of information that the society accesses the most. The financial education programs should also be integrated into programs that they like to stay tuned (either by watching, reading, or hearingsource of information)in order to improve the level of conveyance and make effective the transmission of information. One particular information that should be effectively disseminated to the society is the information regarding deposit insurance system in Indonesia, not only to improve the level of trust of society to the bank and formal financial system, but also to improve the level of access to finance.

The result of this pilot survey indicates that the financial education programs should not be designed a stand-alone program. Rather, there is an urgent need to integrate the financial education program into the national financial education system, starting from elementary school to college/university. This will encourage maximum participation of all aspect of community, from family, private sector, and government.

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# APPENDIX

## METHODOLOGY OF CONSTRUCTING AN FLI SCORE

# METHODOLOGY OF CONSTRUCTION AN FLI SCORE

This part will discuss the methodology of constructing Financial Literacy Index (FLI) score for the data resulted from the Financial Literacy Pilot Survey. There are several different methods in calculating FLI. Bumcrot, Lin, and Lusardi (2011) constructed an index of financial literacy based on the number of correct answers provided by each respondent to the five financial literacy questions. Those five financial literacy questions are: (1) interest rates, (2) inflation, (3) the workings of risk diversification, (4) the relationship between bond prices and interest rates, and (5) the relationship between interest payments and maturity in mortgages. An individual answering all five of the questions correctly has a financial literacy index of 5 and an individual answering none of the five questions correctly has a financial literacy index of 0.

Van Rooij *et al.* (2007) and Lusardi (2008) classify the level of financial literacy into the basic financial literacy and the advanced financial literacy. Lusardi measured the basic financial literacy by devising questions such as the working of interest rates, the effects of inflation, and the concept of risk diversification. The advanced financial literacy encompasses the understanding about the relationship between risk and return; how bonds, stocks, and mutual funds work; and basic asset pricing.

Meanwhile, Kempson *et al*. (2005) shows that financial capacity is related to four domains of behaviour, i.e. (1) managing money; (2) planning ahead; (3) making choices and (4) getting help. Kempson *et al*. (2005) concludes that financially capable people are: (1) well organized, keep control over their financial resources, make ends meet resisting pressure to spend or borrow money and budget unexpected expenditure; (2) able to deal with a large fall in income and unexpected events, make provision for long term (save money and plan for retirement), know how and where to seek advice and help; (3) aware, confident and able to choose between the available financial products; (4) able to find and compare information for themselves and know where and when to turn for advice and help from a third party. The above four behaviour domains are frequently referred by surveys and research on financial literacy, such as the baseline survey of financial capability in the United Kingdom (Atkinson *et al.*, 2006) and in the Romania (Stănculescu, 2010).

The basic concept of financial literacy that was used to develop the financial literacy questionnaire in this project referred to the concept and measurement of financial literacy of Kempson *et al.* (2005), Atkinson *et al.* (2006), van Rooji *et al.* (2007), Lusardi (2008), Stănculescu (2010). Meanwhile, the methodology in constructing financial literacy index (FLI) refers to Bumcrot, Lin, and Lusardi (2011), Atkinson *et al*. (2006), van Rooji *et al.*, (2007) and OECD (2008). Figure A1 shows the general process of constructing FLI score in this survey.

**Figure A1**

**General Process of Constructing FLI**
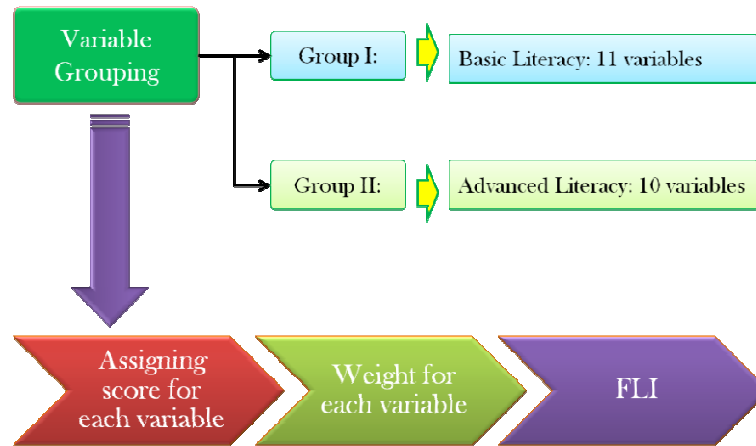


The methodology involves 4 (four) steps, i.e. 1) variable grouping; 2) assigning score for each variable; 3) calculating weight for each variable; and 4) constructing financial literacy index. Each of those processes is briefly explained as follows:

## 4. Variable Grouping

We classified the financial literacy variables into two groups, i.e. basic financial literacy and advanced financial literacy. Basic financial literacy group consisted of 11 variables related to: 1) Knowledge on formal financial product, such as requirement of opening saving account (requirement of ID, minimum amount of money to open bank account, and minimum balance on bank account) and total number deposit guaranteed by government; 2) Numeracy regarding finance such as simple interest, compounded interest, calculate interest on loan; and 3) Basic concept of inflation, discount, time value of money, and money illusion.

Meanwhile, the advanced financial literacy groups covered the knowledge about the function of stock market, interest rate and bond price, returns on stock versus bond, risk of bond and stock, the meaning of buying stock, the meaning of buying bond, penalty when selling bond before maturity, which investment give the highest return, which investment produces the highest return fluctuation, and asset diversification. The variables of the basic and advanced financial literacy are presented in Table A1.

**Table A1**

**Basic and Advanced Financial Literacy Variables**

| Variable | Variable Explanation | Code of Question | Question in the Questionnaire |
|---|---|---|---|
| **Basic Literacy Group** | | | |
| id | Requirement of ID | E.1. | Do you need ID card such as National Identity Card (*Kartu Tanda Penduduk*/ KTP) or driver license when you open a savings account at a bank? |
| intial_dpst | Minimum amount of money to open saving account | E.2. | Do you have to deposit certain amount of money as an initial deposit to open a savings account at a bank? |
| min_balance | Minimum balance on saving account | E.3. | Does a saving account generally have a minimum balance? |
| guarantee | Deposit guaranteed by government | E.6. | If a citizen has a deposit in a bank and the bank becomes bankrupt, will the government guarantee his/her saving/deposit? |
| interst1 | Simple interest | E.9. | Suppose you have saving account of Rp1,000,000 with interest 4% per annum. (Assuming that you do not pay administrative fees and you do not deposit nor withdraw any money from your account). After exactly one year, how much money will you have in your account (including interest)? |
| intrest2 | Compounded interest | E.10. | Suppose you have saving account of Rp1,000,000 with interest 4% per annum. (Assuming that you do not pay administrative fees and you do not deposit nor withdraw any money from your account). After exactly two years, how much money will you have in your account (including interest)? |
| loan_intrest | Calculate interest on loan | E.11. | Let's assume that you took a bank credit of Rp1,000,000 to be paid back during a year. The credit charge is Rp50,000. Please give a rough estimate of the annual interest rate on your credit. |
| dscount | Inflation | E.12. | Let's assume that you saw a TV-set of the same model on sales at two different shops. The initial retail price of it was Rp2,000,000. Shop A offered a discount of Rp250,000, while Shop B offered a 10% discount. Which shop offered a better bargain? |
| infltion | Discount | E.13. | Imagine that the interest rate on your savings account is 1% per annum and inflation is 2% per annum. After exactly 1 year, how many good and services would you be able to buy with the money in your saving account? |

| Variable | Variable Explanation | Code of Question | Question in the Questionnaire |
|---|---|---|---|
| time_value | Time value of money | E.14. | Assume you inherit Rp10.000.000 today and your sister/brother will inherit Rp10.000.000 3 years from now. Who is richer because of the inheritance in real term? |
| money_illusion | Money illusion | E.15. | Suppose that in the year 2014, your income has doubled than 2013 and prices of all goods have doubled too. How many good and services will you be able to buy with your income in the 2014? |
| **Advanced Literacy Group** | | | |
| stck_mrkt_fnction | Function of stock market | E.16. | Which of the following statements describes the main function of the stock market? |
| bond_intrest | Interest rate and bond price | E.17. | If the interest rate falls, what should happen to bond prices? |
| stck_mutualfnd | Returns on stock versus bond | E.18. | Buying a company stock usually provides a safer return than mutual fund/bond. |
| bond_stck | Risk of bond and stock | E.19. | According to your opinion, are bonds normally riskier than stocks? |
| buy_stck | The meaning of buying stock | E.20. | Which of the following statements is correct? If somebody buys the stock of firm B in the stock market, then… |
| buy_bond | The meaning of buying bond | E.21. | Which of the following statements is correct? If somebody buys a bond of firm B, then … |
| sell_bond | Penalty when selling bond before maturity | E.22. | True or false, if you buy a 10-year bond, it means you cannot sell it after 5 years without incurring a major penalty. |
| retrn | Which investment give the highest return | E.23. | Considering a long time period, which asset normally gives the highest return? |
| retrn_voltilty | Which investment produce the highest return fluctuation | E.24. | Normally, which asset displays the highest fluctuations of return over time? |
| asset_dvrsfction | To put or not to put your investments into one basket | E.25. | When an investor spreads his money among different assets, does the risk of losing money will … |

Source: Please see Table A.2

**Table A2.**

**Excerpt Questions on Financial Literacy**

| I.  Basic Financial Knowledge |
|---|
| [E] For No .E.1 – E.3, here we would like to ask you some questions. Please answer with **Yes** or **No**.If you don't know please reply with **do not know** |
| E.1 Do you need ID card such as **National Identity Card (*Kartu Tanda Penduduk*/ KTP) or driver license** when you open a savings account at a bank?<br>1. Yes　　　　　2. No　　　　　98.Do not know |
| E.2 Do you have to deposit **certain amount of money** as an **initial deposit** to open a savings account at a bank?<br>1. Yes　　　2. No　　　　98.Do not know |
| E.3. Does a saving account generally have a **minimum balance**?<br>1. Yes　　　2. No　　　　98.Do not know |
| **Case Study** |
| E.6. If a citizen has a deposit in a bank and the bank becomes bankrupt, will the government guarantee their saving/deposit?<br>　　1. Yes→Go to No. E.7.　　2.No→Go to No. E.9　　98.Do not know→Go to No. E.9 |
| **Numeracy [E] Use Show Card page.26, No.E.9.**<br>E.9. Suppose you have saving account of **Rp1,000,000** with **interest 4% per annum**. (Assuming that you **do not pay administrative fees** and **you do not deposit nor withdraw** any money from your account). **After exactly one year**, how much money will you have in your account (including interest)?<br>　1.　More than Rp1,040,000　　　　98. Do not know<br>　2.　ExcatlyRp1,040,000　　　　　99. Refuse to answer<br>　3.　Less than Rp1,040,000 |
| **[E] Use Show Card page. 26, No.E.10.**<br>E.10.　Suppose you have saving account of **Rp1,000,000** with **interest 4% per annum**. (Assuming that you **do not pay administrative fees** and **you do not deposit nor withdraw** any money from your account). **After exactly two years**, how much money will you have in your account (including interest)?<br>　1.　More than Rp1,080,000　　　　98. Do not know<br>　2.　Exactly Rp1,080,000　　　　　99. Refuse to answer<br>　3.　Less than Rp1,080,000 |
| **[E] Use Show Card Page. 27, No.E.11.**<br>E.11. Let's assume that you took a bank **credit** of **Rp1,000,000to be paid back during a year**. The **credit** |

**charge is Rp50,000**. Please give a rough estimate of the annual interest rate on your credit.

1. …………………………% 98. Do not know 99. Refuse to answer

---

**Discount [E] Use Show Card page.27, No.E.12.**

E.12. Let's assume that you saw a TV-set of the same model on sales in two different shops. The initial retail price of it was Rp2,000,000. Shop A offered a discount of Rp250,000, while Shop B offered a 10% discount. Which shop offered a better bargain?

1. Shop A 98. Do not know
2. Shop B
3. Shop A offered bargain as good as Shop B 99. Refuse to answer

---

**The rises of general price of goods (Inflation). [E] Use Show Card page. 28, No.E.13.**

E.13. Imagine that the **interest rate** on your savings account was **1% per annum** and **inflation** was **2% per annum**. **After exactly 1 year**, how many good and services would you be able to buy with the money in your account?

1. More than today 98. Do not know
2. Exactly the Same 99. Refuse to answer
3. Less than today

---

**Time value of money[E] Use Show Card page.28, No.E.14.**

E.14. Assume you inherit Rp10.000.000 today and your sister/brother will inherit Rp10.000.000 3 years from now. Who is richer because of the inheritance in **real term**?

1. You 98. Do not know
2. Your's Brother/Sister 99. Refuse to answer
3. Equally rich

---

**Money Illusion [E] Use Show Card page.28, No.E.15.**

E.15. Suppose that in the year 2014, your income has doubled than 2013 and prices of all goods have doubled too. How many good and services will you be able to buy with your income in the 2014?

1. More than 2013 98. Do not know
2. Exactly same 99. Refuse to answer
3. Less than 2013

| II. Advance financial knowledge |
| --- |

E.16. Which of the following statements describes the main function of the stock market?

**[E] Use Show Card page. 29, No.E.16.**

1. The stock market helps to predict stock earnings
2. The stock market results in an increase in the price of stocks
3. The stock market brings people who want to buy stocks together with those who want to sell stocks
4. None of the above
98. Do not know

---

E.17. If the **interest rate falls**, what should happen to **bond prices**?

1. Rise
2. Fall
3. Stay the same

4. None of the above
98. Do not know
99. Refuse to answer

---

E.18. Buying a company stock usually provides a safer return than mutual fund/bond.

1. True
2. False

98. Do not know
99. Refuse to answer

---

E.19. According to your opinion, are bonds normally riskier than stocks?

1. Yes
2. No, Stock riskier than Bond
3. Both of them have the same risk

4. None of the above
98. Do not know
99. Refuse to answer

---

E.20. Which of the following statements is correct? If somebody buys the stock of firm B in the stock market, then… **[E] Use Show Card page. 29, No.E.20.**

1. He owns a part of firm B
2. He has lent money to firm B
3. He is liable for firm B's debts
4. None of the above
98. Do not know
99. Refuse to answer

---

E.21. Which of the following statements is correct? If somebody buys a bond of firm B, then …

**[E] Use Show Card page. 29, No.E.21.**

1. He owns a part of firm B
2. He has lent money to firm B
3. He is liable for firm B's debts
4. None of the above
98. Do not know
99. Refuse to answer

| | |
|---|---|
| E.22. Trueor false, if you **buy a 10-year bond**, it means you cannot sell it after 5 years without incurring a major penalty. | |
| 1. True | 97. Do not know |
| 2. False | 99. Refuse to answer |

| | | |
|---|---|---|
| E.23. Considering a long time period, which asset normally gives the highest return? | | |
| **[E] Use Show Card page. 30, No.E.23.** | | |
| 1. Saving | 3. Stock | 99. Refuse to answer |
| 2. Bond | 98. Do not know | |

| | | |
|---|---|---|
| E.24. Normally, which asset displays the highest fluctuations of return over time? | | |
| **[E] Use Show Card page. 30, No.E.24.** | | |
| 1. Saving | 3. Stock | 99. Refuse to answer |
| 2. Bond | 98. Do not know | |

| | | |
|---|---|---|
| E.25. When an investor spreads his money among different assets, does the risk of losing money will … | | |
| **[E] Use Show Card page. 30, No.E.25.** | | |
| 1. Rise | 3. Stay the same | 99. Refuse to answer |
| 2. Fall | 98. Do not know | |

## 5. Assigning score for each variable

For each variables in Table A1, we assigned a score of 1 for correct answer, and 0 for otherwise (including incorrect answer, do not know, and refuse to answer).

## 6. Calculate Weight to Each Variable

In developing the FLI, We sought commonly used approached and maintained the comparability of the methodology to previous studies. We measured FLI by using two different weighting methods, i.e. Simple Weight Method and Factor Analysis Method.

a. Simple Weight Method

Under this approach, each variable in each variable group was given equal weight, such as employed by Bumcrot, Lin, and Lusardi (2011). Therefore, the weight for each variable in the Basic Financial Literacy Group follows the following formula:

$$Simple\_basic\_W_i = \frac{1}{N}$$

where:

Simple_basic_W$_i$ :     the weight for variable *i* in the Basic Financial Literacy Group

N:                          the number of variables in the Basic Financial Literacy Group

Meanwhile, the weight for each variable in the Advanced Financial Literacy Group follows the following formula:

$$Simple\_advanced\_W_j = \frac{1}{M}$$

where:

Simple_advanced_W_j :      the weight for variable *j* in the Advanced Financial Literacy Group

M:      the number of variables in the Advanced Financial Literacy Group

b. Factor Analysis

The second approach is the principal components analysis or factor analysis such as carried out by Atkinson *et al*. (2006), van Rooji *et al.*, (2007) and OECD (2008). Factor analysis is a statistical method used to describe correlated variables. The main theoretical point of the factor analysis is that the financial literacy is treated as unknown but related to a number of pieces of information about a person (OECD, 2008). Within a particular domain, the questions that measure the financial literacy will be analyzed to measure how far an underlying factor may be constructed that can best explain the variation that we will observe in the replies towards the questions in the questionnaires. A new, single variable will then be used to represent the best combination of information that we will derive from the range of questions asked.

The objective of factor analysis is to explain the variance of the observed data through a few linear combinations of the original data. Different from the simple weight, the factor analysis method assigns a weight to a variable based on the correlation of the variable to common factors.

The process to calculate the weight for each variable is presented in Figure A1. The detail process is explained as follows:

1) Calculating the Factor Loading and Identify Common Factors

Factor analysis resulted in factor loading and common factor. The calculation of common factors used Maximum Likelihood method and the method to select the common factor used the Kaiser-Guttman method. Under the Kaiser-Guttman method, the selected common factors for each group of variable were those with eigenvalue greater than one. The factor analysis process resulted in three common factors for basic financial literacy variables and two common factors for advanced financial literacy variables.

**Figure A2**

**Factor Analysis Process**
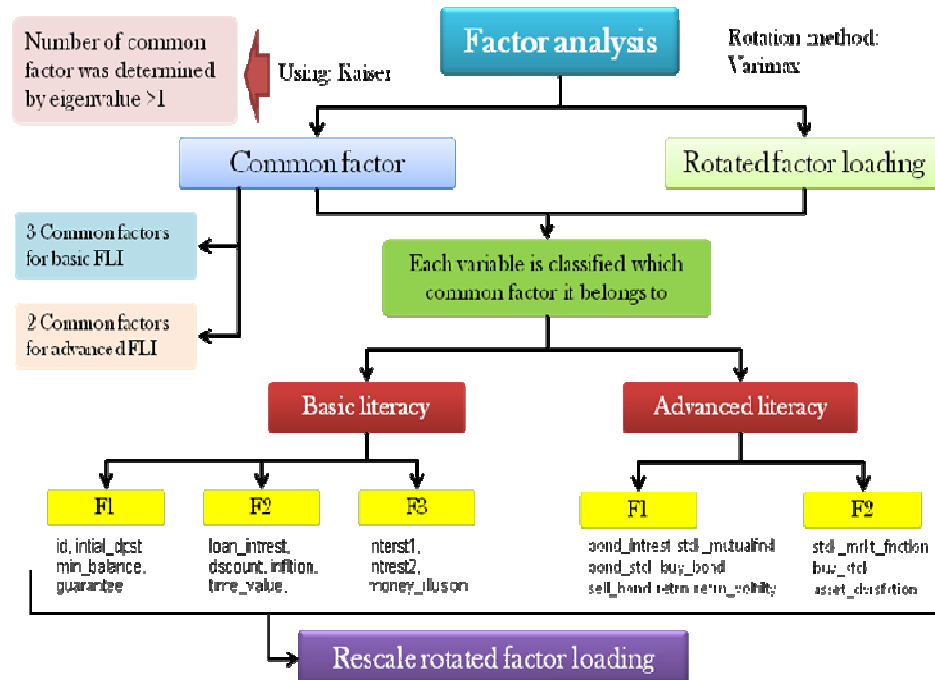


2) Calculate the Rotated Factor Loading

After choosing the common factors to keep, it is a standard practice to perform a rotation so as to enhance the interpretability of the results. The sum of eigenvalues is not affected by rotation, but changing the axes will alter the eigenvalues of particular factors and will change the factor loadings. The goal of all of these steps is to obtain a clear pattern of loadings. However, different rotations imply different loadings. In this study, we applied the most commonly used rotation method, orthogonal rotation with the varimax rotation method, such as used by OECD (2008). Varimax rotation is a type of orthogonal rotation methods that minimize the number of individual variables that have a high loading on the same factor in order to obtain a simpler structure of the factors. Orthogonal rotation method assumes that the factors in the analysis are uncorrelated. The result of the rotated factor loading for Basic Financial Literacy and Advanced Financial Literacy Group is presented in Table A3.

**Table A3**

**Rotated Factor Loading for Basic and Advanced Literacy Group**

| Rotation Method: Orthogonal Varimax | | | |
|---|---|---|---|
| Factor: F_BASIC_SMC | | | |
| Initial loadings: Unrotated | | | |
| Convergence achieved after 18 iterations | | | |
| Rotated loadings: L * inv(T)' | | | |
| | F1 | F2 | F3 |
| id | 0.097038 | 0.745452 | -0.09212 |
| intial_dpst | 0.102109 | 0.768092 | 0.002064 |
| min_balance | 0.091179 | 0.591766 | 0.163169 |
| guarantee | -0.02047 | 0.239674 | -0.11971 |
| interst1 | 0.448137 | 0.097773 | 0.580926 |
| intrest2 | 0.089791 | 0.135389 | -0.57879 |
| loan_intrest | 0.801587 | 0.14791 | 0.081523 |
| dscount | 0.502008 | 0.085293 | 0.025952 |
| infltion | 0.468318 | 0.080527 | -0.01923 |
| time_value | 0.282954 | -0.11751 | 0.058102 |
| money_illusion | 0.281965 | 0.015355 | 0.302052 |

| Rotation Method: Orthogonal Varimax | | |
|---|---|---|
| Factor: F_ADVANCED_SMC | | |
| Initial loadings: Unrotated | | |
| Convergence achieved after 18 iterations | | |
| Rotated loadings: L * inv(T)' | | |
| | F1 | F2 |
| stck_mrkt_fnction | 0.31771 | 0.416436 |
| bond_intrest | 0.517453 | 0.320129 |
| stck_mutualfnd | 0.538878 | 0.204325 |
| bond_stck | 0.503677 | 0.171579 |
| buy_stck | 0.162495 | 0.762449 |
| buy_bond | 0.666688 | 0.233643 |
| sell_bond | 0.548533 | 0.062974 |
| retrn | 0.277014 | 0.059393 |
| retrn_voltilty | 0.476441 | 0.400572 |
| asset_dvrsfction | 0.127125 | 0.438141 |
| stck_mrkt_fnction | 0.31771 | 0.416436 |

3) Classification of Each Variable

After the rotation process, each variable was classified to which common factor it belonged to based on the correlation of each variable to the common factor resulted in Step 1 above. The classification of variable indicates the relevance of each variable in the factor. The factor analysis resulted in three common factors for basic knowledge as follow:

a) F1 consisted of requirement of ID and minimum amount of money to open saving account, minimum balance on saving account, and deposit guaranteed by government.

b) F2 consisted of calculation of interest on loan, discount, inflation, and time value of money.

c) F3 consisted of simple interest, compounded interest, and money illusion.

Meanwhile, there were two common factors for advanced financial knowledge as follow:

a) F1 consisted of interest rate and bond price, returns on stock versus bond, risk of bond and stock, the meaning of buying bond, penalty when selling bond before maturity, which investment give the highest return, and which investment produce the highest return fluctuation.

b) F2 consist of function of stock market, the meaning of buying stock, and asset diversification.

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4) Rescale the rotated factor loading

The rotated factor loadings were then rescaled in order to derive an easier interpretation. The squared factor loading represent the proportion of the total unit variance of the variables which is explained by the factor. The rescaled factor loadings were calculated by using the following formula:

$$k_i = \frac{r_i^2}{\sum\limits_{i=1}^{N} r_i^2}$$

Where:
$k_i$: rescaled factor loading
$r_i$: rotated factor loading
i:  variable of each group
N: number of variable of each group

5) Calculate the Variable Weights

The weight of each variable in each variable group was calculated by multiplying the rescaled factor loading for each variable with the sum of square of the factor loading of all variables in the common factor to which the variable belonged. The formula is as follow:

$$Pc_i = k_i \cdot R_c \qquad \text{with} \quad R_c = \sum\limits_{i=1}^{N} r_i^2$$

Where:

$Pc_i$:  weight of variable *i*

$k_i$:   rescaled factor loading for variable *i*

$r_i$:   rotated factor loading

$R_c$:  sum of square of the rotated factor loading of all variables in the common factor to which the variable *i* belongs

i:   variable of each group

N:   number of variable of each group

6) Rescale Variable Weights

For easier interpretation, each variable weight was rescaled in order to vary from 0 and 1. The formula to rescale of the variable weight is as follow:

a) Basic Financial Literacy

$$Pc\_bsc\_W_i = \frac{Pc_i}{N}$$

Where:
$Pc\_bsc\_W_i$ :      the weight of variable *i* in basic literacy group
i:                  variable *i* in basic literacy group
N:                  number of variable in the basic literacy group

b) Advanced Financial Literacy

$$Pc\_advncd\_W_j = \frac{Pc_j}{\sum_{j=1}^{M} Pc_j}$$

Where:

Pc_advncd_W$_i$ : the weight of variable *i* in advanced literacy group

i: variable *i* in advanced literacy group

M: number of variable in the advanced literacy group

Table A4 shows the comparison of variable weights resulted from simple weight method and factor analysis method. The main idea of the weighting method using the factor analysis is to produce variable weights in such a way that variables that were highly correlated with the common factor were given higher weights. For the confirmation, the next section will discuss the confirmation of variable weight resulted from factor analysis using simple Pearson correlation.

**Table A4**

**Comparison of Variable Weights using Factor Analysis and Simple Weights for Basic Financial Literacy**

**Basic Financial Literacy**

| Variable | Factor Analysis | Simple Weight |
|---|---|---|
| id | 0.159 | 0.091 |
| intial_dpst | 0.169 | 0.091 |
| min_balance | 0.100 | 0.091 |
| guarantee | 0.016 | 0.091 |
| interst1 | 0.098 | 0.091 |
| intrest2 | 0.094 | 0.091 |
| loan_intrest | 0.183 | 0.091 |
| dscount | 0.071 | 0.091 |
| infltion | 0.060 | 0.091 |
| time_value | 0.022 | 0.091 |
| money_illusion | 0.027 | 0.091 |

**Advanced Financial Literacy**

| Variable | Factor Analysis | Simple Weight |
|---|---|---|
| stck_mrkt_fnction | 0.065 | 0.1 |
| bond_intrest | 0.092 | 0.1 |
| stck_mutualfnd | 0.100 | 0.1 |
| bond_stck | 0.086 | 0.1 |
| buy_stck | 0.212 | 0.1 |
| buy_bond | 0.158 | 0.1 |
| sell_bond | 0.112 | 0.1 |
| retrn | 0.026 | 0.1 |
| retrn_voltilty | 0.082 | 0.1 |
| asset_dvrsfction | 0.067 | 0.1 |

**Confirmation Result of Variable Weight using Simple Pearson Correlation**

The Pearson correlation is the most common method to measure the correlation between two variables. Pearson coefficient of correlation ( r ) usually takes value between -1 and 1[1]. The larger the r value, the stronger the association between the two variables. The correlation of 1 or -1 means that the two variables are perfectly correlated. The value of zero implies no correlation or relationship between the two variables. A positive correlation means that relatively high scores on one variable are paired with relatively high scores on the other variable, and low scores are paired with relatively low scores. On the other hand, a negative correlation means that relatively high scores on one variable are paired with relatively low scores on the other variable. For confirmation purposes, we use Simple Pearson Correlation.

Before calculating the Pearson correlation, we arranged a contingency table that shows the distribution/dependence of each variable to other variables. Contingency table is a table of two dimensional table containing frequencies by category (Table A5). In this condition, value of each variable only takes on two values. i.e. 1 for correct answer and 0 for incorrect answer.

**Table A5**
**Contingency Table**

| X / Y | 1 | 0 | Totals |
|---|---|---|---|
| **1** | A | B | A + B |
| **0** | C | D | C + D |
| **Totals:** | A + C | B + D | N |

Note:

A: Correct answer on question X and correct answer on question Y

B: Incorrect answer on question X and correct answer on question Y

C: Correct answer on question X and incorrect answer on question Y

D: Incorrect answer on question X and incorrect answer on question Y

To calculate the Pearson Correlation, we applied phi coefficient that also referred to "mean square contingency coefficient". The formula of phi coefficient is as follow:

$$\text{phi\_coefficient} = \frac{(AD - BC)}{\sqrt{(A+B)(C+D)(A+C)(B+D)}}$$

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[1] http://www.une.edu.au/WebStat/unit_materials/c4_descriptive_statistics/pearsons_coeff.html

Table A6 below shows the result of phi coefficient for the basic financial literacy group. As can be seen, the basic financial literacy variables that had high correlation with other variables (noted with highlight in yellow) were given higher weight (see Table A6 below). Meanwhile, the simple weight method produced equal weight for all variables. Thus, factor analysis method resulted in a more appropriate and well-distributed weight.

**Table A6**
**Phi Coefficient for Basic Literacy Group Variables**

| | id | intial_dpst | min_balance | guarantee | interst1 | intrest2 | loan_intrest | dscount | infltion | time_value | money_illusion |
|---|---|---|---|---|---|---|---|---|---|---|---|
| id | | 0.60 | 0.42 | 0.24 | 0.16 | 0.20 | 0.23 | 0.21 | 0.19 | 0.08 | 0.13 |
| intial_dpst | | | 0.49 | 0.22 | 0.23 | 0.22 | 0.27 | 0.23 | 0.22 | 0.12 | 0.19 |
| min_balance | | | | 0.34 | 0.32 | 0.22 | 0.32 | 0.26 | 0.28 | 0.15 | 0.29 |
| guarantee | | | | | 0.23 | 0.32 | 0.27 | 0.17 | 0.27 | 0.21 | 0.24 |
| interst1 | | | | | | 0.12 | 0.50 | 0.32 | 0.37 | 0.32 | 0.42 |
| intrest2 | | | | | | | 0.28 | 0.21 | 0.28 | 0.23 | 0.18 |
| loan_intrest | | | | | | | | 0.47 | 0.47 | 0.33 | 0.39 |
| dscount | | | | | | | | | 0.36 | 0.30 | 0.32 |
| infltion | | | | | | | | | | 0.30 | 0.30 |
| time_value | | | | | | | | | | | 0.29 |
| money_illusion | | | | | | | | | | | |

## 4. Calculating Financial Literacy Index

Financial Literacy Index for each observation in each variable group was then calculated by summing of the product of the score of each variable and its corresponding weight. The score of basic and advanced financial literacy index was multiplied by 100 for easier interpretation. Therefore, the score for basic and advanced financial literacy index varies between 0 and 100.

The formula for calculating the basic and advanced financial literacy based on the simple weight method is as follows:

c)  Basic financial literacy index

$$FLI\_Smpl_{i,obs} = \sum_{i=1}^{N}(Score_{i,obs} \cdot Smpl\_bsc\_w_i \cdot 100)$$

where:

$FLI\_Smpl_{i,obs}$:       basic financial literacy index of respondent *obs*

$Score_{i,obs}$:       the score of respondent *obs* in answering variable *i*

$Smpl\_bsc\_w_i$:       the simple weight of variable *i*

d) Advanced financial literacy index

$$FLI\_Smpl_{j,obs} = \sum_{j=1}^{N}(Score_{j,obs} \cdot Smpl\_advncd\_w_i \cdot 100)$$

where:

$FLI\_Smpl_{j,obs}$:       advanced financial literacy index of respondent *obs*

$Score_{j,obs}$:       the score of respondent *obs* in answering variable *j*

$Smpl\_bsc\_w_j$:       the simple weight of variable *j*

Meanwhile, the formula for calculating the basic and advanced financial literacy based on the factor analysis method is as follows:

a) Basic financial literacy index

$$FLI\_Pc_{i,obs} = \sum_{i=1}^{N}(Score_{i,obs} \cdot Pc\_bsc\_w_i \cdot 100)$$

where:

$FLI\_Pc_{i,obs}$:       basic financial literacy index of respondent *obs*

$Score_{i,obs}$:       the score of respondent *obs* in answering variable *i*

$Pc\_bsc\_w_i$:       the weight of variable *i* based on factor analysis

b) Advanced financial literacy index

$$FLI\_Pc_{j,obs} = \sum_{j=1}^{N}(Score_{j,obs} \cdot Pc\_advncd\_w_i \cdot 100)$$

where:

$FLI\_Smpl_{j,obs}$:       advanced financial literacy index of respondent *obs*

$Score_{j,obs}$:       the score of respondent *obs* in answering variable *j*

$Smpl\_bsc\_w_j$:       the simple weight of variable *j*

After calculating the basic and advanced financial literacy index for each observation, then we calculate the total score financial literacy index for each respondent that was constructed from the basic and advanced financial literacy index of the corresponding observation. Each variable group was given equal weight. Thus, the total score of financial literacy index was simply the arithmetic mean of the basic and advanced financial literacy, with the following formula for both the simple weight method and the factor analysis methods:

1) Simple weight method

$$FLI\_Smpl_{obs} = 0.5FLI\_Smpl_{i,obs} \cdot 0.5FLI\_Smpl_{j,obs}$$

2) Factor analysis method

$$FLI\_Pc_{obs} = 0.5FLI\_Pc_{i,obs} \cdot 0.5FLI\_Pc_{j,obs}$$

Table 6 shows the statistic descriptive of the basic, advanced, and overall financial literacy index. As we can see on the Table A7, the Jarque-Bera statistic of overall financial literacy index by using factor analysis method showed a better distribution than that by using the simple weight method. This is indicates that factor analysis result in a better weight distribution and more representative result in developing the financial literacy index.

**Table A7**

**Statistical Information of Basic, Advanced, and Overall Financial Literacy Index**

| | Basic Financial Literacy Index | | Advanced Financial Literacy Index | | Overall Financial Literacy Index | |
|---|---|---|---|---|---|---|
| | Simple Weight | Factor Analysis | Simple Weight | Factor Analysis | Simple Weight | Factor Analysis |
| Mean | 62.60 | 66.55 | 16.24 | 18.47 | 39.42 | 42.51 |
| Median | 63.64 | 69.57 | 0.00 | 0.00 | 40.91 | 42.73 |
| Maximum | 100.00 | 100.00 | 80.00 | 88.74 | 85.45 | 91.38 |
| Minimum | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| Std. Dev | 20.19 | 22.45 | 21.13 | 23.80 | 15.88 | 17.65 |
| Skewness | -0.57 | -0.79 | 1.05 | 0.97 | 0.18 | 0.04 |
| Jarque-Bera | 25.02 | 48.25 | 83.88 | 72.47 | 2.46 | 0.39 |