Financial literacy in Malaysia, 2015-2018

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ABSTRACT

This paper provides an overview of the state of financial literary of Malaysians using data from the OECD (INFE) Financial Literacy Survey conducted in the year 2015 and 2018. Besides the three components of financial literacy namely, financial knowledge, financial attitude and financial behaviour, this paper also analyses the financial vulnerability of individuals. The effects of socio-demographic factors excluding gender are significant in determining financial literacy levels. Generally, Malaysians do not think that they have high financial knowledge, and the objective financial knowledge assessment reflects this as less than 40% of the respondents meet the minimum financial knowledge target score. There are no significant differences in the level of financial knowledge between 2015 and 2018 but financial attitude towards money usage has worsened in 2018 when compared to 2015. However, in terms of financial behaviour, Malaysians are generally active savers, set long-term financial goals, make considered and informed purchases, and keep a close watch on their personal affairs. Malaysians are financially vulnerable, but they seem more prepared in weathering the storm and having financial cushions for emergencies in 2018 compared to 2015. The findings suggest that more effort is needed in educating Malaysians on fundamental financial concepts and ways to enhance their financial cushion.

Keywords: financial knowledge, financial attitude, financial behaviour, financial cushion, financial vulnerability

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1. Introduction

The OECD International Financial Education Network (INFE) defines financial literacy as "*a combination of awareness, knowledge, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial well-being*" (OECD, 2011). The focus on financial literacy has gained traction in the past decade as individuals are shouldering more financial decisions against a financial landscape which has become increasingly complex and sophisticated. The longer lifespan implies that individuals now must plan beyond regular savings and managing day-to-day expenses. Individuals currently must make longer term financial plans such as retirement while avoiding incurring excessive loans which have become more easily available.

According to the Debt Counselling and Management Agency (AKPK), almost 40% of those who have enrolled in the Debt Management Program encountered problems in managing their debt due to poor financial planning (AKPK, 2018 and 2020). Since the establishment of AKPK in 2006, the number of individuals who had enrolled in the Debt Management Program as of 2018 was 246,061 and by 2020, the accumulated number stands at 324,380 individuals. Since 2011, AKPK has introduced POWER!, its own financial education program to promote financial education and to elevate financial literacy. In addition, the Central Bank of Malaysia, Bank Negara

Malaysia also launched MOBILE LINK in 2011 to provide advisory services to adults on financial matters under the purview of Bank Negara Malaysia. In 2016, Bank Negara Malaysia established the Financial Education Network (FEN) to drive and coordinate national financial education programs. Subsequently, in 2019, FEN launched the Malaysian National Strategy for Financial Literacy from 2019 to 2023. Financial education has also been added into the school curriculum to expose children to financial concepts and responsible financial behaviour from a young age. These initiatives highlight the concerns and efforts on promoting financial education and elevating Malaysians' financial literacy.

In 2010, OECD (INFE) launched a pilot study to measure financial literacy across 14 countries including Malaysia to enable international comparisons of financial literacy in these countries. Following the pilot study, OECD (INFE) conducted another financial literacy survey in 2015 and 2018 to track the trends of financial literacy and to enable updated comparisons of financial literacy across various countries. Malaysia participated in all three surveys which were conducted nationwide. Therefore, data from the OECD (INFE) surveys provide comprehensive data on the financial literacy of Malaysians.

Most studies on financial literacy of Malaysians have used smaller scale data and focused on specific segments of the Malaysian population. Studies on the various aspects of personal financial management related issues and on several segments of Malaysians such as students (Danial et al, 2020; Chuah et al., 2020; Yew et al., 2017), working adults (Hamid and Loke, 2021; Abdullah et al., 2019; Loke, 2017a; Ali et al., 2015), the older population (Yoong et al., 2012 and Jariah et al., 2012), and employees of various sectors (Chan et al., 2018; Mokhtar et al., 2017) have mushroomed in recent years. Additionally, these studies focused on selected financial behaviour and financial attitudes and not the overall financial literacy of Malaysians. Furthermore, there has not been any analysis that draws from a nationwide study such as the data obtained from the OECD (INFE) surveys in measuring financial literacy. The only nationwide studies on such matters that used the OECD (INFE) 2010 Pilot Study were studies on household preparedness for income shock (Loke, 2016a), living beyond means (Loke, 2016b), and financial management practices (Loke, 2017b). Nevertheless, even with using the OECD (INFE) 2010 Pilot Study, these studies focused only on selected financial management issues. Moreover, there has not been any analysis on the significance of socio-demographic factors on financial literacy using nationwide data. The significance of socio-demographic factors in previous studies were investigated to ascertain selected financial behaviour, financial attitude, and financial knowledge separately but not as a composite of financial literacy which encompass financial knowledge, financial attitude, and financial behaviour. Additionally, as the OECD (2020 and 2016) mainly compared the findings across participating countries, it does not provide a detailed country report and it also did not compare the findings between the two waves of surveys.

Based on the gaps, using data from the OECD (INFE) survey in 2015 and 2018, this paper provides an updated overview and comparison of Malaysians' financial literacy between 2015 and 2018. The analysis of financial literacy follows the OECD (2020 and 2016) closely which primarily comprised three main components, financial knowledge, financial behaviour, and financial attitude. Given the financial repercussions of COVID-19 on Malaysians, this paper also includes some analysis of the financial vulnerability of individuals. As the analysis is drawn from data collected in 2015 and 2018, it provides an overview of Malaysians' financial vulnerability before the pandemic. Furthermore, the paper will also present analysis on the significance of socio-demographic effects on financial literacy. This will provide further understanding on the status of financial literacy of different segments of the population.

The rest of the paper is organized as follows. Section 2 discusses the previous studies relating to financial literacy and some global trends on financial literacy, financial knowledge, financial behaviour, and financial attitude. Section 3 describes the OECD (INFE) financial inclusion data from 2015 and 2018 and the present study's research methodology. Section 4 discusses the logit estimates of financial literacy and comparative descriptive analysis on Malaysians' financial knowledge, financial attitude, and financial behaviour respectively between 2015 and 2018. This is then followed by a comparative analysis on the state of financial vulnerability of Malaysians in 2015 and 2018. The paper concludes in section 5.

2. Literature review

In the early years, financial literacy had many definitions, and some have argued that financial literacy, financial education and financial knowledge could be used interchangeably (Howlett, et al., 2008; Yoong et al., 2012) while Huston (2010) argued that financial literacy goes beyond financial education and financial knowledge. Following OECD's (2011) definition of financial literacy, Atkinson and Messy (2012) recommended that financial literacy should encompass three components namely financial knowledge, financial behaviour, and financial attitude. As such, the computed financial literacy scores of the OECD (INFE) Survey in 2015 and 2018 considered these three components (OECD, 2020 and 2016). Nevertheless, a number of studies still regard financial literacy to be synonymous to financial knowledge (Kadoya and Khan, 2019; Mouna and Anis, 2017; Grohman, 2016; Disney and Gathergood, 2013; van Rooij et al., 2012; Lusardi and Mitchell, 2011).

Lusardi and Mitchell (2011) is one of the earliest studies to research financial knowledge around the world. In the study, the term 'financial literacy' was used to refer to financial knowledge. Lusardi and Mitchell found that that low financial knowledge levels even exist in economies with developed financial markets such as Germany, Netherlands, Sweden, Italy, Japan, New Zealand, and the United States of America (USA). Furthermore, financial knowledge levels differed significantly across countries and sub-populations. Many subsequent studies on financial literacy that takes into account financial knowledge, financial behaviour and financial attitude. Financial literacy differs widely by socio-demographic variables such as gender, age, education and income (Atkinson and Messi, 2012; Lusardi and Mitchell, 2014; Bucher-Koenen et al., 2017; Yoshino et al., 2017; Garg and Singh, 2018; Potrich et al., 2018; Mirzaei and Buer, 2022). In particular, Lusardi and Mitchell (2011) found that women, young adults, and older adults tend to have lower financial knowledge. Equivalent results were also found in financial literacy studies. Bucher-Koenen et al., (2017), Potrich et al. (2018), and Bannier and Schwarz (2018) found significant gender gaps in financial literacy levels while Finke et al. (2016), Yoshino et al. (2017), Garg and Singh (2018) and Kadoya and Khan (2020) found that age affects financial literacy levels too. As for education, Lusardi, and Mitchell (2014), and Bianchi (2017) pointed out that higher educated individuals are more likely to have opportunities to learn about financial issues at the workplace and are more financially sophisticated. As a result, there exists a significant positive correlation between education and financial literacy levels. Many studies have also found that financial literacy increases with income (Lusardi and Tufano, 2015; Atkinson and Messi, 2012; Yoshino et al., 2017; Garg and Singh, 2018; Mirzaei and Buer, 2022).

The cross-country financial literacy analysis by OECD (2016 and 2020) found that financial literacy remained low among the sampled countries. For the OECD (INFE) 2015 survey, the average score was slightly higher at 13.2 out of the maximum score of 21. The highest score was 14.9 attained by France while Poland obtained the lowest score of 11.6 (OECD, 2016). On the other hand, for the OECD (INFE) 2018 survey, the average financial literacy score was 12.7 out of a maximum score of 21, which was under 61% of the maximum financial literacy score (OECD, 2020). In that survey, the highest score was attained by Hong Kong with a score of 14.8, which was 71% of the maximum score while the lowest score was 11.1 by Italy (53% of the maximum score).

Financial knowledge is a critical component in financial literacy as it measures the knowledge that individuals have that enables them to compare financial products, weigh the basic costs of borrowing and savings and make appropriate and well-informed decisions (OECD, 2020). The financial knowledge questions developed by Lusardi and Mitchell (2008) and Lusardi (2008) are widely used by OECD (2020 and 2016), Kadoya and Khan(2019), Grohman (2016), Mouna and Anis (2016), Disney and Gathergood (2013), and van Rooij et al. (2012) to study the level of financial knowledge, the determinants of financial knowledge and the relationship between financial knowledge and selected financial behaviour. In fact, Stolper and Walter (2017) summarized the studies that have utilized the same financial knowledge assessment questions. The financial knowledge assessment questions by Lusardi and Mitchell (2008) and Lusardi (2008) assess individuals' numeracy skills such as interest paid on loans and simple interest rate calculation, time value of money, and calculation of compound interest. Furthermore, financial concepts such as knowledge on risk diversification, the relationship between returns and risk, and the relationship between inflation and the costs of living are also included in the assessment.

In the OECD (INFE) Survey of 2015 (OECD, 2016), on average, only 56% of adults from the participating countries scored the minimum target financial knowledge score of five out of seven. While 84% of adults in Hong Kong were able to meet the minimum target financial knowledge score, less than 35% of adults in Malaysia and South Africa could answer at least five out of the seven questions correctly. The latter two countries were the countries with the lowest financial knowledge score. In the OECD (INFE) Survey of 2018, there was a slight decline whereby only 52.5% of the participants across the global sample could answer at least five out of the seven questions correctly. Hong Kong remained as the country which was the most financially knowledgeable whereby 92.2% of the adults could achieve the minimum target score (OECD, 2020). In contrast, only 28.8% and 30.8% of adults in Colombia and Romania who could achieve the minimum target score. These two countries have the lowest financial knowledge levels among the participating countries (OECD, 2020). The results in both the OECD (INFE) surveys revealed that there is a large variation in the financial knowledge levels by country.

The study on financial behaviour varies widely and many studies have focused only on a single or a few financial behaviours. These studies examined the relationship between financial knowledge and financial behaviour while controlling socio-demographic effects. Previous studies have found that financial knowledge helps individuals with plans for retirement savings (Lusardi and Mitchell, 2017; van Rooij et al., 2012), wealth accumulation (Hastings et al., 2013; Sekita, 2013), participation in the stock market (van Rooij et al., 2011; Allgood and Walstad, 2016) and managing indebtedness (Disney and Gathergood, 2013). On the other hand, the OECD (INFE) Financial Literacy measurement toolkit measured the financial behaviour by assessing three potentially prudent financial behaviours. The behaviours include savings and setting long-term financial goals, making considered purchases and keeping a watchful eye on financial affairs (OECD, 2018). According to OECD (2020), planning and saving ensures that individuals have some financial cushion to help them weather economic shocks while making considered purchases which implies individuals are trying to live within their means and to avoid overspending. Keeping an eye on financial affairs encompasses tracking cash flows and paying bills on time and such behaviour implies that individuals are meeting their essential expenditures and avoiding falling into debt. The OECD (INFE) Survey of 2015 and 2018 follow this measurement for financial behaviour (OECD, 2020 and 2018). Only studies that investigated financial literacy followed this measurement for financial behaviour as the rest of the studies on financial behaviour focused solely on a single financial behaviour.

In the OECD (INFE) Survey of 2015, 51% of the adults across the participating countries were able to achieve the minimum target score of six out of nine. France had the highest number of achievers with 85% of its participants managed to meet the minimum target score while less than 25% of Hungarians were able to achieve the minimum target score. For the OECD (INFE) Survey of 2018, only 43% of the global sample achieved the minimum target score. France did not participate, and Slovenia took over as the country with the highest percentage of adults meeting the minimum target score of six. 73% of the participants from Slovenia achieved the minimum target score while only 26% of Italians were able to achieve the same. There was a slight improvement in Hungary where in the OECD (INFE) Survey of 2018, 29.7% of its participants achieved the minimum target score (OECD, 2020). There was a marked improvement of financial behaviour among Malaysians as 69% of its participants achieved the minimum target score for financial behaviour in the OECD (INFE) Survey of 2018 compared to 56% of Malaysians who achieved the minimum target score in the OECD (INFE) Survey of 2015 (OECD, 2020 and 2016). In fact, Malaysia ranked second after Slovenia for financial behaviour in 2018 (OECD, 2020).

Financial attitude refers to individuals’ propensity to spend instead of saving and their time preference. An individual is considered to have poor financial attitude if the individual has negative attitude towards spending and prioritizes short-term wants over long-term security. OECD (2020 and 2018) measured financial attitude using three questions that assessed individuals’ attitude towards money usage and planning using a 5-point Likert scale. Agarwalla et al., (2015), Salvatore et al., (2018), Fessler et al., (2019) and Morgan and Long (2020) are among the many others who have used this financial attitudinal assessment in their studies.

On average, 50% of the adult participants in the OECD (INFE) Survey of 2015 were able to achieve the minimum target score of three out of five. Over 70% of participants in New Zealand and Norway were able to achieve the minimum target score while less than 30% of participants in Jordan, Hong Kong and Poland were able to meet the minimum target score. It is interesting to note that while Hong Kong was at the top of the ladder in terms of financial knowledge, it was ranked almost the lowest in terms of financial attitude (OECD, 2016). In the OECD (INFE) Survey of 2018, 42.5% of the global sample participants were able to meet the minimum target score, which was a slight decline from the previous survey in 2015. Similar observations were also found for the case of Malaysia where there was only 29.5% of Malaysian participants who could achieve the minimum target score in 2018 compared to almost 40% in 2015 (OECD, 2020 and 2016). Thailand ranked the top (84.4%) while Georgia was found to have the lowest percentage of adults (21.4%) who were able to achieve the minimum target score of three (OECD, 2020).

The scope of the study in financial literacy has expanded over time. Goyal and Kumar (2020) provided a systematic review and analysis on the evolution of financial literacy research over the years. Notwithstanding the importance of the relationships between the three components of financial literacy and also the implications of these components on financial well-being and financial resilience, the present study will solely focus on analysing the trend and the state of Malaysians' financial knowledge, financial behaviour and financial attitude as there has not been a study that analyses these components in detail using nationwide data such as the ones from OECD (INFE) Survey of 2015 and 2018. An analysis on the socio-demographic effects on financial literacy is included in the present study but other relationships among the components is beyond the scope of this paper.

3. Methodology

3.1 Data

Data used in this study is taken from the OECD (INFE) Financial Literacy Survey conducted in 2015 and 2018. It is a comprehensive survey that collects information regarding the uptake of financial products and services, spending behaviour and financial service usage, financial knowledge, behaviour and attitude, financial inclusion, financial satisfaction, money management, long-term financial planning, and awareness of financial regulatory. Information on respondents' socio-demographic were also collected in the survey. The survey was conducted nationwide in Malaysia. The target respondents were adults aged between 18 and 79 and the interviews were conducted by telephone or face-to-face to ensure the understanding of the questions especially for respondents with low levels of literacy. For both surveys, stratified random sampling based on census data was used. The sample was stratified based on six categories namely, geographical, urban or rural, ethnicity, age, gender, and income. The survey was prepared in three languages namely Malay, English, and Mandarin. The sample size for 2015 and 2018 surveys were 4,573 and 3,395, respectively. Data access was granted by Bank Negara Malaysia.

3.2 Model

Financial literacy considers an individual's financial knowledge, financial attitude, and financial behaviour. This follows Atkinson and Messy (2012)'s recommendation and the approach taken by OECD (2020 and 2016) in measuring financial literacy. Following the minimum target score set by OECD (2020 and 2016) for financial knowledge, an individual who had at least five out of seven financial knowledge questions correctly will be given a score of 1 for financial knowledge and a score of 0 if otherwise. A score of 1 implies the individual is financially knowledgeable.

As for financial attitude, three financial attitude questions were used as an indicator. An individual is given a score of 1 if the individual indicates that they disagree or strongly disagree to two out of the three statements. A score of 0 is given otherwise. This is modified from the OECD (2020 and 2016) approach where the minimum target score is three out of five, implying 60% achievement. Financial behaviour is measured based on five behaviours which encompass active savings, long-term financial planning, keeping track of cash flow, paying bills on time, and making considered purchases instead of nine behaviours as in OECD (2020 and 2018). The five behaviours were chosen to represent the key components as the other four are additional statements under the five components. A score of 1 is given if an individual frequently and always observes at least three out of the five behaviours. This implies an achievement of 60% of the targeted behaviour. The minimum target score for financial behaviour used by OECD (2020 and 2018) is to achieve a score of six out of nine indicating approximately 67% achievement.

As financial literacy consists of financial knowledge, financial attitude and financial behaviour, the financial literacy score is a sum of the scores of these three components. Given that the scores of these three components are either 0 or 1, the total sum of financial literacy score would range from 0 to 3. An individual is classified as being financially literate if his or her financial literacy score is 2 or 3 while an individual is classified as not being financially literate if his or her financial literacy score is below 2. Table 1 summarizes the description of scores and indicators for each of the financial literacy components.

Table 1: Description of variable scoring system

Financial literacy components	Indicators	Score
Financial knowledge	Seven financial knowledge questions	1: 5 out of 7 questions are correct 0: Less than 5 questions are correct
Financial attitude	5-point Likert scale on the level of agreement to the statements: • I find it more satisfying to spend money than to save it for the long-term. • I tend to live for today and let tomorrow take care of itself. • Money is there to be spent.	1: 2 out of 3 statements are answered as "strongly disagree or disagree" 0: Less than 2 statements are answered as "strongly disagree or disagree"
Financial behaviour	5-point Likert scale on the level of frequency to the statements: • Active savings. • I set long-term financial goals and strive to achieve them. • Before I buy something, I carefully consider whether I can afford it. • I pay my bills on time. • I keep a close personal watch on my financial affairs.	1: 3 out of 5 statements are answered as "frequently or always" 0: Less than 3 out of 5 statements are answered as "frequently or always"
Financially literate (Dependent variable in the logit model)	Sum of the scores of financial knowledge, financial attitude, and financial behaviour.	1: Total score is 2 and above 0: Total score is below 2

The explanatory variables consist of socio-demographic variables which include gender, age, education, income, ethnicity, and geographical region. Age is categorized into seven age groups with the youngest age group being those aged between 18 to 20 years old and the oldest age group being those above 69 years old. Education is divided into four categories namely primary, secondary, post-secondary and technical education and tertiary education. In terms of ethnicity, Malay and the East Malaysian Bumiputra are categorized in the same ethnic group while the other two ethnic groups are Chinese and Indian and others. Indian and others are merged into a category. As the study is conducted nationwide, geographical regions are divided into five groups representing East Malaysia, the Southern, Northern, Central and Eastern regions of Peninsular Malaysia.

Logistic regression modelling was used to determine the factors that could significantly explain the likelihood of an individual being financially literate. In general, the logit model could be written as follows:

$$log\frac{P}{1-P} = \alpha + \beta_i X_i + \varepsilon \qquad (1)$$

where P denotes the probability of an individual being financially literate. P takes the value of 1 if the respondent is financially literate and the value 0 if the respondent is not financially literate. β_i denotes the coefficient of the explanatory variables, while X_i refers to the explanatory variables. ε is the stochastic error term for regression.

4. Analysis

There are two main analysis sections in this paper. The discussion begins with an analysis on the logit estimates of the socio-demographic effects on financial literacy. The second part of the analysis breaks down the three components of financial literacy and presents a comparative analysis on the state of financial knowledge, financial behaviour, and financial attitude of Malaysians between the OECD (INFE) Financial Literacy Survey Data of 2015 and 2018. The state of financial vulnerability of Malaysians is also included in the second section.

4.1 Socio-demographic effects on financial literacy

A logistic regression model is used to examine the significance of socio-demographic effects on financial literacy for the 2015 and 2018 data. It is found that the model is good fit as the Hosmer-Lemeshow chi-sq statistics are 8.75 and 12.59 for the logit model of the 2015 and 2018 data respectively, indicating that the null hypothesis cannot be rejected. Additionally, the logit model using the 2015 and 2018 data shows a prediction accuracy of 65.34% and 72.53%, respectively.

Contrary to existing studies, gender gaps in financial literacy was found to be not significant (Lusardi and Mitchell, 2011; Bucher-Koenen, 2016; Potrich et al., 2018; Bannier and Schwarz, 2018). Ethnicity also does not play a significant role except that for the 2018 data, Chinese were more likely to be financially literate compared to Malays at 10% significance level. For the other socio-demographic factors such as age, education, and income, the results are consistent with previous studies. Age is found to have significant effect on an individual's financial literacy and, as age increases, one is more likely to be financially literate. Having university education increases the odds of being financially literate compared to those with who only had secondary or primary education. There is a difference in the significance of income on financial literacy between the 2015 and 2018 data. While income significantly increases the odds of being financially literate according to the 2015 data, no significant income differences on financial literacy was found for the 2018 data. The results revealed that there are varying differences in the financial literacy level according to geographical regions in the country. Individuals in East Malaysia have significantly lower odds of being financially literate compared to individuals residing in the central region of Peninsular Malaysia. This finding is consistent for both the 2015 and 2018 data. According to the findings from the 2015 data, individuals residing in the northern region of Peninsular Malaysia increases the odds of being financially literate compared to those residing in the central region but the differences between the northern and central region is not significant for the 2018 data. On the other hand, according to the 2018 data, those residing in the southern region of Peninsular Malaysia had decreased odds of being financially literate compared to those residing in the central region of Peninsular Malaysia.

Table 2 presents the logit estimates analysis on socio-demographic effects on financial literacy for both 2015 and 2018 data.

Table 2: Logit estimates of financial literacy

	2015		2018	
	Odds ratio	Std. error	Odds ratio	Std. error
Gender	0.974	0.066	0.912	0.081
Age				
20-29	1.543**	0.275	1.293	0.204
30-39	2.172***	0.378	1.373**	0.209
40-49	2.498***	0.442	1.219	0.194
50-59	2.324***	0.43	1.507**	0.245
60-69	1.948***	0.406	1.816**	0.475
Above 69	1.585	0.569	2.396*	1.186
Education				
Technical & post-secondary education	0.939	0.152	0.771	0.148
Secondary school	0.685***	0.067	0.625***	0.074
Primary school	0.444***	0.051	0.359***	0.091
Income				
RM1000-RM5000	1.768***	0.168	1.613	0.561
RM5000-RM10000	2.769***	0.333	1.425	0.507
Above RM10000	8.315***	2.228	1.543	0.566
Ethnicity				
Chinese	0.942	0.074	1.195*	0.12
Indian & others	0.852	0.104	0.811	0.141
Geographical region				
North	2.054***	0.19	0.566	0.07
South	0.937	0.1	0.922***	0.116
East coast	1.137	0.127	0.754	0.108
East Malaysia	0.538***	0.056	0.323***	0.048
Number of observations	4158		2719	

Note: *,**,*** denote 10%,5% and 1% significance level. The base variables are age below 20 years old, university education, household monthly income below RM1000, Malay and Central region of Peninsula Malaysia.

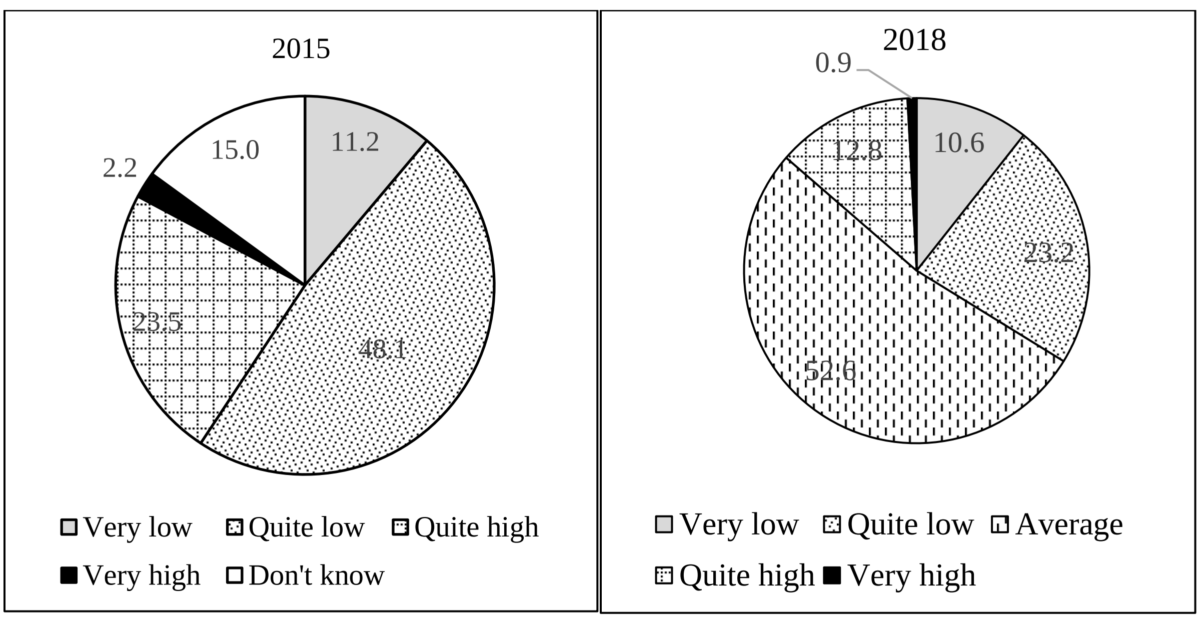
4.2 Comparative descriptive analysis

The analysis on the state of the three components of Malaysians' financial literacy, namely financial knowledge, financial attitude, and financial behaviour are discussed in this section. Additionally, an analysis on the state of Malaysians' financial vulnerability is also discussed in this section. The analysis compares the data from the OECD (INFE) Financial Literacy Survey of 2015 and 2018.

4.2.1 Financial knowledge

There are some differences in the self-assessment options given to respondents in 2015 compared to 2018. In the 2015 survey, there was an option of "I don't know" as part of the options given to the respondents for the self-assessed financial knowledge question but the option of "I don't know" was not available in the 2018 survey. Instead, it was substituted by the option of 'average'. Hence, although a significant percentage of respondents (52.6%) rated their financial knowledge as 'average' in 2018, no conclusion can be made with regards to 2015 as the option of 'average' was not available.

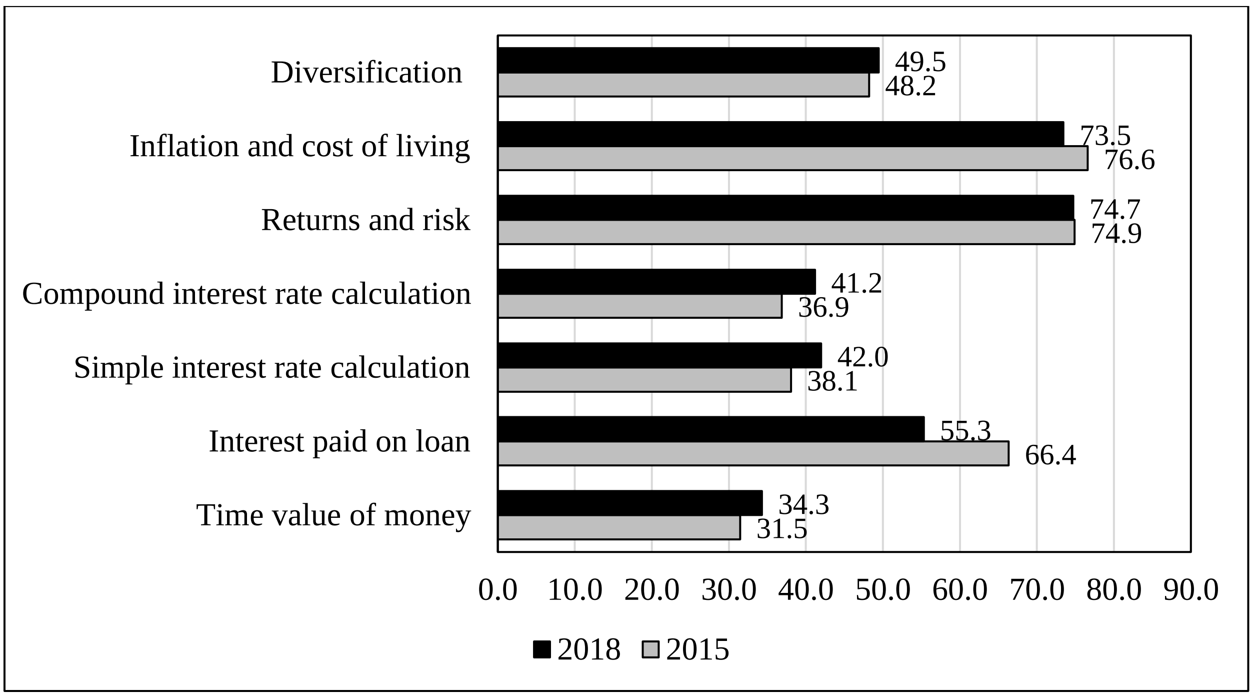
Figure 1: Self-assessment of financial knowledge in 2015 and 2018



From Figure 1, it is found that only a small proportion of respondents rated their financial knowledge very highly. Only 2.2% and 0.9% of the respondents in the survey of 2015 and 2018 respectively, felt that their financial knowledge is exceedingly high. There was also decline in the fraction of respondents who rated their financial knowledge as quite high between the two-survey period. This could indicate that as the financial landscape becomes increasingly sophisticated, individuals feel less equipped or less adequate in their financial knowledge to understand financial concepts and products.

In the objective assessments of financial knowledge, seven financial concepts were assessed. Figure 2 presents the percentage of individuals who had answered the question correctly for each of the financial concepts that were assessed. It also compares the financial knowledge of individuals in 2015 and 2018 and highlights the strengths and weaknesses of individuals' knowledge.

Figure 2: Percentage of individuals with correct answers by financial knowledge concepts in 2015 and 2018.



The findings imply that Malaysians showed weak knowledge on time value of money and interest rate calculation whether simple or compound interest calculation as less than 43% of individuals answered these questions correctly. On the other hand, individuals showed strong knowledge on the relationships between returns and risk and inflation and costs of living as over 70% of individuals in both years answered these questions correctly. When comparing with the other participating countries, Malaysia fared worse in terms of understanding the time value of money and interest paid on loan. Among the participating countries, the average percentage of individuals who answered the concept on time value of money and interest paid on loan correctly were 59.5% and 84.4%, respectively compared to 34.3% and 55.3% of Malaysians who answered the same questions correctly in 2018 (OECD, 2020).

Overall, the t-test statistics in Table 3 shows that there are significant differences for all the financial knowledge concepts except for the relationship between returns and risk, and diversification. Additionally, it can be concluded that the individual's financial knowledge of concepts has improved in 2018 compared to 2015, except for the knowledge on interest paid on loans and the understanding between inflation and costs of living, where it had worsened.

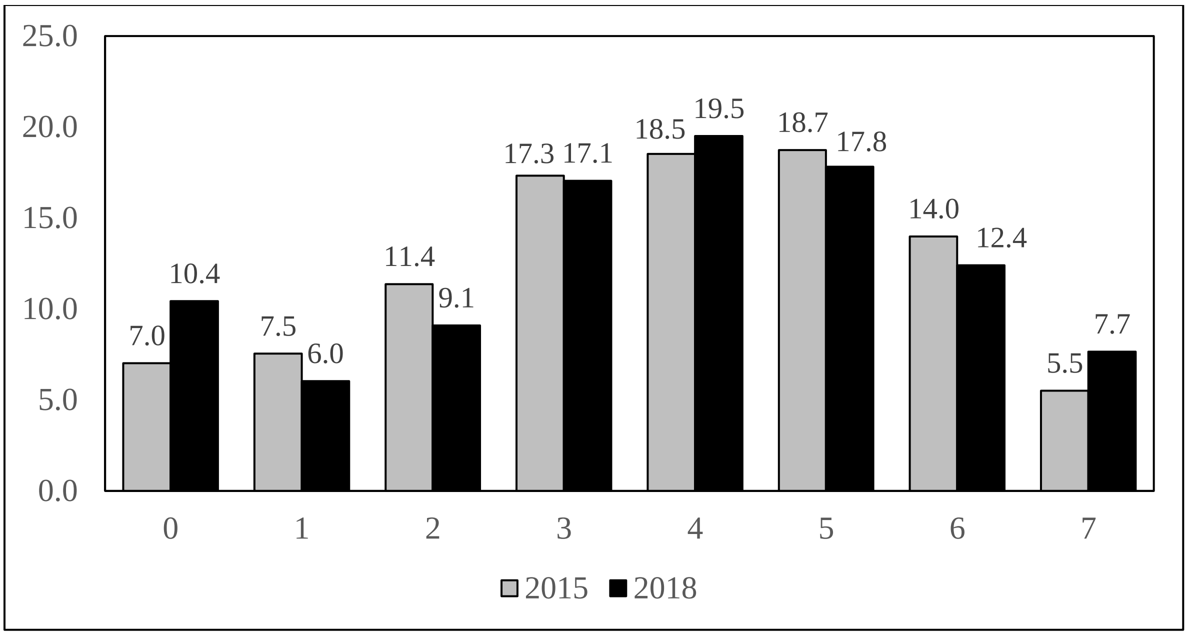
Table 3: t-test statistics on financial knowledge concepts between the 2015 and 2018 data

Financial knowledge concepts	t-statistics
Time value of money	2.660***
Interest paid on loan	-10.095***
Simple interest rate calculation	3.5487***
Compound interest rate calculation	3.915***
Returns and risk	-0.194
Inflation and cost of living	-3.238***
Diversification	1.1186

Note: *** indicates significance at 1% level. A one-tail test was conducted with the hypothesis that % of 2018 is higher than % of 2015.

Figure 3 shows 38.2% and 37.9% of the respondents in 2015 and 2018 correctly answered at least five out of seven questions on financial knowledge, which was the minimum target score in the OECD survey. There was a slightly lower percentage of individuals who could achieve the minimum target score in the year 2018 compared to 2015 but the differences were not significant as noted by the t-statistics (0.4684). The non-significant differences between the financial knowledge scores in both these years are also reflected in the mean score. The mean score for both years is 3.7 out of 7. In 2018, there was a slightly higher percentage of individuals who had all the seven questions correct (7.7%) compared to 2015 where only 5.5% fell into this category. However, on the other extreme, there was also a higher percentage of individuals in 2018 who did not get any questions correct (10.4%) compared to the 7% of individuals in 2015.

Figure 3: Overall breakdown of financial knowledge score: 2015 and 2018



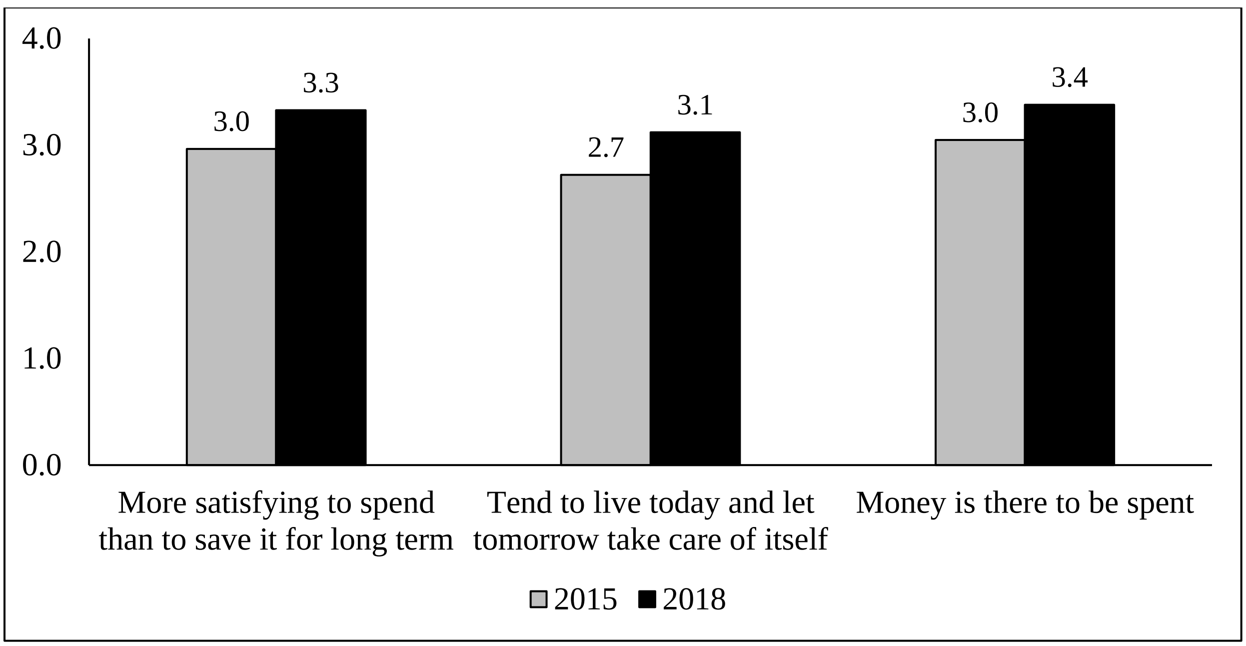
At the global level, in 2018, Malaysia's financial knowledge score was among the lowest and at the same par as Indonesia, which also had a mean score of 3.7 and was slightly higher than Romania, which was the country with the lowest financial score with a mean score of 3.5 (OECD, 2020). On the other hand, the average mean score among the participating countries of the 2018 survey (OECD, 2020) and the 2015 survey (OECD, 2016) were of 4.4 and 4.6, respectively. Similarly, in 2015, Malaysia's financial score was the second lowest while Romania which had a mean score of 3.3, was the country with the lowest mean financial score (OECD, 2016). Overall, the findings show that Malaysians have low financial knowledge compared to other countries and

Malaysia's overall financial knowledge did not improved significantly from 2015 to 2018. However, there were significant improvements in the knowledge of most of the financial concepts.

4.2.2 Financial attitude

Three financial attitudinal questions were used to assess individuals' attitude towards money usage (see, Table 1). Figure 4 shows the mean score for each of the statements used to measure financial attitude which follows the OECD (2020 and 2016) approach. The mean score is computed from a 5-point Likert scale. A cursory analysis indicates that more Malaysians exhibited short-term time preferences in 2018 than in 2015. In other words, compared to 2015, the financial attitude of Malaysians had worsened.

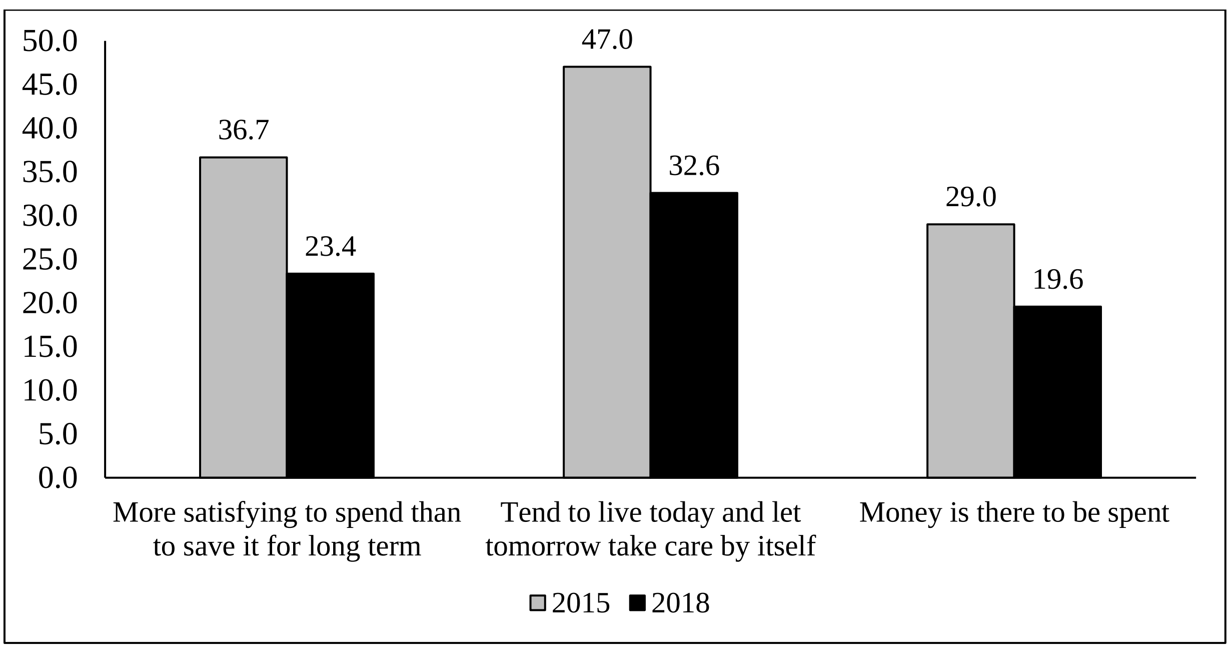
Figure 4: Mean rating of financial attitude for 2015 and 2018



t-statistics shows that the mean score for all the three financial attitudinal statements in 2018 significantly worsened compared to 2015 at a 1% significance level. The t-statistics are -14.9802, -14.9918 and -13.8907, respectively. Although the financial attitude appears to have worsened from mean score of 3.1 in 2015 to 3.4 in 2018, the mean score in 2018 was still within the range of 3. This implies that Malaysians' financial attitude is entirely unfavourable. This is because, a mean score in the range of 3 simply indicates that on average, the respondents neither disagreed nor agreed with the statements given. This could also imply Malaysians generally do not exhibit a strong short-term or long-term preference.

The percentage of Malaysians who showed a positive financial attitude is presented in Figure 5. A positive financial attitude implies that an individual exhibits a preference for long-term financial planning and they have chosen to disagree or strongly disagree with the three statements used to measure financial attitude. There was a lower percentage of individuals who had a positive financial attitude in 2018 compared to 2015. For all the three statements concerning attitude towards spending money, less than 40% of Malaysians disagreed or strongly disagreed with the statements given.

Figure 5: Percentage of individuals who has a positive financial attitude



4.2.3 Financial behaviour

The analysis on financial behaviour is divided into four sections: i) savings behaviour, ii) long-term financial planning such as setting financial goals and retirement planning, iii) tracking financial cash flows, iv) product holdings and making informed purchases.

i) Savings behaviour

Approximately 87% of the individuals surveyed acknowledged that they are active savers regardless of the savings channels in both 2015 (87.6%) and 2018 (87.2%). Among the participating countries, Malaysia was one of the countries with the highest percentage of active savers. The average percentage of active savers for participating countries in the OECD (INFE) survey of 2018 was 70.4% (OECD, 2020).

While most Malaysians are active savers, it is important to explore further Malaysians' saving behaviour such as their current monthly savings rates. As shown in Table 3, the range of savings rate options given to the respondents was slightly different for both years.

Table 3: Current monthly savings rate in 2015 and 2018

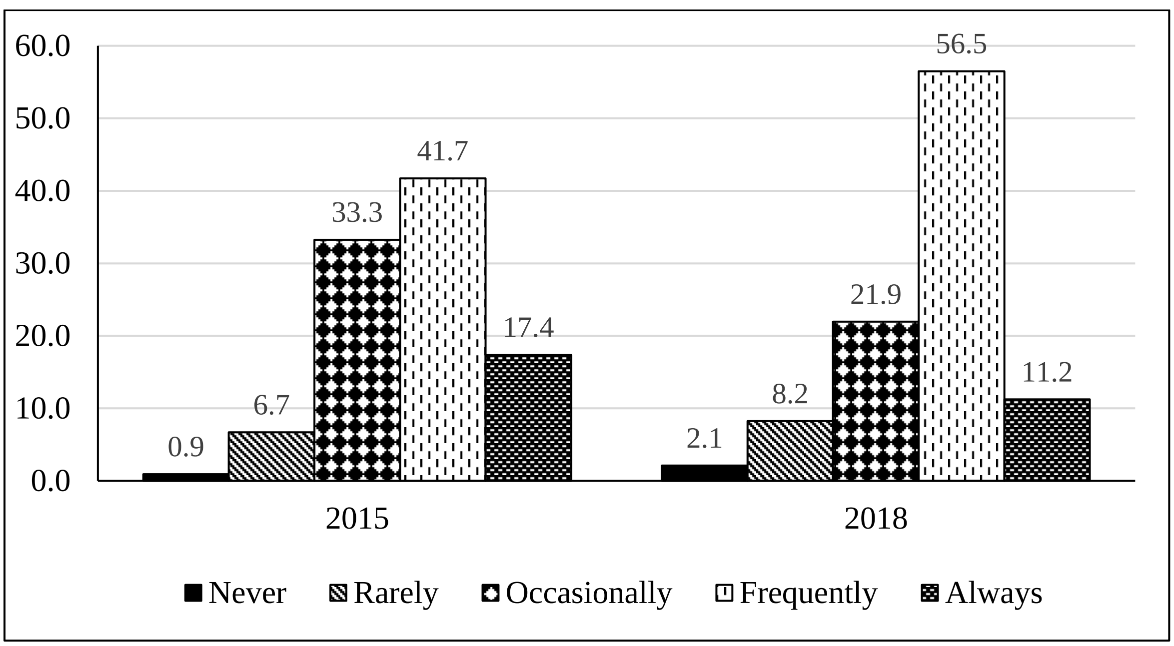
Savings rate as a percentage of their monthly household income	2015	Savings rate as a percentage of their monthly household income	2018
Less than 6%	36.4	Less than 5%	23.6
6-10%	26.6	5-10%	37.2
11-20%	12.6	11-20%	17.7
21-35%	5.3	21-35%	5.8
36-60%	2.6	36-50%	2.0
Above 60%	2.1	Above 50%	0.8
I don't know	14.4	I don't know	12.9

In 2015, the majority saved less than 6% followed by 6-10% while in 2018, the majority saved between 5-10% followed by less than 5%. Overall, 75.6% and 78.5% in 2015 and 2018 were currently saving at least 20% a month, respectively. This met the minimum recommended savings rate as Malaysians were encouraged to save at least 10% assuming that they are contributors to the Employee Provident Fund (EPF) would have at least 23% of savings in terms of their retirement funds. The additional personal savings of 10% would imply that they have retirement savings of at least 33% of their income. According to Ong (2014), the Private Pension Administrator recommends that Malaysians save 33% of their salary for retirement savings of which 23% comes from EPF contribution and 10% from personal savings.

ii) Long-term financial planning

From the individuals surveyed in 2015 and 2018 respectively, many of them frequently and always set long-term financial goals. This is shown in Figure 6. Collectively, 56.8% in 2015 frequently and always set long-term financial goals while 63.3% of individuals in 2018 did so. On the other hand, less than 10% of the individuals surveyed in 2015 and 2018 rarely or never set long-term financial goals. In conclusion, Malaysians do set long-term financial goals.

Figure 6: Frequency of setting long term financial goals

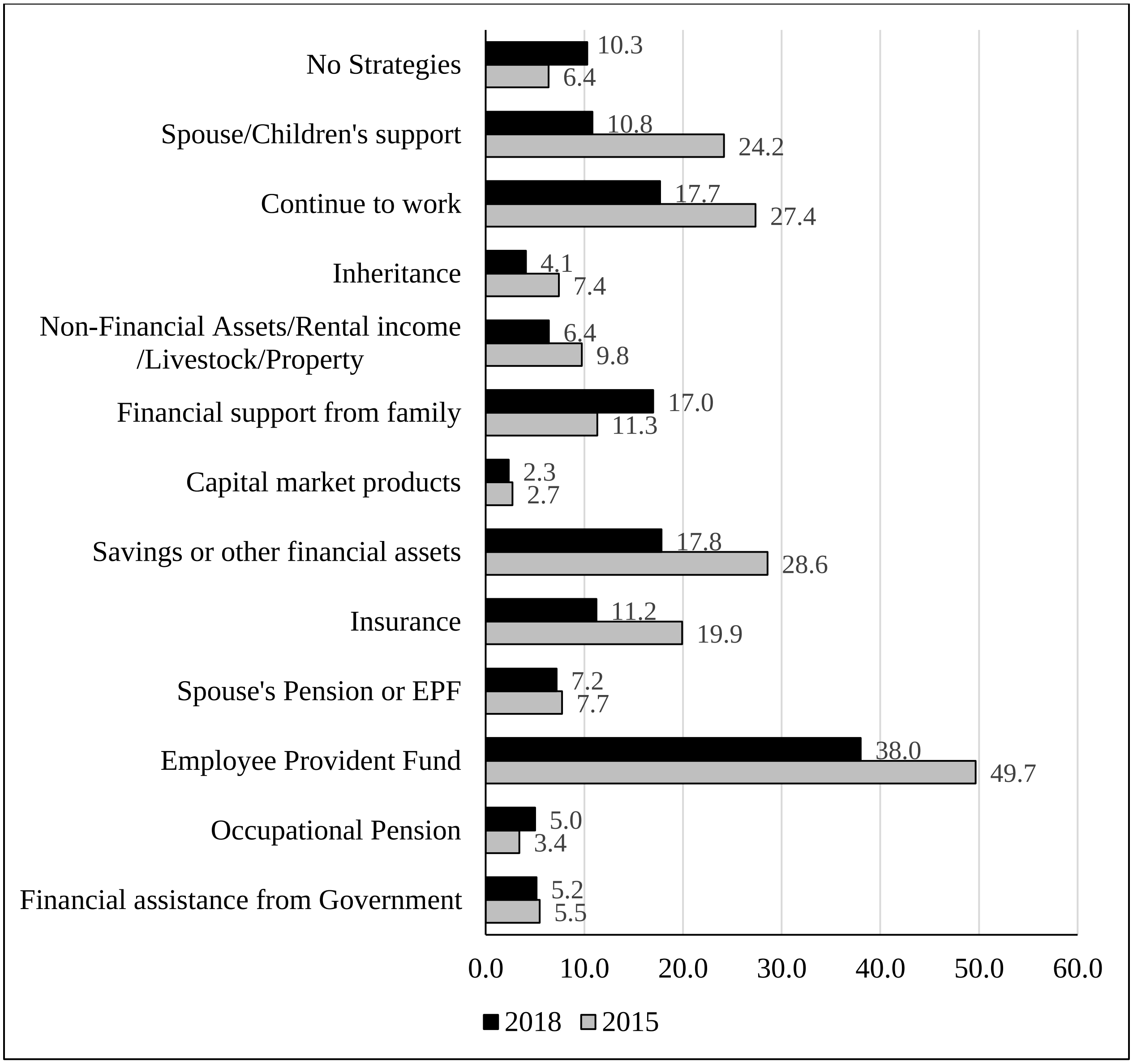


Given that the majority of the respondents exhibit long-term financial planning behaviour, an analysis is conducted to investigate a specific long-term financial planning, namely retirement planning. Figure 7 presents the various retirement strategies that individuals had in 2015 and 2018 to cover their expenses at an old age. The retirement strategies could be in the form of formal (institutional) sources, private voluntary pension, and informal sources. Formal sources would be government assistance, occupational pension, EPF, and spouse's formal retirement funds. On the other hand, private voluntary pensions include insurance, savings, or other financial assets and capital market products. Informal sources would encompass financial support by family members, income from non-financial assets, inheritance, and employment. The categorization of the retirement strategies follows the OECD Financial Literacy Survey.

There were 59.1% and 47.4% of respondents who had retirement strategies in formal channels in 2015 and 2018, respectively while there were 40.9% and 52.5% of respondents who had retirement strategies either in private pensions or informal sources in 2015 and 2018, respectively.

Among the various retirement strategies, EPF stands out as the most popular retirement strategy but, less than half of the individuals surveyed are EPF contributors in Malaysia (World Bank, 2018). The percentage of individuals who had EPF as one of their retirement strategies fell from 49.7% in 2015 to 39.0% in 2018. Further investigation found that 68.2% of those who were full-time salaried employees in 2015 had EPF while only 59.4% of those full-time salaried employees in 2018 had EPF. Additionally, 66.6% of the sample were in active employment compared to 73.3% of the sample in 2015. This partly explains the low percentage of EPF subscription found in the data of 2018. Approximately 5% received financial assistance from the

Figure 7: Retirement strategies to cover old age expenses



government either from national or state levels such as welfare aid or zakat. While EPF serves as a retirement savings fund for privately employed workers, civil service workers depend on government pension as their retirement income. In the survey, only 3.4% and 5% of individuals surveyed in 2015 and 2018 had occupational pensions as their means of retirement income. There was an increased percentage of individuals who did not have any retirement strategies from the 2018 survey (10.3%) compared to the 2015 survey (6.4%).

There were 27.4% and 17.7% of individuals in the 2015 and 2018 surveys who expressed that they plan to continue to work to cover old age expenses. Additionally, there was high reliance on financial support from families or spouses and children as retirement strategies. For those without formal retirement channels, most of them have their retirement strategies in informal sources with financial support from families, spouses, or children as the most popular channel. The private pension channel is not popular for those without formal retirement channels as less than 25% of them took on private pensions as their alternative retirement strategy in 2018.

iii) Keeping watch on financial affairs

The third analysis on financial behaviour pertains to individuals' behaviour in tracking their financial cash flows. Tracking of financial cash flows is considered an important financial behaviour as it enables individuals to be informed of their financial status and to minimize overspending or over commitment of financial responsibilities.

Individuals' behaviour of tracking financial cash flows was analysed from two aspects, namely the frequency of keeping a close watch on personal financial affairs and the frequency of paying bills on time. A 5-point Likert scale was used ranging from 'never' to 'always' to capture the extent of the frequency of keeping a close watch on personal financial affairs and paying bills on time. Overall, it is found that there exists a significant association between the frequency of keeping a close watch on personal financial affairs and the frequency of paying bills on time (chi-sq statistics = 2,400). Additionally, keeping a close watch on personal financial affairs and paying bills on time is moderately correlated with a correlation coefficient of 0.52.

Most of the individuals surveyed in 2015 and 2018 had the habit of frequently and always keeping a close watch on personal financial affairs and paying bills on time. There was an improvement in these two behaviours in 2018 compared to 2015. For example, in 2018, there was a slightly higher percentage of individuals who frequently and always paid their bills on time in 2018 (68.4%) compared to 2015 (55.9%). The details are presented in Table 4.

Table 4: Frequency of keeping close watch on personal financial affairs and paying bills on time: Comparison between 2015 and 2018

Frequency	Keeping close watch on personal financial affairs		Paying bills on time	
	2015 (%)	2018(%)	2015 (%)	2018(%)
Never	0.5	0.8	1.2	0.8
Rarely	5.4	5.2	9.0	5.4
Occasionally	32.8	22.3	34.0	25.4
Frequently	41.1	57.2	34.6	54.5
Always	20.2	14.5	21.3	13.9

On comparing with the other participating countries of the OECD (INFE) Financial Literacy Survey, Malaysians fared better in terms of keeping close watch on personal financial affairs and in terms of paying bills on time in 2018. Across the participating countries, the average percentage of individuals who keep a close watch on personal financial affairs and paying bills on time were 67.2% and 79.4% respectively in 2018 (OECD, 2020).

iv) Making considered purchases

The fourth aspect of financial behaviour is to investigate whether individuals make careful considerations before making a financial decision. This could be in terms of considering their own affordability before making purchases and getting the information required before committing to a transaction. Individuals who make considered and informed purchases will avoid excessive spending and have a good understanding on the commitment of their purchases.

It is found that individuals surveyed in 2015 and 2018 were prudent in their purchase behaviour. Over 75% of them would carefully consider their affordability before making a purchase in both 2015 and 2018. Additionally, in terms of making their decision in purchasing or adopting a financial product, individuals also tended to make informed purchases. Informed purchase implies that an individual has considered several options from different companies before deciding, considered assorted options from one company, or had looked around but found no other options to consider. There was an increase in the percentage of individuals who made an informed purchase of financial products in 2018 compared to 2015, from 61.2% to 77.2% based on the recent uptake of financial products. Table 5 presents the results.

Table 5: Making considered and informed purchase: 2015 and 2018

Responses	Considered purchase		Informed purchase	
	2015 (%)	2018 (%)	2015(%)	2018(%)
Yes	76.4	77.5	61.2	77.2
No	2.3	3.9	n.a	
Neutral	21.3	18.6		

Note: For considered purchase:
Data of 2015: "Yes" refers to those who have stated that they completely agree and agree to making considered purchase, while No refers those who have stated that they completely disagree or disagree to making considered purchase.
Data of 2018: "Yes" refers to those who always and frequently make considered purchase while "No" refers to those rarely or never make considered purchase.

4.2.4 Financial vulnerability

Apart from the financial literacy components, the OECD Financial Literacy Survey also included questions that provide insight to individuals' financial vulnerabilities. The questions that relate to financial vulnerability include holdings of emergency funds equivalent to three months of living expenses, at least one month's salary worth of savings to meet unexpected expenses, the duration that individuals can sustain their expenditure due to income shock, and ability to live within means in the past 12 months. These indicators have become more relevant considering the financial repercussions of the COVID-19 pandemic in the last two years, giving an insight to the availability of financial cushions among Malaysians pre-COVID-19 period.

The financial repercussions of the nationwide economic lockdown due to COVID-19 exposed the financial vulnerability of Malaysians. Many experienced loss of employment or pay cuts. While the data of 2015 and 2018 are pre-COVID-19 periods, the data findings indicate a weak level of financial preparedness of Malaysians for an emergency or income shock.

Financial vulnerability is analysed using various indicators. Indicators considered in the analysis are the duration that individuals can sustain their expenditure due to income shock, level of emergency funds by duration, and ability to live within means in the past 12 months.

Table 6 compares the duration of which individuals can sustain themselves due to income shock in 2015 and 2018. An individual should be able to sustain themselves for at least three months without resorting to borrowing or relocating due to income shock (Garman & Forgue, 1997; Greniger et al., 1996; Hanna & Wang, 1995; DeVaney, 1994). This assumes that unemployed individuals take an average of three to six months to be re-employed (Johnson and Widdows, 1985). Only 24.7% and 30.9% of individuals could survive at least three months and above due to income shock in 2015 and 2018, respectively. Furthermore, 37.9% and 32.2% could sustain not more than a month if they experience income shock. According to Loke (2016a), only 20.8% of Malaysians met the minimum duration of three months in 2010. Although, most individuals did not meet the minimum duration adequacy of funds for income shock, Malaysians overall have improved in their preparedness for income shock in 2018 compared to 2015 and 2010.

Table 6: Duration of sustainability of funds because of income shock: 2015 and 2018

Duration of sustainability of funds	2015	2018
Less than one week	11.9	8.5
At least one week but not one month	26.1	23.7
At least one month but not three months	37.4	36.9
At least three months but not six months	16.3	19.0

Above six months	8.4	11.9

From the participating countries in the survey in 2018, OECD (2020) reported that 28% of the global sample participants could survive one week or less, 40% could survive between one to six months and 18% could survive six months and above. Malaysians were in better position as there was higher percentage of respondents who could survive between one to six months and lower percentage of individuals who could survive one week or less in 2018 compared to 2015.

In the survey, respondents were also asked if they had emergency funds equivalent to three months of living expenses and whether they had one month's salary worth of savings to meet unexpected expenses. Table 7 summarizes the percentage of individuals who have holdings of emergency funds equivalent to three months of living expenses and at least one month's salary worth of savings to meet unexpected expenses.

Table 7: Holdings of emergency funds and least one money salary worth of savings: 2015 and 2018

Funds holdings	2015 (%)	2018 (%)
Holdings of at least one month salary worth of savings	40.9	43.8
Holdings of emergency funds equivalent to 3 months of living expenses	50.4	40.4

Contrary to the duration of sustainability against income shock, 50.4% and 40.6% of the surveyed respondents in 2015 and 2018 acknowledged that they had emergency funds equivalent to three months of living expenses. This somewhat paints a different outlook on the financial vulnerability of the individuals. However, 11.1% and 20.2% of them in 2015 and 2018 respectively admitted that they do not know if they have emergency funds equivalent to three months of living expenses. On the other hand, 40.9% and 43.8% of the surveyed respondents in 2015 and 2018 respectively noted that they had savings equivalent to at least one month of their salary. While these indicators provide different perspectives of an individual's financial vulnerability, what remains clear is that the majority of Malaysians are vulnerable to economic shock if it persists for more than three months.

Apart from having poor financial cushions, slightly half of the individuals (56.0%) surveyed in 2018 could live within means. However, this is an improvement compared to 2015 whereby the percentage of individuals whose income could meet their living expenses in the past 12 months was 38.4 %. There was a quite significant percentage of respondents who responded "I don't know" in both 2015 and 2018. If those who responded "don't know" are excluded, the percentage of those who live within means in the past 12 months when the survey was conducted was 71.8% in 2018 and 43.2% in 2015. Table 8 summarizes the results.

Table 8: Living within means in the past 12 months: 2015 and 2018

Living within means in the past 12 months	2015 (%)	2018 (%)
Yes	38.4	56.0
No	50.4	23.1
I don't know	11.2	17.9

5. Discussion

The socio-demographic effects on financial literacy are consistent with previous studies except for gender and income. No significant gender gap in financial literacy is found in the data for both years while income is found to have no significant effects on financial literacy in 2018 only. Malaysians' confidence towards their level of financial knowledge has declined as most Malaysians do not think that they have high financial knowledge. In 2015, less than 25% of the respondents thought that they have "quite high and high" financial knowledge but in 2018, less than 15% of the respondents shared the same sentiment.

Generally, Malaysians have low financial knowledge and there were no significant differences in the distribution of financial knowledge scores obtained between 2015 and 2018 data, but there were significant improvements in the knowledge of a few financial concepts. Notably, there was an improvement in the percentage of individuals who got the answer correct for concepts relating to the time value of money and calculation of simple and compound interest rates on loans. However, Malaysians' understanding of time value of money and calculation of interest rates on loans remains weak compared to the rest of the participating countries in the survey. These fundamental financial concepts are important in basic financial decisions when individuals weigh the cost and returns of the loans and investments. Therefore, the continuous push in promoting financial education is a step in the right direction. This is especially so, given that the impact of financial education is long-term and numerous studies have shown that financial knowledge promotes healthy financial behaviour and attitude (Hamid and Loke, 2021; Abdullah et al., 2019; Chan et al., 2018; Sabri et al., 2017; Mokhtar et al., 2017; Loke, 2017a; Lusardi and Mitchell, 2017; Disney and Gathergood, 2013; Parker et al., 2012).

Malaysians' financial attitude is considered neutral whereby it exhibits a strong preference for short-term or long-term attitude towards money usage. A long-term attitude towards money usage is encouraged so that individuals are motivated to make long-term financial planning, particularly retirement planning. Attitude towards money is found to drive financial behaviour such as overspending and credit card debt (Klontz and Britt, 2012; Kahler and Fox, 2005; Hayhoe et al., 1999).

Financial behaviour was analysed based on four aspects. Malaysians are active savers and over 70% were saving at least 20% of their income in 2015 and 2018. On the other hand, while Malaysians set long-term financial goals, they are poor in planning retirement strategies. As the findings revealed that higher percentage of individuals had poorer retirement strategies in 2018 compared to 2015, there is a need to nurture and promote long-term financial attitude. Furthermore, with only 17.8% and 2.3% planning to use financial assets and capital market products respectively as their retirement strategies, individuals should be educated about financial investments as one of the retirement planning strategies. In Malaysia, while there is a retirement savings fund, known as the Employee Provident Fund (EPF) for privately employed workers, approximately 68.2% of the labour workforce are EPF members and only 30.9% of the Malaysian working population are active EPF contributors (EPF, 2017). For Malaysians who contribute to EPF, many of them do not have adequate EPF savings for retirement and this is due to various reasons such as low accumulated savings as income is low (EPF, 2016), the utilization of the withdrawal facilities for housing and education purposes (EPF, 2018), and the lack of utilization of the members' investment scheme (EPF, 2018). Furthermore, due to COVID-19, many EPF contributors have withdrawn their retirement funds through special withdrawal facilities such as i-Lestari, i-Sinar, and i-Citra and it is predicted that 73% of EPF members will have inadequate funds to retire above the poverty line (Salim, 2021).

Malaysians keep a close watch on their personal financial affairs and pay their bills on time and they have improved in these aspects in 2018 compared to 2015. However, in terms of weathering income shock and having financial cushions for financial emergencies, Malaysians were more prepared in 2018 compared to 2015. The percentage of individuals who could sustain themselves for at least three months due to income shock, had one-month salary worth of savings for emergency purposes, and had emergency funds equivalent to three months living expenses was higher in 2018 compared to 2015. Furthermore, a higher percentage of individuals were able to live within means in 2018 compared to 2015.

As revealed by the findings, only 30.9% of respondents could sustain themselves above three months if there was an income shock and 40.4% had emergency funds equivalent to three months of living expenses in 2018. This suggests that Malaysians are not prepared for income shock and with the recent prolonged COVID-19 pandemic, it is not surprising to find that Malaysians were adversely affected. Therefore, the public should be educated and made aware of the recommended minimum amount of savings for emergency funds. This is similar to EPF which has outlined the minimum recommended savings according to age (EPF, 2019). However, as different individuals have different lifestyles, instead of recommending a certain level of monetary value, the recommendation can be made in relation to living expenses or salaries. This way, it will also be easier for individuals to understand and plan their savings for emergency purposes.

6. Conclusion

This paper has provided an overview of the state of financial literacy among Malaysians and a glimpse on the financial vulnerability of Malaysians prior to the COVID-19 pandemic as the analysis is based on data collected from the OECD (INFE) Financial Literacy Survey which was conducted in 2015 and 2018.

The findings show that financial literacy is increasingly important with the growing complexity of the financial landscape and digitalization of finance. Therefore, the promotion of financial education should be intensified. Furthermore, digital financial literacy could also be added to the promotion of financial literacy and financial education programs. Furthermore, notwithstanding the importance of knowledge in basic financial concepts and digital finance, the COVID-19 experience has revealed the importance of savings particularly, having emergency funds and preparing for income shock.

Retirement planning has gained importance as there is an increased concern that Malaysians do not have adequate retirement savings to sustain themselves throughout their retirement. This is reflected in the findings of the study where Malaysians showed high dependency on financial support from family members followed by plans to continue working to cover their expenses at old age.

In addition, promoting a higher future time perspective, the habit of keeping a close watch on personal financial affairs should be encouraged. Lastly, keeping a close watch on personal financial affairs should also include increased frequency of checking sufficiency of emergency savings as individuals would be more aware of their emergency savings.

This paper acknowledged that significant relationships may exist between the various components of financial literacy and financial vulnerability, but this is beyond the scope of this study. However, given that there has not been a comprehensive insight on the state of financial literacy of Malaysians and how it has developed, a comparative descriptive analysis as presented in this paper is warranted.

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