INTERDISCIPLINARY APPROACH TO ECONOMICS AND SOCIOLOGY

ECONOMICS
& Sociology

FINANCIAL HOUSEHOLDS' EFFICACY, RISK PREFERENCE, AND SAVING BEHAVIOUR: LESSONS FROM LOWER-INCOME HOUSEHOLDS IN MALAYSIA

Suhal Kusairi,
Universiti Malaysia Terengganu, Malaysia
E-mail: suhal@umt.edu.my

Nur Azura Sanusi,
Universiti Malaysia Terengganu, Malaysia
E-mail: nurazura@umt.edu.my

Suriyani Muhamad,
Universiti Malaysia Terengganu, Malaysia
E-mail: suriyani_md@umt.edu.my

Madihah Shukri,
Universiti Malaysia Terengganu, Malaysia
E-mail: madihah@umt.edu.my

Nadia Zamri,
Universiti Malaysia Terengganu, Malaysia
E-mail: nadyaazamryvv@gmail.com

ABSTRACT. Many government policies contain recommendations how to improve financial literacy, particularly through programmes of financial education and personal finance. However, personal financial management is not solely related to knowledge and financial literacy; individual confidence level in own financial abilities and household differences need to be considered in this regard. This paper investigates household financial efficacy through application of psychometric instruments, financial literacy, risk preference and demographic characteristics towards saving decision behaviour. The sample covers 404 households in Peninsular Malaysia and utilises the logistic and probit empirical model. The results show that household's financial efficacy is essential for household's saving decision behaviour and choice of saving instrument. Financial literacy, race, education and dependence ratio and location (rural or urban) of the household also play a role in saving instruments selection. More specifically, households with higher levels of financial efficacy are more likely to use bank-based or other lower risk saving instruments as compared to non-banking-based instruments.

Introduction

Malaysian Government has defined six strategies and six drivers of change in development policies and has formulated new approaches to tackling the challenges so that to achieve the developed country status by 2020. One of the six drivers of change is increasing the level of B40 households in the direction of the middle class. According to the Economic Planning Unit (2015), B40 households have incomes in the lowest 40% in Malaysia.

At the same time, some 2.7 mln households have average monthly incomes at the bottom 40% (B40), around RM2, 537. In Malaysia, although the welfare of B40 households is improving, many remain marginalised from enjoying the full set of opportunities afforded by Malaysia's economic advancement. If the B40 households remain in their current socioeconomic position, it will become a social cost to the nation through reduced numbers of the necessary skilled workforce and other negative effects on the growth of national output. Meanwhile, the imbalance between rural and suburban households also affects economic growth. Sustainable development requires these most troublesome households be in the focus on social and economic reforms.

Several government initiatives have been launched with the aim to shift the B40 households into the middle class by increasing their income level as well as level of education and skills. Such efforts include strengthening community-based and social enterprises as well as private companies, in the attempt to develop the capacity to get engaged in high-productivity economic activities which are innovative and creative. B40 households can save and create wealth through the ownership of non-financial assets so that to be more resilient to economic shocks. Lastly, B40 households can become independent and less reliant on government assistance.

However, Malaysian households are facing financial problems. The central bank reported that household debt in 2013 reached 86.7% of the Gross Domestic Product. The Insolvency Department of Malaysia reported that the total of 134,550 individuals declared bankruptcy from 2007 to June 2014. On average, 68 people declare themselves bankrupt every day. Those aged 35 to 44 years had the highest percentage of these, at 34.23%, followed by those aged 45 to 54 years (26.70%), and 25 to 34 years (20.27%). Bankruptcy due to purchase loans recorded the total of 30,452 cases, followed by 20,529 cases of housing loans, 18,053 cases of personal loans and 14,431 cases of business loans.

This problem arises due to improper saving decision-making under the circumstances of limited income and wrong saving instruments selection. In other words, the cause of this problem is that financial management skills are weak when it comes to B40 households' saving decisions. Farrell et al. (2015) stated that financial efficacy is the factor differentiating successful households in normal or recession conditions.

Research often focuses on effective financial decision-making and the process of prioritizing particular saving instruments (Farrell, 2015). Nevertheless, studies rarely explore the results of the household acting as an economic agent. For example, according to the contract theory, a family of husband and wife can be seen as a firm with its collection of contracts between shareholders. Thus, this study takes into account individual's capability to enter into contracts and what effect these contracts may have on household's decisions. The rational argument of this framework as presented by Bandura (1977, 1989) while Farrell et al. (2015) suggest that father, mother or family members may influence the abilities of individuals to make financial decisions and communicate them properly.

The remaining part of the article will be organised as follows. Section two reviews the literature on behavioural finance theory and the already available empirical findings. Section three details the research methodology, data sources, the definition of variables, and specifies

the model to be used for logistic and probit analyses. Section four discusses the results while section five concludes the study and lists the implications.

1. Literature review

Consumption and production are basic human activities. Production is the process of producing goods and services through economic factors such as land, human resources, capital, and entrepreneurship. In contrast, consumption is the process of consuming goods and services by utilising income. The financial market is a mechanism between the surplus and the deficit funds from both activities. The surplus can be saved through financial instruments. In this case, financial efficacy, risk preferences, financial literacy, and social demographics influence saving decisions and the choice of saving instruments.

The efficient market hypothesis (EMH) and rational expectation theory are the two mainstream theories of human economic activity. Both theories postulate that market prices reflect all the available information, past, current, and future, because all participants are rational utilisers of information (Haugen, 1999; Ramiah et al., 2015). The pillars of the mainstream theory include Markowitz's (1952) theory of portfolio selection, which states that the first stage of portfolio selection involves the formation of relevant beliefs on the basis of observation regarding the market and personal risk preference of investors. It starts with the relevant beliefs and ends (optimally) with the selection of a portfolio.

In addition, the asset pricing theory of Lintner (1965) and Sharpe (1964) states that, in equilibrium, a line shows the relationship between the expected return and the standard deviation of the return for efficient combinations of risky assets or portfolios. It also guides the establishment of the condition under which stock is held long (short) in optimal portfolios even though the risk premium is negative or positive. Fama (1965, 1970) developed the efficient market hypothesis for investment decisions, in which stock prices follow a random-walk process such that the actual price of financial instruments at any point in time is a good estimate of the intrinsic value. Then, Black and Scholes (1973) developed the option pricing theory as a model to estimate the price of a European option. Fama and French's (1993, 1996) asset pricing model extended the single index model to multiple indexes as a benchmark of the asset pricing model that considers the firm size, market to book value, and momentum.

Opposing the mainstream theory, market anomalies known as the inefficient market hypothesis and irrational behaviour are the landscape of behavioural finance. The main idea is that financial decisions also depend on self-control and social aspects and are considered to be a psychological, moral aspect. Behavioural economics and finance are not a new concept. Adam Smith (1759) introduced the theory of moral sentiments. The main explanation is that economic agents decide their economic activity not solely through rational expectations but also through the moral aspect. Smith (1776) also provided a comprehensive view of inquiries into the nature and causes of the wealth of nations. Some analysts have pointed out the contradictions between liberalism or natural liberty and morality in this work's explanation of human activity, especially economic activities. Smith introduced the 'invisible hand' into the market mechanism because he believed that most people are self-interested, sympathetic, and wish to be thought of well. All these points concern the morality of economic agents.

The pillars of behavioural finance include Selden's (1912) psychology of the stock market, which argues that the movement of stock prices depends on the mental attitude of the market participants. Festinger et al. (1956) introduced social psychology as a state of cognitive dissonance that arises when two simultaneously held cognitions are inconsistent. Because the experience of dissonance is unpleasant, the person will strive to reduce it by changing his/her beliefs. Pratt's (1964) utility and risk consider utility functions, risk aversion, and risk as a proportion of total assets. Tversky and Kahneman's (1986)

judgemental heuristics concern the development of the availability heuristic, postulating that a person evaluates the frequency of classes or the probability of events by availability. Three heuristics are employed to make a judgement under uncertainty: representativeness, availability, and anchoring. Harrison and Ruststrom (2009), Kahneman and Tversky (1979), and Thaler (1980) promoted prospect theory and stated that people underweigh outcomes that are merely probable in comparison with outcomes that will be obtained with certainty, advocating the use of prospect theory as an alternative descriptive theory. In addition, expected utility theory and prospect theory can be reconciled using a mixture model.

De Bond and Thaler (1985) and Shiller (1981) stated that the efficient market hypothesis is at best an 'academic' model and does not describe the observed movements in financial prices. People overreact systematically to dramatic news events, resulting in substantial weak-form inefficiencies in the stock market. Yaari (1987) made modifications to expected utility theory to obtain the 'dual theory of choice under risk'. Samuelson and Zeckhauser (1988) showed that decision-making experiments confirm the presence of status quo bias. Kahneman et al. (1990) argued that the loss aversion and endowment effects persist even in market settings with opportunities to learn.

Related to the standard theory of self-efficacy and individual behaviour, Bandura (1994) and Gecas (1989) stated that the basic concept of self-efficacy refers to an individual's sense of self-agency, borne from a belief that he/she can accomplish a given task and more broadly cope with life's challenges. Self-efficacy can be expressed through various elements of individual behaviours, such as how well an individual perseveres in the face of adversity, stress, or negative shock and whether he/she has a good capability to absorb pressure from external or internal factors. In other words, he/she has an optimistic or pessimistic attitude towards the future and thinks in self-enhancing or self-debilitating ways (Bandura, 2006b).

The concept of self-efficacy has been applied to economic or financial decision behaviour, and it could be argued that individuals with a greater sense of self-assuredness in their expenditure and financial management capacities are more likely to approach any economic and financial difficulties. In other words, they encounter problems as 'challenges to be mastered, rather than as threats to be avoided' (Bandura, 1994; Bandura et al., 1987; Farrell et al., 2015). Such a positive attitude is likely to result in achievement and more favourable individual financial outcomes.

Studies have also applied financial self-efficacy as the independent variable in a standard model of economic behaviour to evaluate its significance in predicting investigated behavioural outcomes. Some studies have assessed the explanatory power of the related concepts of 'investment self-efficacy' (Forbes & Kara, 2010), 'entrepreneurial self-efficacy' (Kickul et al., 2008), and women's personal finance behaviour (Farrell, 2015). Generally, the results indicate that financial self-efficacy could explain favourable individual economic outcomes positively.

2. Methodological approach

2.1 Research Model

We demonstrate the econometric applicability of financial self-efficacy and extend it to financial household efficacy in the saving decision behaviour of B40 households. We derived the model of financial households' efficacy from basic contract theory (Baker et al., 2006, 2007). Here the contract is between an individual agent, namely a husband and his wife, and their family, especially their parents, who might directly or indirectly influence their economic decisions. In line with this, Bandura (2006a) argued that the assessment of collective efficacy distinguishes between the source of judgements (i.e. individuals) and the

level of the phenomenon being assessed (i.e. personal efficacy or group efficacy). Perceived collective efficacy resides in the minds of members as the belief that they have in common regarding the group's capability. In a collectivity, it is members acting on their common beliefs who contribute to the group's functioning (Bandura, 1977, 1997; Bandura et al., 2014).

This research employs behavioural finance, with a psychological approach to financial decisions through self-efficacy and family efficacy, by focusing on saving behaviour, psychometric application, and the effect of self-efficacy on saving decisions. The analysis is extended to the effect of family efficacy and household efficacy on saving decisions. In this research, there are five variables, namely 1) saving decision behaviour, 2) household financial efficacy, 3) financial literacy, 4) risk preference, and 5) geographic characteristics.

According to Keynesian economics, savings consist of the balance remaining when the cost of a person's consumer expenditure is subtracted from the amount of disposable income that he or she earns in a given period. Saving behaviour is the study of individuals, groups, or organisations and the processes that they use to select saving products and satisfy their needs as well as the impacts that these processes have on the saver and society. Savings are measured as the probability outcome for each of the different types or sets of saving or financial products. The value is 1 if ymi is more than 0 and 0 if ymi is otherwise.

Financial self-efficacy refers to individuals' perceived ability to manage their finances (Lapp, 2010). It is related to their self-confidence in carrying out financial management tasks (Lown, 2011) and could reflect their financial skills. Thus, financial self-efficacy is a psychological concept that can be an important predictor of successful performance in individual financial empowerment. Similarly, financial family efficacy refers to parents' perceived ability to manage their finances. We argue that the abilities of parents reflect on their children. Household financial efficacy refers to collective financial efficacy, which in this paper consists of a husband, his wife, and their family. Our study applies the Financial Self-Efficacy Scale (FSES), as developed and validated by Lown (2011) but with certain adjustments. We redefined the FSES for measuring household or collective financial efficacy in line with the argument that household financial efficacy is a process agreed among household members regarding expenditure and saving decisions (see Appendix A).

Financial literacy is the ability to understand how money works in the world, that is, how someone earns or makes it, how that person manages it, how he/she invests it (turns it into more), and how he/she donates it to help others. Financial literacy is presented by the level of education (through which she/he can develop the fundamental literacy and numeracy skills needed to acquire financial knowledge and develop financial literacy).

Risk preference is the tendency to choose a risky or less risky option. Generally, economists and financial professionals apply the concept of risk preference to investment and financial decisions. This research applies risk preference as a personal preference for risk. The personal preference of risk is measured as an individual's personality and willingness to take a financial risk if he/she has some precautionary cash for saving or investment.

Socio-demographics are the characteristics of respondents related to social and demographic factors, such as household income, gender, ethnicity, age, education, saving instruments (rural or urban), dependency ratio, marriage status, and status as a decision maker. Compared with the existing literature, in this research, we include the differences in ethnicity and rural–urban areas in saving behaviour.

Logistic and Probit Model

The logistic model can be written as the following probability functions equation:

$$f(y_i) = \pi(x_i)^{y_i}(1 - \pi(x_i))^{1-y_i} \tag{1}$$

with $y_i = 0, 1$.

The logistic regression model is as follows:

$$\pi(x) = \frac{e^{(\beta_0 + \beta_1 x_i + \cdots + \beta_p x_p)}}{1 + e^{(\beta_0 + \beta_1 x_1 + \cdots + \beta_p x_p)}} \tag{2}$$

where p = the number of independent variables. Equation (2) is transformed into the form of a logistic model equation to make it easier to estimate its parameters.

$$g(x) = \beta_0 + \beta_1 x_1 + \cdots + \beta_p x_p \tag{3}$$

Equation (3) is a logistic model with the independent variable of p.

An alternative logistic model is the probit model. The probit model is a regression analysis used to describe the relationship between dependent variables and independent variables, in which the dependent variable values (Y) are assumed to be qualitative with the binary values of 0 and 1. To pass this conjecture using the cumulative normal distribution function for regression, the probit model uses the normal distribution method.

The probability distribution used is the standard distribution, namely:

$$f(y_i I \pi_i) = \pi_i^{y_i}(1 - \pi_i)^{1-y_i} \tag{4}$$

with $y_i = 0, 1$, and π_i is the probability of the first event of Y = 1. The transformation function in the probit model is the cumulative distribution function (CDF) of the normal distribution function as a function of the connection to the generalised linear model (GLM).

$$P(y_i = 1 I x_i) = \emptyset(\beta' x) = \int_{-\infty}^{\beta' x} \emptyset(z) dz \tag{5}$$

$$F(g)(x)) = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{\beta X_i} e^{-\frac{z^2}{2}} dz \tag{6}$$

In general, the probit model can be expressed by the following equation:

$$P_i = F(Z_i) = F(\beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \cdots + \beta_P X_{Pi} + \varepsilon_i) \tag{7}$$

F is the cumulative probability function, and X_{ij} is an independent variable that is stochastic. To obtain an estimation of the probit value of probit (Z_i), we can use the inverse from the cumulative normal distribution as follows:

$$P_i = F^{-1}(Z_i) = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \cdots + \beta_P X_{Pi} + \varepsilon_i \tag{8}$$

The logistic model analysis steps are as follows: 1) the parameter estimation of the logistic regression equation using the maximum likelihood method to estimate beta (β) parameters in partial. This method estimates the β parameter by maximising the likelihood function with data conditions to follow certain distributions. 2) The model obtained then determines whether the independent variables significantly affect the dependent variable. The tests used are a whole test and partial tests (using the likelihood ratio test). 3) The model's density test is used to ensure that there is a significant difference between the yield and the chosen model (using the chi-square). 4) The odds ratio shows the comparison between the probability of the target outcome and that of the non-target outcome. The level of influence of each independent variable is significant using the odds ratio, and it can be concluded that the odds ratio (OR) based on equation 3 is as follows:

$$OR = \frac{\dfrac{\pi(1)}{[1 - \pi(1)]}}{\dfrac{\pi(0)}{[1 - \pi(0)]}} = \frac{\pi(1)[1 - \pi(0)]}{\pi(1)[1 - \pi(1)]} = \frac{e^{\beta_0 + \beta_1}}{e^{\beta_0}} = e^{\beta_1} \tag{9}$$

Finally, the robustness test is conducted by utilising the classification analysis and goodness of fit test introduced by Hosmer and Lemeshow (2000).

2.2. Sampling and Data Collection

A survey and grounded research were conducted. The unit of analysis in this research is B40 households from urban and rural areas from various ethnicities, specifically Malay, Chinese, and Indian, on the Peninsular of Malaysia. Primary data were collected from respondents using a questionnaire and sample frame from the Department of Statistics Malaysia.

Cluster proportional and systematic random sampling were used to select the sample population. To obtain strong and valid results for the characteristics of the population, the minimum sample was determined through the cluster proportional systematic random sampling method. The cluster was based on the state and rural–urban areas. Then, it was distributed based on proportional allocation. The total population of B40 household participants from Pahang, Selangor and Johor is 747,800. The determination of the minimum sample size was suggested by Krejcie and Morgan (1970), with a chi-square value for the degree of freedom at the desired confidence level (3.844), the degree of accuracy expressed as a proportion (0.05), and the population proportion assumed as 0.5 to provide the maximum sample size. This results in a required sample size of 385 units. Fortunately, the research sample contained 404 B40 households, 5% more than the required sample.

The data collection techniques consisted of questionnaires, observations, and interviews. The questionnaire was given to all the selected B40 households. Closed-ended questions were used in this questionnaire, and the options were provided using the Likert scale (see Appendix A). The items of the questionnaire were constructed based on the strong definition, the determinant of dimensions, and the measurement of every variable. It is a critical step in survey research to ensure that the items of the questionnaire are related to the main issues being studied.

3. Results and Discussion

The discussion of the results begins with a descriptive analysis of the main variables of the study, followed by an analysis of the impact of the geographic characteristics, risk preference, financial literacy, and financial efficacy on the saving decision behaviour regarding non-durable goods; they are finalised through the diagnostic test of the best model.

Table 1. Responses to Financial Households' Efficacy Scale (FHES) items (%)

Survey item	Strongly agree	Agree	Neutral	Disagree	Strongly disagree	Total
FHES1	56	28	7	5	4	100
FHES2	55	29	6	6	4	100
FHES3	49	24	7	12	8	100
FHES4	58	25	4	6	7	100
FHES5	52	35	4	5	4	100
FHES6	53	28	6	7	6	100

Note: Based on the sample of respondents used in the estimation ($n=404$).

In Table 1, the responses to each question are assigned a value from 1 to 5, with higher scores corresponding to higher levels of perceived financial household efficacy. Each respondent's scores for the six items were summed to produce a total score that could range from a potential minimum value of 6 to a maximum possible value of 30. This sum constituted the household's score on the FSES. In our sample, the distribution of scores

ranged from 6 to 30, divided by the maximum score with a mean of 0.7730 and a standard deviation of 0.1672 with a minimum of 0.2 and a maximum of 1.

Table 2 depicts the results of the scale reliability and communalities tests for household efficacy. All the survey items are significant in showing a high value of factor loading, ranked from 0.794 to 0.870. The remaining items in this factor have a comfortable value, as the minimum value is 0.794 and the maximum is 0.870. The reliability Cronbach's alpha is satisfactory at 0.878 and in accordance with composite reliability at 0.908 for all six items. We utilised several measures to validate the construction of our Financial Household Efficacy Scale (FHES) instrument statistically and thereby demonstrate its reliability when applied to our sample. Firstly, to assess the internal consistency of the six items used to construct the FHES instrument, we computed Cronbach's alpha (Cronbach, 1951; Garson, 2012). The FHES scores generated a Cronbach's alpha value of 0.8145, indicative of high internal consistency.

Table 2. Correlation matrix and communalities test for the households efficacy

Survey Item	Correlation Matrix			Extraction
	Loading Factor	Corrected Item-Total Correlation	Cronbach's Alpha	
FHES1	0.794	0.656	0.874	0.612
FHES2	0.863	0.775	0.828	0.773
FHES3	0.866	0.755	0.823	0.736
FHES4	0.846	0.742	0.841	0.713
FHES5	0.870	0.775	0.828	0.732
FHES6	0.855	0.760	0.811	0.741
Scale Reliability – Cronbach Alpha	0.878			
Scale Reliability - Composite Reliability	0.908			
Number of Item	6			

Note: Based on the sample of respondents used in the estimation (*n*=404).

Secondly, to assess the strength of the correlation underlying all six survey items, we performed principal component analysis through the communalities extraction test. Factor analysis is preferred as an early investigation before principal component analysis as it measures the ratio of an item's unique variance, known as its communality. The shared variance items are identified using the dimension reduction technique, and thus it is highly recommendable to remove any item with a communality score of less than 0.2 (Child, 2005). As seen in Table 2, in the last column, the results of the principal component analysis show that the six survey items used to construct the FHES loaded heavily onto a single factor, indicating that our constructed instrument effectively captures a common element of behaviour, which is its objective.

Table 3 presents the results of the factor structure conducted to test the inter-correlations among the variables in exploratory factor analysis (EFA). This was achieved by running the data and identifying the pattern matrix. The aim of this pattern matrix is to confirm the correlation value among the items.

Table 4 shows the summary statistics of the research variable. The dependent variable is saving decision behaviour related to saving instrument selection, that is, whether a household prefers to save its surplus money in the short term and take lower risk, such as saving accounts and fixed deposit banking (saving=1) or to use long-term or higher-risk saving instruments, such as gold, mutual funds, and premium saving certificates. The independent

INTERDISCIPLINARY APPROACH TO ECONOMICS AND SOCIOLOGY

variable is financial efficacy as presented by the household financial efficacy, financial literacy represented by financial courses and formative financial experience, risk preference represented by willingness to take a risk in their daily financial affairs, and geographic characteristics such as gender, race (Malay, Chinese, and Indian), location of the household (rural or urban), education level, and dependency ratio measured as the total number of persons in the household. We derived the financial households' efficacy from the financial self-efficacy measure developed by Lown (2011), taking into account the household's geographic location and financial decision making related to saving.

Table 3. Factor structure of pattern matrix using principal component analysis

Survey Item	Component					
	1	2	3	4	5	6
FHES1	0.086	0.251	0.217	0.634	0.249	-0.156
FHES2	0.062	0.265	0.143	0.793	0.061	0.093
FHES3	0.233	0.132	0.262	0.745	0.072	-0.069
FHES4	0.210	0.119	0.249	0.764	0.078	-0.070
FHES5	0.209	0.084	0.302	0.747	0.087	-0.053
FHES6	0.190	0.096	0.190	0.743	0.082	-0.061
Total Initial Eigenvalues	13.910	2.805	1.772	1.503	1.284	1.133
% of Variance Initial Eigenvalues	40.912	8.251	5.211	4.420	3.778	3.333
Cumulative % of Initial Eigenvalues	40.912	49.163	54.375	58.795	62.572	65.905

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
Rotation converged in 6 iterations.
Rotation class: Orthogonal

Table 4. Summary statistics of research variables

Variable	Mean	Std. Dev.	Min	Max
Saving decision	0.5792	0.4943	0	1
Household financial efficacy	0.7730	0.1672	0.2	1
Financial course	1.2475	0.6365	1	4
Formative experience	0.8020	0.3990	0	1
Risk preference	2.0470	0.9240	0	3
Household income	3285.156	502.451	2500	4500
Gender	0.3837	0.4869	0	1
Race	1.2228	0.6494	1	4
Locus of household	0.8144	0.3893	0	1
Education	3.1683	0.5778	2	4
Dependency level	4.4827	1.5696	1	10
Age	42.2847	11.1202	21	76

Note: Based on the sample of respondents used in the estimation (*n*=404).
Sources: Data analysis

The summary statistics of the data used in the analysis indicate the breadth of diversity within our sample. Among some key characteristics, our respondents' ages are spread from 21 to over 76; their education levels range from below elementary school to bachelor

qualifications; their household income brackets per year span from below RM30,000 to more than RM54,000; their dependency levels range from below 1 person to 10 persons for every household; the location of households consists of rural and urban areas; and the races include Malay, Chinese, and Indian. Thus, compared with many previous studies that have applied the FHES instrument, our sample is heterogeneous in terms of such socio-demographic characteristics but almost homogeneous in terms of income.

  Table 5 presents the bivariate probit model, showing the impact of financial efficacy, financial literacy, risk preference, and demographic characteristics on saving decision behaviour regarding saving instrument selection. The results indicate that household financial efficacy, financial literacy, and geographic characteristics influence the saving instrument selection significantly. The global model is the best fit, as shown by the LR chi-square test with a significance level of 1% and the pseudo R square of 17%.

  The results also indicate that the saving instrument selection is partially influenced by the financial household efficacy, financial literacy, risk preference, and demographic characteristics. The coefficient of household financial efficacy is 1.355, which indicates that the probit estimation or z score will increase by 1.355 if the household financial efficacy increases by 1 unit at a significance level of 1%. The coefficient of formative financial experience is -0.4553, which shows that the probit estimation or z score will decrease by 0.4553 if the formative financial experience increases by 1 unit at a significance level of 1%.

Table 5. Results of bivariate probit: coefficient estimates of the likelihood of having a saving instrument in each group

Variables	Coefficient	dy/dx	Std Error	Z	Pvalue
Psychometric Instrument:					
Financial household-efficacy	1.1355	0.435	0.4176	2.27	0.01***
Financial literacy:					
- Financial course:	0.0846	0.032	0.1089	0.78	0.436
- Financial experience	-0.4553	-0.165	0.1838	-2.48	0.01***
Risk preferences	-0.1087	-0.042	0.0784	-1.39	0.165
Household income	-0.0978	-0.037	0.1439	-0.68	0.497
Socio-demographic characteristics:					
Gender	0.0021	0.001	0.1451	0.01	0.989
Malay race	-2.1184	-0.470	0.5320	-3.98	0.00***
China race	-1.6831	-0.552	0.6157	-2.73	0.01***
Locus of household	-1.0805	-0.344	0.1986	-5.44	0.00***
Higher education	-1.1015	-0.418	0.2952	-3.73	0.00***
Senior high school	-0.4327	-0.161	0.2592	-1.67	0.095*
Dependency ratio	-0.1037	-0.040	0.0451	-2.3	0.022**
Constant (atrho)	3.8104	0.001	0.7349	5.18	0.00***
Total probability		0.613			
Model criteria:					
Log likelihood	-228.742				
LR χ^2	92.40				
Prob $> \chi^2$	0.0000				
Pseudo R^2	0.1680				
Number of observation	404				

Notes: *** denotes significance at the 1%. ** denotes significance at the 5% and * denotes significance at the 10%.
Source: Data Analysis

Furthermore, regarding the geographic characteristics, the coefficient of the Malay race is -2.1184, which indicates that the probit estimation or z score will decrease by 2.1184 if Malays are at a significance level of 1%. The coefficient of Chinese is -1.6831, which suggests that the probit estimation z score will decrease by 1.6831 if it has a significance level of 1%. The coefficient of location is -1.0805, which indicates that the probit estimation will reduce by 1.0805 if the location is urban at a significance level of 1%. The coefficient of higher education is -1.1015, showing that the probit estimation or z score will decrease by 1.1015 if higher education is at a significance level of 1%. The coefficient of senior education is -0.4327, which indicates that the probit estimation will decrease by 0.4327 if higher education is at a significance level of 10%. The coefficient of the dependency ratio is -0.1037, pointing out that the probit estimation or z score will decrease by 0.1037 if the dependency ratio increases by 1 unit at a significance level of 5%.

In other words, the marginal effect of the total probability of saving with lower risk is 61.3%. The household financial efficacy is 0.435, which indicates that, when the financial household efficacy average increases by 1 unit, then the probability of households saving with lower risk increases by 43.5%. The marginal effect of financial courses is 0.032, which indicates that, when the financial course average increases by 1 unit, then the probability of households saving with lower risk increases by 3.2%. Financial experience is -0.165, which suggests that, when the average financial experience increases by 1 unit, then the probability of households saving with lower risk decreases by 16.5%. The marginal effect of risk preferences is -0.042, indicating that, for households with higher risk preferences, their savings with lower risk decrease by 4.2%. The marginal effect of income is -0.037, which indicates the probability that, when households have a higher income, their savings with lower risk decrease by 3.7%.

The marginal effect of gender is 0.001, which indicates that, when men represent households, the probability of households saving with lower risk increases by 0.1%. The score for race is -0.47 for Malay and -0.552 for Chinese, indicating that different races choose different saving instruments. Here, the probability of Chinese households saving with lower risk decreases by 55.2% compared with Malay households, for which it decreases by 47%. Urban households record a marginal effect of -0.344, which indicates that their probability of saving with lower risk decreases by 34.4%. Education is -0.47 for higher education and -0.552 for senior high school, indicating that different education levels result in different saving instrument selection. Here, the probability of higher-educated households saving with lower risk decreases by 41.8% compared with senior high school, for which it decreases by 16.1%. The marginal effect of the dependency ratio is -0.040, which indicates that the probability of households with higher dependency saving with lower risk decreases by 4%.

Table 6 presents the bivariate logistic model and the impact of financial efficacy, financial literacy, risk preference, and demographic characteristics on saving decision behaviour. The results indicate that the household financial efficacy, financial literacy, and geographic characteristics significantly influence the probability of saving instrument selection. The global model is the best fit, as shown by the LR chi-square test, with a significance level of 1% and a pseudo R square of 17%. The results also indicate that the saving instrument selection for saving expenditure is partially influenced by households' financial literation, risk preference, and demographic characteristics. The magnitude of each influence from all the significant predictor variables can be explained as follows when other things remain constant. The coefficient of household financial efficacy is 1.9241, indicating that the log-odds or probability of short-term or lower-risk saving instruments, such as

savings accounts and fixed deposits (saving equal to 1), will increase by 1.9241 if the household financial efficacy increases by 1 unit at a significance level of 1%. The coefficient of formative financial experience is -0.7933, indicating that the log-odds will decrease by 0.7933 if the formative financial experience increases by 1 unit at a significance level of 5%.

In addition, regarding the geographic characteristics, the coefficient of the Malay race is -3.7118, indicating that the log-odds will decrease by 3.7118 if Malays are at a significance level of 1%. The coefficient of Chinese is -3.0194, showing that the log-odds will decrease by 3.0194 if the Chinese are at a significance level of 1%. The coefficient of location is -1.8596, implying that the log-odds will reduce by 1.8596 if the location is an urban area at a significance level of 1%. The coefficient of higher education is -1.8328, indicating that the log-odds will decrease by 1.8328 if higher education is at a significance level of 1%. The coefficient of senior education is -0.7061, suggesting that the log-odds will decrease by 0.7061 if the senior education is at a significance level of 1%. The coefficient of the dependency ratio is -0.1790, signalling that the log-odds will decrease by 0.1790 if the dependency ratio increases by 1 unit at a significance level of 5%.

Table 6. Results of bivariate logistic: coefficient estimates of the likelihood of having saving instruments in each group

Variables	Coefficient	Odd Ratio	dy/dx	Std Error	Z	Pvalue
Psychometric Instrument						
Financial household-efficacy	1.924	6.849	0.452	0.703	2.74	0.01***
Financial literacy:						
- Financial course	0.135	1.14	0.032	0.183	0.74	0.461
- Financial experience	-0.793	0.452	-0.172	0.315	-2.52	0.012**
Financial risk preferences	-0.174	0.840	-0.041	0.132	-1.32	0.188
Household income	-0.1668	0.846	-0.039	0.238	-0.7	0.483
Socio-demographic characteristics:						
Gender	0.005	1.005	0.001	0.239	0.02	0.984
Malay race	-3.712	0.024	-0.462	1.067	-3.48	0.00***
China race	-3.019	0.0489	-0.574	1.185	-2.55	0.01***
Locus of household	-1.860	0.158	-0.343	0.357	-5.2	0.00***
Higher education	-1.833	0.16	-0.428	0.496	-3.69	0.00***
Senior high school	-0.706	0.494	-0.160	0.435	-1.62	0.105*
Dependency ratio	-0.179	0.836	-0.042	0.076	-2.37	0.018**
Constant (atrho)	6.609	741.75	0.001	1.384	4.77	0.00***
Total probability	-	-	0.623	-	-	-
Model criteria						
Log-likelihood	-228.465					
LR χ^2	92.95					
Prob > χ^2	0.000					
Pseudo R	0.169					
Number of observation	404					

Notes: *** denotes significance at the 1%. ** denotes significance at the 5% and * denotes significance at the 10%.
Source: Data Analysis

In other words, the marginal effect of the total probability of saving with lower risk is 62.3%. The household financial efficacy is 0.452, indicating that, when the average financial household efficacy increases by 1 unit, then the probability of households saving with lower risk increases by 45.2% and the probability of higher financial household efficacy is 7 times better (odds ratio=6.849) compared with lower financial efficacy. The marginal effect of financial courses is 0.032, indicating that, when the average financial course increases by 1 unit, then the probability of households saving with lower risk increases by 3.2%. This is a probability that is 1.14 times better than that for households that have not attended a financial course. Financial experience is -0.172, indicating that, when the average financial experience increases by 1 unit, the probability of households saving with lower risk decreases by 17.2%. This is a probability that is 0.452 times better than that for households without financial experience. The marginal effect of risk preferences is -0.041, revealing that the probability of households with higher risk preferences saving with lower risk decreases by 4.1%. This is a probability that is 0.84 times lower than that for households without a financial risk preference. The marginal effect of income is -0.039, indicating that the probability of households with a higher income saving with lower risk decreases by 3.9%. This is a probability that is 0.846 times less than that for households with a lower income.

The marginal effect of gender is 0.001, signifying that, when men represent households, the probability of them saving with lower risk increases by 0.1%. This is a probability that is 1 time better than households with a female decision maker. The marginal effect of race is -0.462 for Malay and -0.574 for Chinese, indicating that different races use different saving instruments. Here, the probability of Chinese households saving with lower risk decreases by 57.4% compared with Malay households, for which it decreases by 46.2%. This probability of saving with lower risk is lower by 0.02 times for Malay households and 0.49 times for Chinese households. Urban households have a marginal effect of -0.344, implying that their probability of saving with lower risk decreases by 34.4%. This is a probability that is 0.158 times less than that for rural households. Education is -0.428 for higher education and -0.16 for senior high school, indicating that different levels of education influence the selection of saving instruments. Here, the probability of higher-educated households saving with lower risk decreases by 42.8% compared with that for households educated to senior high school level, which decreases by 16%. This probability of saving with lower risk is 0.16 times lower for higher-educated households and 0.494 times lower for senior high school households. The marginal effect dependency ratio is -0.042, indicating that the probability of households with a higher dependency ratio saving with lower risk decreases by 4.2%. This probability shows that they are 0.836 times less likely to save with lower risk.

The results imply that households with higher financial efficacy tend to select saving instruments such as savings accounts and fixed deposits. Households are most likely to avoid risk in their saving decision, because the money surplus of B40 households is very small. Households with formative financial experience (educated to save since childhood) tend to save their money in long-term or high-risk saving instruments. The results are supported by Bandura (1994, 2006a, 2006b) and Farrell (2015), who showed that individuals with higher financial efficacy and exposure to risk will take the challenge in making decisions and their probability of success will be higher. The geographic characteristic indicated that there is a significant difference between race and location of the household whereby Chinese households choose higher saving instruments than Malay households and urban households do not prefer banking-based saving instruments. Higher education influences the saving decision behaviour and reduces the saving instruments for lower-risk households. Households with a higher dependency ratio prefer to save their money through long-term or higher-risk saving instruments.

INTERDISCIPLINARY APPROACH TO ECONOMICS AND SOCIOLOGY

Robustness Test

The final analysis is the goodness of fit test for the logistic regression and probit models. The test aims to determine whether the model can show that there is a real difference between the observed results and the prediction or empirical model. Tables 7a and 7b present the results of the correct classification of the logistic and probit models. The logistic model indicates that 183 is D (target outcome) and 66 is ~D (non-target outcome). Classified as positive, D is 183 and ~D is 66 with a total of 249 positives or 73%. Classified as negative, D is 51 and ~D is 104 with a total of 155 negatives or 22%. In addition, the probit model indicates that 183 is D and 66 is ~D. Classified as positive, D is 183 and ~D is 66 with a total of 249 positives or 73%. Classified as negative, D is 51 and ~D is 104 with a total of 155 negatives or 22%.

Table 7a. Analysis of classification responds

| Classified | Logistic Model | | | Probit Model | | Total |
| | ------ TRUE ------ | | | ------ TRUE ----- | | |
	D	~D	Total	D	~D	
+	183	66	249	183	66	249
-	51	104	155	51	104	155
Total	234	170	404	234	170	404

Source: Data Analysis

For the correctness of the prediction results, as obtained by the logistic model, 117 or 71% of B40 households are oriented towards long-term or higher-risk saving instruments and 86 or 46% of B40 households are oriented towards short-term or lower-risk saving instruments. Therefore, the total number of correctly classified households is 71% with sensitivity of 78% and specificity of 61%. In addition, the probit model indicates that 119 or 72% of B40 households are oriented towards short-term or lower-risk saving instruments and 55 or 20% of B40 households are oriented towards short-term or lower-risk saving instruments. Therefore, the total correctly classified is 70% with sensitivity of 80% and specificity of 54%.

Table 7b. Classified + if predicted Pr (D) >= .5
True D defined as saving decision behaviour!= 0

		Logistic		Probit	
Sensitivity		Pr(+ D)	78.21%	Pr(+ D)	78.21%
Specificity		Pr(-~D)	61.18%	Pr(-~D)	61.18%
Positive predictive value		Pr(D +)	73.49%	Pr(D +)	73.49%
Negative predictive value		Pr(~D -)	67.10%	Pr(~D -)	67.10%
False + rate for true ~D		Pr(+~D)	38.82%	Pr(+~D)	38.82%
False - rate for true D		Pr(- D)	21.79%	Pr(- D)	21.79%
False + rate for classified	+	Pr(~D +)	28.66%	Pr(~D +)	28.31%
False - rate for classified	-	Pr(D -)	36.05%	Pr(D -)	34.52%
Correctly classified			71.04%		71.04%

Source: Data Analysis

Table 8 contains the results of the Hosmer–Lemeshow test for the overall goodness of fit of the logistic regression and probit models. The results fail to reject H0 at the significance level of 10%, because the P-value is higher than the alpha. It implies that there is no real

difference between the observed result and the prediction or empirical model at the significance level of 10% and concludes that the specification has goodness of fit and is robust.

Table 8. Hosmer-Lemeshow Test

Model specification	HR chi2	do	Prob > χ^2
Logistic	6.04	(8)	0.6429
Probity	9.73	(8)	0.2846

Source: Data Analysis

The finding also indicates that the logistic specification model is better, because the link function of probity has a deviance value lower than the logistic link function. Table 9 shows that the HR chi-square of probit is 9.73 and the HR chi-square logistic is 6.04 with a P-value of 64.29% for the logistic model and 28.46% for the probit model.

Conclusion

The article investigated the empirical support for the relationship between household financial efficacy, financial literacy, risk preference, geographic characteristics, and saving decision behaviour related to the saving instrument selection for saving expenditure. We impose a logistic and probit empirical model and survey research design. The unit of analysis is B40 households; the sampling technique consists of multistage sampling and cluster systematic random sampling. The sample contains 404 households from 3 states on the Peninsular of Malaysia, divided into urban and rural areas.

The results show that households with higher financial efficacy tend to select saving instruments such as savings accounts and fixed deposits or banking. B40 households are less likely to opt for risky savings, as their money surplus is small. Households with formative financial experience tend to save their money in long-term or higher-risk saving instruments. These results suggest that individuals with higher financial efficacy who are exposed to risk will take on the challenge in making decisions and their probability of succeeding will be higher. Geographic characteristics indicate that urban households prefer to save with long-term or higher-risk saving instruments. Households with a higher dependency ratio prefer to save using short-term or lower-risk saving instruments.

The policy implications of the findings suggest that financial efficacy, financial literacy, and demographic characteristics are important to determine the choice of saving instruments. Therefore, the Government should take these variables into account in policy development. Such results also provide important information for financial institutions regarding the preference of savers or depositors.

Acknowledgement

References

Baker, M., & Wurgler, J. (2006). Investor sentiment and the cross-section of stock returns. *Journal of Finance, 61*, 1645-1680.
Baker, M., & Wurgler, J. (2007). Investor sentiment in the stock market. *Journal of Economic Perspectives, 21*, 129-151.

Bandura, A. (1977). Self-efficacy: Toward a unified theory of behavioral change. *Psychological Review, 84*, 191-215

Bandura, A. (1994). Self-efficacy. In V.S. Ramachaudran (Ed.), *Encyclopedia of Human Behaviour*, *4* (pp. 71-81). New York: Academic Press.

Bandura, A. (1997) Self-Efficacy: The Exercise of Control. New York: Freeman

Bandura, A. (2006a). Guide for constructing self-efficacy scales. In F. Pajares & T.C. Urdan (Eds.), *Self-Efficacy Beliefs of Adolescents* (pp. 307-337). Greenwich, CT: Information Age Publishing.

Bandura, A. (2006b). Toward a Psychology of Human Agency. *Perspectives on Psychological Science*, *1*(2), 164-180.

Bandura, A., Caprara, G.V, Barbaranelli, C., Regalia, C., & Scabini, E. (2014). Impact of Family Efficacy Beliefs on Quality of Family Functioning and Satisfaction with Family Life. *Applied Psychology: An International Review*, 2011, *60*(3), 421-448.

Bandura, A., & Wood, R. (1989). The effect of perceived controllability and performance standards on self-regulation of complex decision making. *Journal of Personality and Social Psychology, 56*(5), 805-814.

Black, F., & Scholes, M. (1973). The Pricing of options and corporate liabilities. *Journal of Political Economy, 81*, 637-665.

Child, D. (2006). The essentials of factor analysis. (3rd ed.). New York, NY: Continuum International Publishing Group.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*(3), 297-334.

De Bondt,W. F. M., & Thaler, R. H. (1985). Does stockmarket overreact?. *Journal of Finance, 60*, 793-805.

Fama, E., & French, K. (1993). Common risk factors in the returns on stocks and bonds. *Journal of Financial Economics, 33*, 3-56.

Fama, E., & French, K. (1996). Multifactor explanations of asset pricing anomalies. *Journal of Finance, 51*, 55-84.

Fama, E. (1965). Random walks in stock market prices. *Financial Analysts Journal, 21*, 55-59.

Fama, E. (1970). Efficient capital markets: A review of theory and empirical work. *Journal of Finance, 25*, 383-417.

Farrell, E., Fry, Tim R.L., & Risse, L. (2015). The significance of financial self-efficacy in explaining women's personal finance Behaviour. *Journal of Economic Psychology* http://dx.doi.org/10.1016/j.joep.

Festinger, L., Riecken, H. W., & Schachter, S. (1956). When prophecy fails. Minneapolis: University of Minneapolis Press.

Forbes, J., & Kara, S. M. (2010). Confidence mediates how investment knowledge influences investing self-efficacy. *Journal of Economic Psychology*, *31*, 435-443.

Garson, G. D. (2012). *Testing Statistical Assumptions*. Asheboro, North Carolina: Statistical Associates Publishing.

Gecas, V. (1989). The social psychology of self-efficacy. *Annual Review of Sociology*, *15*, 291-316.

Harrison, G. W., & Rutstrom, E. E. (2009). Expected utility theory and prospect theory: One wedding and a decent funeral. *Experimental Economics, 12*, 133-158.

Haugen, R. (1999). The inefficient stock market. Upper Saddle River (NJ): Prentice Hall.

Hosmer, D.W., & Lemeshow, S. (2000) Applied Logistic Regression. New York, NY: John Wiley & Sons Inc;

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. *Econometrica*, *47*(2), 263-292.

Kahneman, D., Knetsch, J. L., & Thaler, R. H. (1990). Experimental tests of the endowment effect and the coase theorem. *Journal of Political Economy, 98*, 1325-1348.

Krejcie, R.V., & Morgan, D.W. (1970). Determining Sample Size for Research Activities. *Educational and Psychological Measurement*, *30*(3), 607-610.

Kickul, J., Wilson, F., Marlino, D. & Barbosa, S. D. (2008). Are misalignments of perceptions and self-efficacy causing gender gaps in entrepreneurial intentions among our nation's teens? *Journal of Small Business and Enterprise Development*, *15*(2), 321-335.

Lintner, J. (1965). The Valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets. *The Review of Economics and Statistics, 47*, 13-37

Lown, J. M. (2011). Development and validation of a financial self-efficacy scale. *Journal of Financial Counseling and Planning*, *22*(2), 54-63.

Lapp, W. M. (2010). Behavior models for prosperity: A statistical assessment of savings and behavioral change. EARN Research Brief. San Francisco, CA: Earned Assets Resource Network. Retrieved from http://www.earn.org/static/uploads/files/5_-Behavioral_Models_for_Prosperity_A_Statistical_Assessment_of_Savings_and_Behavioral_Change.pdf

Pratt, J. W. (1964). Risk aversion in the small and the large. *Econometrica, 32*, 122-136.

Markowitz, H. M. (1952). Portfolio selection. *Journal of Finance, 7*, 77-91.

Ramiah, V. Xu, Xiaoming. Moosa, Imad A. (2015). Neoclassical finance, Behavioral finance and Noise Traders: A review and assessment of the literature**.** *International Review of Financial Analysis*, *41*, 89-100.

Samuelson, W., & Zechauser, R. (1988). Status quo bias in decision making. *Journal of Risk and Uncertainty, 1*, 7-59.

Sharpe, W. F. (1964). Capital asset prices: A theory of market equilibrium under conditions of risk. *Journal of Finance, 19*, 425-442.

Selden, G. C. (1912). Psychology of the stock market: Human impulses lead to speculative disasters. New York: Ticker Publishing.

Shiller, R. J. (1981). Do stock prices move too much to be justified by subsequent changes in dividends?. *American Economic Review, 71*, 421-436.

Smith, Adam (1759). *The Theory of Moral Sentiments*. Printed for Andrew Millar, in the Strand; and Alexander Kincaid and J. Bell, in Edinburgh. https://www.adamsmith.org/the-theory-of-moral-sentiments/

Smith, Adam (1776). *An Inquiry into the Nature and Causes of the Wealth of Nations*. W. Strahan and T. Cadell, London.

Thaler, R. H. (1980). Toward a positive theory of consumer choice. *Journal of Economic Behavior and Organization, 1*, 39-60.

Tversky, A., & Kahneman, D. (1986). Rational Choice and the Framing of Decisions. *The Journal of Business, 59*(4/2): The Behavioral Foundations of Economic Theory. pp. S251-S278.

Yaari, M. E. (1987). The dual theory of choice under risk. *Econometrica, 55*, 95-115.

Appendix A

The Financial Household Efficacy Scale (FHES)

Please respond to the following statements using these response categories:

1 = strongly disagree	2 = not agree	
3 = neutral	4 = agree	5 = strongly agree

FHES1 : I entrust my household to make financial decisions when unexpected expenses arise.

FHES2 : I believe in the ability of my household to make progress towards financial goals.

FHES3 : I give consent to my household to use (credits) as an alternative when unexpected expenses occur.

FHES4 : I ask the opinion of my household when I have a hard time figuring out a solution related to the financial challenges.

FHES5 : When I lack confidence, I trust households to manage their finances.

FHES6 : I am confident in shifting my responsibilities to the households when I am worried about running out of money in the future.