FINANCIAL LITERACY AND FINANCIAL RISK TOLERANCE OF LOTTERY GAMBLERS IN THAILAND

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ABSTRACT

This paper investigates the impacts of financial literacy level, financial risk tolerance and demographic characteristics on gambling behavior of informal laborers. The data were analyzed by Multivariate Analysis of Variance and Multinomial Logistic Regression. The total of 995 participants used in this research were collected by Multi-Stage Randomization from the informal laborers in Southern Thailand. The empirical analysis revealed that the financial literacy confidence, the risk tolerance, and the demographic characteristics were significant determinants of the gambler's behavior. The older the gamblers were, the more they got addicted to gambling. Also, the more the people perceived that they have a high level of financial literacy, the more they would gamble. However, it was found that the female laborers were more frequent gamblers than the males. Thus, agencies responsible for supervising the financial education should be aware of the expected outcomes, not only focusing on actual financial literacy, but also supporting the individuals to achieve a healthy level of financial literacy confidence.

1. INTRODUCTION

One well-known phrase revealing some attitudes in the Thai society is "*the poor buy lottery, the rich buy stock.*" Basically, in Thailand, there are 2 types of lotteries; the formal or "above ground" lottery, and the informal or "underground" lottery. While the former, a government sponsored lottery, is considered a legal activity, the latter is deemed an illegal lottery practice regardless of whether it is "*stock lottery*", "*GSB lottery*" or "*Malay lottery*"[1]. Not only do worldwide lottery-ticket sales continuously increase (Lee et al., 2015), but also in Thailand it was found that during the years 2012 – 2019 the total revenue of the Government Lottery Office (GLO) was 25,089.17 million US$ and kept increasing every year. The most recent data in 2019 revealed that the GLO's total revenue was 5,162.65 million US$ – approximately 2.5 times

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[1] 1 US$ = about 30 Baht in November 2020. These 3 types of illegal lottery basically are dubbed according to the sources where they derive the winning prize numbers: the stock market for the "stock lottery", the Government Savings Bank for the "GSB lottery", and the MAGNUM – a private company in Malaysia that provides commercial (legal) gambling – for the "Malay lottery".

higher than in 2018 (Government Lottery Office, 2015). Moreover, both legal and illegal lotteries together had a total revenue of 8,333.33 million US$ in 2018; threefold the amount that Thais purchased Long-Term Equity Fund (LTF) and Retirement Mutual Fund (RMF) (TMB Analytics, 2019). In addition to the unbelievably large amount of money that Thai people spent on gambling, from 2015 to 2019, the purchasers of government sponsored lottery increased from 19 to 23 million person, while the underground lottery grew from 22.03 to 29.08 million person (Research Centre for Social and Business Development (SAB), 2017). The one opportunity that Thai people enjoy the most is the government sponsored lottery, and the next in rank is the underground one (SAB, 2020). Thus, in order to clearly portray the lottery betting in Thailand, this study opted to specifically focus on the government sponsored lottery and the underground lottery.

A prior study revealed that the buyers of lottery tend to have low income and a low education level (Afifi et al., 2010). Instead of considering only one's education level, the financial literacy should be taken into account as well. In order to provide more in-depth information, this study thus considers different dimensions of financial literacy: both financial literacy (FinLit) and financial literacy confidence (FLC). This study thus took the risk tolerance (RiskTol) factor into consideration and categorized the gamblers in accordance with their frequency of purchasing the lottery tickets. Purchasing lottery tickets is in fact an activity that harms the poor since the economic drawbacks could affect the poor more than the rich, even if both were purchasing lottery tickets in similar amounts. Some even consider that purchasing lottery tickets is a tax on the poor, because gambling addiction could lead one to more frequent and continuous gambling (Vora-Sitta, 2018).

In order to cover those affected by the lottery to the extent possible, this study thus focused on the informal labourers. As for further qualifications, these labourers had to be 15 years old or older, work without a contract or have no employer as stated in the labour law, without social security from work, and having no reliable wage or compensation. The informal laborers in Southern Thailand were chosen, since more than half of the labor in Thailand or 20.8 million are informal laborers (National Statistical Office, 2017). Moreover, the amount of money that people in Southern Thailand use in lottery ranked No.2, second only to that in Northeastern Thailand (Piriyarangsan et al., 2014). The objective of this study was to explore the lottery behaviour of informal labourers in Southern Thailand by considering their frequency of gambling and analysing the causes of their gambling addiction. The results of the study provide insights on gambling behavior, as well as reveal factors affecting the frequency of purchasing lottery tickets. If the decrease in unnecessary expenses strengthens the finance of those with low income, then to lessen the amount of lottery purchases by each individual is what the government should aim at. Finally, a Probable Pathological Gambler would face all kinds of problems in finance, health, family and society. In order to effectively solve this problem, the government agencies and those concerned should design policies to support individuals by improving not only their financial literacy but also improve healthy levels of financial literacy confidence.

2.   LITERATURE REVIEW

2.1.   Financial Literacy and Financial Literacy Confidence

Normally a study of financial literacy would measure what people know or understand about the financial concepts. This is evident when one wishes to measure each individual's level of financial literacy, and the studies in the past would apply multiple-choice questionnaires. The principle of this method is to measure what people know about finance, and the total score would be used to indicate the "actual" financial knowledge. Actually, financial literacy includes more than just knowledge, to understand self-confidence is equally related aspects (McCannon et al., 2016). Although economists have preferred to use objective measures in their research, there is growing interest in the use of subjective measures for studying different types of financial behaviours, such as risk attitudes (Hallahan et al., 2004). Therefore, if actual financial knowledge concerns the knowledge that one indeed possesses, perceived financial knowledge subjectively represents people's self-confidence in their financial knowledge (Allgood & Walstad, 2016; Zahirovic-Herbert et al., 2016).

There is still no universal consensus on the definition of financial literacy, which leads to the use of different measurement methods of financial literacy. Therefore, the measurements of financial literacy vary in accordance with the research purpose (Bakar & Bakar, 2020). In the survey of financial literacy level in 2013 conducted by the Organization for Economic Co-operation and Development (OECD), Thai people were found to have a low level of financial literacy. The Thais' financial knowledge level was the lowest among all the countries participating in the survey (Atkinson & Messy, 2012). Additionally, in the same year, the Fiscal Policy Research Institute Foundation (FPRI) and the Fiscal Policy Office (FPO) surveyed the level of financial knowledge of people in various groups nationwide, finding that 14 million Thai people lacked financial knowledge. Recognizing the low financial literacy situation among Thais, the Bank of Thailand (BOT) collaborated with the National Statistical Office (NSO) in conducting nationwide surveys of financial literacy among Thais since 2006, and repeat every three years. The Bank of Thailand (BOT) survey in 2016 determined that the three groups that possessed the lowest level of financial knowledge were students, workers with low incomes, and farmers, all of whom lacked not only financial literacy, but also the ability to apply knowledge acquired to real-life situations. It can be said that many Thais are not equipped with basic analytical skills, cannot make logical decisions, and do not have a positive attitude toward saving. Consequently, there has been an increase in household debt as well as in problems related to informal loans. This is consistent with the study of Chotewattanakul et al. (2019) about the debt behaviour in Thailand. Moreover, studies of financial literacy in Thailand have been conducted to examine financial literacy of special populations, such as generation Y (Gruenwald & Chatterji, 2016), generations X and Y (Amonhaemanon & Vora-Sitta, 2020), college students (Chaiphat, 2019), and the middle class income group (Grohmann, 2018). As a result, policies have consequently focused on improving the people's financial literacy (Kempson et al., 2006).

2.2.   Risk Tolerance

Risk tolerance concept enables us to understand how people behave in response to various situations. In this study, risk tolerance is defined as the highest level of risk that one could accept, or the maximum amount of uncertainty that people are willing to accept when making a financial

decision (Grable, 2008; Van de Venter et al., 2012). Bayar et al. (2020) proposed that financial risk tolerance is a key factor affecting people's financial decisions, both in saving and in investment (Grable et al., 2004), and also the foundation factor for designing the financial planning models (Grable, 2016), which is a financial decision making process to achieve one's financial target (Snelbecker et al., 1990). Regarding the risk tolerance level, studies in the past suggest that young people have higher level than the old ones, males higher than females, and singles higher than married ones. In addition to this, it was also found that when people got more income and more wealth, higher education level, their risk tolerance would also increase (Duasa & Yusof, 2013; Fisher & Yao, 2017; Kannadhasan, 2015; Mahdzan et al., 2017; Pinjisakikool, 2017; Rahmawati et al., 2015; Sharma et al., 2017; Sulaiman, 2012; Yong & Tan, 2017). Furthermore, many studies in the past have revealed that the higher the level of financial literacy, the higher the level of an individual's financial risk tolerance (Frijns et al., 2008; Grable & Joo, 2004; Grable & Roszkowski, 2008).

2.3　Gambling Behavior

Lottery has now become part of Thai people's daily life (Pravichai & Ariyabuddhiphongs, 2015). Kamnualsilp et al. (2014) found that working-age people were the ones that most enjoyed buying lottery tickets. This finding was consistent with the survey on Thai people and gambling by TMB Analytics (2019); people buying lottery were found in all ages but the highest purchasing group was 33 – 35 years old, or in so-called family-building age. Piriyarangsan et al. (2014) and Noppanun (2011) found that the illegal lottery buyers were distributed across low, medium and high-income groups. The study results also confirmed that the Thai households spent more on lottery when they had more income, however when considered in proportion to the income those with a low income spent more on lottery than the others. The survey data from TMB Analytics (2019) found that households with income in the lowest 10 % spent 3.7 % of their income on lottery, whereas those with income in the highest 10 % spent merely 0.8 %. Since education level directly affects income, the former factor thus provided the same result on gambling behaviour as the latter one. Those with a low education level and a low income would buy lottery tickets more often than those with high income, because the former group perceived that lottery was the single way to help them move out of poverty (Bunthiam, 2007). Similarly, in the study by Meeboon (2003), it was confirmed that the lottery participation stemmed from the need of the poor to take a risk with the hope to get rich and to have a more comfortable life. The majority of those buying lottery tickets wanted to create hope for their life; if they won the lottery, they would have sufficient income to spend and make life happier and more convenient than their current life (Pongpracha, 2015).

3.　METHODOLOGY

3.1.　Data and Participants

This study collected data by utilizing the questionnaires certified by the Human Research Ethics Committee for social and behavioural study, Prince of Songkla University, No. PSU IRB 2020-PSU-L-002. The questionnaire covers: (1) actual financial literacy; (2) self-assessment of financial literacy; (3) financial risk tolerance; and (4) demographic characteristics of the respondents. Prior to use, these semi-structured questionnaires were tested for both content

validity and consistency of the questionnaire with the objectives, then the test results were used to calculate Item Objective Congruence Index. The reliability in terms of Cronbach's alpha was also calculated and it was 0.837.

3.2.   Variable Measurements

3.2.1. Financial Literacy (FinLit)

The method for measuring the financial literay was adapted from those in the studies by the Bank of Thailand (2016), Lusardi (2012) and Lusardi and Mitchell (2007). The score was based on the correct answers; the higher the score, the higher the financial literacy. The questions used to measure the actual financial knowledge in our study addressed 7 topics: the Deposit Protection Agency (DPA), the Credit Bureau, the compound interest, the inflation, the purchasing power, the risk and return from investment, and the risk diversification.

3.2.2. Financial Literacy Confidence (FLC)

An alternative way to assess financial literacy is to use some type of subjective measure, such as a self-assessment of financial literacy (Hung et al., 2009). Therefore, if actual financial knowledge concerns the knowledge that one indeed possesses, this other one subjectively represents people's self-confidence in their financial knowledge (Allgood & Walstad, 2016; Asaad, 2015; Zahirovic-Herbert et al., 2016). In the evaluation of financial literacy confidence (FLC) level by allowing each individual to evaluate their own financial literacy, the scores ranged from 0 (no financial literacy) to 10 (high financial literacy).

3.2.3. Financial Literacy Index (FLIndex)

Financial Literacy Index was calculated from scores derived from the questionnaire, to measure one's level of financial literacy in total. Given the average score, one with a higher score than the average was considered to have high financial literacy, whereas one with a lower score than the average was considered to have low financial literacy. It was found that both the problem gamblers and the moderate-risk gamblers had mostly a low financial literacy. Only the low-risk gambler group had high financial literacy in its majority.

3.2.4. Risk Tolerance (RiskTol)

As for the evaluation of risk tolerance, the 13 questions with four choices each by Grable and Lytton (1999) were brought to apply. These questions were based on how risk tolerant the chosen response was (1 – least risky choice, 4 – the riskiest choice). Overall risk tolerance was scored as the sum of all responses ranging from 0 – 52.

3.2.5. Gambling Behaviour

The gambling behaviour could be observed from the frequency spent on it. McConkey and Warren (1987) mentioned that gambling behaviour could be measured from one's frequency in purchasing the lottery and was classified into 3 groups: the non-purchasers – those who never buy the lottery at all, light purchasers (buy 1-11 times per year), and heavy purchasers (buy 12 or

more times per year). Like in the study by Felsher et al. (2003), the frequency in purchasing the lottery was also categorized into 3 groups; never, occasional, and regular. Besides, the study by Griffiths and Wood (2000) divided the gamblers into 3 groups according to their level of involvement: the social, leisure or occasional gamblers, the habitual gambler, and pathological gambler. For Rogers and Webley (2001), the gamblers were as well categorized in accordance to their involvement frequency into 4 types: played always, most weeks, some weeks, and rarely or never. This study analysed the gamblers' behaviour by considering their frequency in purchasing the lottery in the past 1 year, classifying them into 3 groups and naming each group like in the study by Gupta and Derevensky (1998). In Thailand, since there are 2 draw dates every month, this study then provided 3 alternatives on frequency to be selected. These 3 groups' names and purchasing behaviours were as follows; (1) Probable Pathological gamblers – the one that buys lottery at every draw date, (2) At-Risk gamblers – the one that buys lottery frequently but not every draw date, and (3) Social gamblers – the one that buys lottery only once in a while.

3.3.   Statistics Applied in This Study

By considering the mean and the standard deviation, it was shown that the financial literacy (FinLit), the financial literacy confidence (FLC) and the risk tolerance (RiskTol) were different for each gambler group. Multivariate Analysis of Variance was utilized to consider or compare the means. The statistics applied to evaluate the significance of differences among the groups were based on 4 components: *Pillai – Bartlett Trace (V), Hotelling's T^2, Wilks's Lambda (λ), and Roy's Largest Root*. Next, Multinomial Logistic Regression was applied to create the forecasting equation. Logistic Regression was tested for its fitness by considering *-2LL* as the statistic to test the fitness of the structural equation. *Cox & Snell R square* and *Nagelkerk value* were utilized to consider or investigate the fitness of model or the percentage in explaining the variation in Logistic Regression Analysis.

4.   RESULTS AND DISCUSSION

4.1.   General Information of the Respondents

For an overview of our survey, Table 1 shows that the majority of the respondents were female, single, had education level lower than bachelor degree, monthly income less than US$ 500, and most of them were in debt. Evidence from previous research shows that demographic factors, education, and income influence lottery purchasing behaviour (Beckert & Lutter, 2013). Considering by gambler type, it is found that the majority of gamblers were At-Risk gamblers. Moreover, it was also found that the proportion of single gamblers was larger than that of the married ones in Probable Pathological gamblers and At-Risk gamblers. This indicates that the singles proportionately purchased lottery more often than the married ones. In additional to this, in the Probable Pathological gamblers, it was found that the proportion of males was larger than that of females (males purchased lottery more often than females); whereas in the Social Gamblers, it was instead found that the proportion of females exceeded that of males.

Table 1: General Information of the Respondents Classified by Gambler Type

Gambler Type	Probable Pathological Gamblers		At-Risk Gamblers		Social Gamblers	
Gender	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**
% Total	6.03	13.87	18.99	51.76	2.01	7.34
% Gambler	30.30	69.70	26.85	73.15	21.51	78.49
Status	**Married**	**Single**	**Married**	**Single**	**Married**	**Single**
% Total	7.04	12.86	29.35	41.41	5.73	3.62
% Gambler	35.35	64.64	41.48	58.52	61.29	38.71
Education	**< Bachelor**	**≥ Bachelor**	**< Bachelor**	**≥ Bachelor**	**< Bachelor**	**≥ Bachelor**
% Total	10.85	9.05	34.07	36.68	3.22	6.13
% Gambler	54.54	45.46	48.15	51.85	34.41	65.59
Income (US$)	**< 500**	**≥ 500**	**< 500**	**≥ 500**	**< 500**	**≥ 500**
% Total	16.98	2.91	55.78	14.97	6.63	2.71
% Gambler	85.35	14.65	78.84	21.16	70.97	29.03
Debt	**Yes**	**No**	**Yes**	**No**	**Yes**	**No**
% Total	18.49	1.41	64.92	5.83	8.74	0.60
% Gambler	92.93	7.07	91.76	8.24	93.55	6.45

Table 2: Financial Knowledge Questions Classified by Gambler Type

Gambler Type	Probable Pathological Gamblers		At-Risk Gamblers		Social Gamblers		Total
FK_DBA	*Correct*	*Incorrect*	*Correct*	*Incorrect*	*Correct*	*Incorrect*	
% Total	12.76	7.14	48.04	22.71	6.03	3.32	100
% Gambler	64.14	35.86	67.90	32.10	64.52	35.48	
FK_Credit Bureau	*Correct*	*Incorrect*	*Correct*	*Incorrect*	*Correct*	*Incorrect*	
% Total	7.94	11.96	25.03	45.73	3.32	6.03	100
% Gambler	39.90	60.10	35.37	64.63	35.48	64.52	
FK_Compound Interest	*Correct*	*Incorrect*	*Correct*	*Incorrect*	*Correct*	*Incorrect*	
% Total	14.37	5.53	49.85	20.90	7.14	2.21	100
% Gambler	72.22	27.78	70.45	29.55	73.34	23.66	
FK_Inflation	*Correct*	*Incorrect*	*Correct*	*Incorrect*	*Correct*	*Incorrect*	
% Total	4.92	14.97	17.89	52.86	3.02	6.33	100
% Gambler	24.75	75.25	25.28	74.72	32.26	67.74	
FK_ Purchasing Power	*Correct*	*Incorrect*	*Correct*	*Incorrect*	*Correct*	*Incorrect*	
% Total	4.82	15.08	18.69	52.06	3.72	5.63	100
% Gambler	24.24	75.76	26.42	73.59	39.78	60.22	
FK_Risk-Return	*Correct*	*Incorrect*	*Correct*	*Incorrect*	*Correct*	*Incorrect*	
% Total	3.62	16.28	14.17	56.58	3.02	6.33	100
% Gambler	18.18	81.82	20.03	79.97	32.26	67.74	
FK_Diversification	*Correct*	*Incorrect*	*Correct*	*Incorrect*	*Correct*	*Incorrect*	
% Total	5.63	14.27	17.29	53.47	3.32	6.03	100
% Gambler	28.28	71.72	24.43	75.57	35.48	64.52	
FLIndex	*Low*	*High*	*Low*	*High*	*Low*	*High*	
% Total	13.47	6.43	46.13	24.62	4.82	4.52	100
% Gambler	67.67	32.33	65.20	34.80	51.61	48.39	

Table 3: Level of Risk Tolerance classified by gambler type

Gambler Type	Probable Pathological Gamblers	At-Risk Gamblers	Social Gamblers	Total
Risk averse Count (%)	16 (8.08)	94 (13.35)	24 (25.81)	134 (13.47)
Risk neutral Count (%)	11 (5.56)	66 (9.38)	7 (7.52)	84 (8.44)
Risk taker Count (%)	171 (86.36)	544 (77.27)	62 (66.67)	777 (78.09)
Total (%)	198 (19.90)	704 (70.75)	93 (9.35)	995 (100)

Table 2 regards the measurements of financial literacy of the respondents. It was found that all gambler types had a low financial literacy. The results from our study are consistent with the financial literacy survey by the Bank of Thailand in collaboration with the National Statistical Office, and the study by Amonhaemanon and Isaramalai (2020) that found low levels of financial literacy among Thai people. Considering the level of risk tolerance by gambler type from Table 3, it was found that all gambler types are mainly risk takers. In the case of gambling, however, despite being aware that it does involve risk they instead feel the unlikely high level of that risk since they expect the benefit or return. Thus, like in the study by Garrett and Sobel (1999), in case the level of risk acceptance is low, one could decide to gamble when given sufficiently high potential return.

4.2 *Comparing Means and Standard Deviations by Type of Gambler*

In this section, we present the analysis results of the mean impact of gambler behaviour. Multivariate Analysis of Variance is used to test for differences between groups. It was found that the Covariance Matrices of the risk tolerance (RiskTol) variable and financial literacy (FinLit) variable of all 3 gambler types were significantly different at statistical level of 0.05 (*Box's M = 3.388, F = 0.561, p = 0.761*). Similarly, for the risk tolerance (RiskTol) and financial literacy confidence (FLC), also significantly different at statistical level of 0.05 (*Box's M = 7.132, F = 1.182, p = 0.313*). On applying *Levene's test* to assess the variances of dependent variables, it was found that the risk tolerance (RiskTol) (*F = 0.401, p = 0.670*), FinLit (*F=1.914, p = 0.148*). The variances of all 3 variables differ significantly by the group, in accordance with the research hypothesis. The Wilks's Lambda was used to explore the differences of means across the groups, and it was found that the differences in risk tolerance factor and the financial literacy affected the mean of gambler type with the statistical significance level of 0.05 *(Wilks's Lambda = 0.985, F = 3.816, sig = 0.004)*. Besides, other statistics applied included Pillai's Trace *(F = 3.816, sig = 0.004)*, Hotelling's Trace *(F = 3.814, sig = 0.004)*, and Roy's Largest Root *(F = 5.128, sig = 0.006)* all consistently showing statistical significance at the level of 0.05. Also, the different financial literacy confidence by gambler type differ statistically significantly in means at the level of 0.05 *(Wilks's Lambda, F = 3.034, sig = 0.017)*. Moreover, other statistics including Pillai's Trace *(F = 3.030, sig = 0.017)*, Hotelling's Trace *(F = 3.038, sig = 0.016)*, and Roy's Largest Root *(F = 5.699, sig = 0.003)* all consistently showed statistical significance at the level of 0.05. In summary, according to the Multivariate Analysis of Variance, the risk tolerance and the financial literacy confidence factor were both influenced by the Probable Pathological gamblers with the statistical significance level of 0.10, whereas the financial literacy was influenced by both Probable Pathological gamblers and the At-Risk gamblers with the statistical significance level of 0.05.

Table 4: Parameter Estimates

Dependent Variable	Parameter	B	Std. Error	*t*	Sig.
Risk Tolerance	Intercept	2.570	0.070	36.652	0.000
	Probable Pathological gamblers	0.147	0.085	1.733	0.083
	At-Risk gamblers	0.000	0.075	-0.004	0.997
	Social gamblers				
Financial Literacy	Intercept	73.559	0.937	78.512	0.000
	Probable Pathological gamblers	3.188	1.136	2.807	0.005
	At-Risk gamblers	2.587	0.997	2.595	0.010
	Social gamblers				
Financial Literacy Confidence	Intercept	5.108	0.184	27.769	0.000
	Probable Pathological gamblers	-0.421	0.223	-1.887	0.060
	At-Risk gamblers	-0.211	0.196	-1.079	0.281
	Social gamblers				

Note: The reference category is Social gamblers.

The Results from Multinomial Logistic Regression

In the analysis of structural equation modelling used in this study, it was found that the *Cox and Snell* value equalled 13.30 %, the *NagelKerke* value equalled 16.30 %, while *McFadden* value equalled 8.40 %. It could then be concluded that, by applying the Logistic Regression technique, the structural equation used in this study had an accuracy of 16.30 %.

Table 5: The Parameter Estimates of Structural Equation

Effect	Model Fitting	Likelihood Ratio Tests	At-Risk gamblers		Social gamblers	
	-2LL of Reduced Model	Chi-Square	B	Exp(B)	B	Exp(B)
Intercept Only	1679.728					
Final	1538.055	141.673***				
Intercept	1546.588	8.533**	-4.123		- 0.915	
Gender	1542.777	4.722*	-0.181	0.834	-0.386	0.680**
status	1541.987	3.932	-0.118	0.888	-0.563	0.570**
Age	1548.736	10.681**	0.509	1.663**	-0.011	0.989
Edu	1542.713	4.658*	-0.495	0.610*	-0.269	0.764
Income	1539.161	1.106	0.282	1.325	0.052	1.053
RiskTol	1551.348	13.293***	0.517	1.678***	-0.113	0.893
FinLit	1538.413	0.358	0.005	1.005	-0.004	0.996
FLC	1551.072	13.017***	0.223	1.250***	0.105	1.110**

Notes: *p < 0.10, **p < 0.05, ***p < 0.001, The reference category is Problem gamblers.

The Case of At-Risk gamblers

$$\text{Logit (P)} = -4.123 + 0.509 \text{ Age} - 0.495 \text{ Edu} + 0.223 \text{ FLC} + 0.517 \text{ RiskTol} \qquad (1)$$

In summary from equation 1 and Table 5, the first set of coefficients represents comparisons between Probable Pathological gamblers and the At-Risk gamblers. There are *Age, Edu, FLC* and *RiskTol* as significant predictors in the model, and persons scoring higher in these variables are

likely to gamble more frequently. It indicates that for every unit increase on age (*Age*), the odds of a person being At-Risk gamblers changed by 1.663 (*b = 0.509, sig = 0.002*). The results of this study are consistent with that of Kaplan (1988) which found age as affecting the lottery purchasing behavior; the older ones bought more lottery tickets than the younger ones. Moreover, for every unit income increase, the odds of a person being an At-Risk gambler changed by a factor of 1.325 (*b = 0.282, sig = 0.289*). This was also supported in the studies by Welte et al. (2002) suggesting that gamblers are less likely to buy lottery tickets when they have a high income. The decision to buy lottery tickets is inversely related to the income; the rich are not likely to buy. Friedman and Savage (1948) explained that those with low income agreed to spend a large amount of their money in a lottery with the expectation to win, despite only having a small chance, whereas those with wealth were reluctant to buy lottery due to the small chance to win.

In contrast, a person scoring higher on education (*Edu*) was less likely to display At-Risk gambling. It indicates that for every unit increase on education, the odds of being At-Risk gamblers changed by a factor of 0.610 (*b = -0.495, sig = 0.067*). That is, obtaining a higher education level would decrease the frequency of gambling by 39 %. Among personal factors, education has been earlier found to relate negatively with lottery gambling (Rogers & Webley, 2001). It is worth noting that the financial literacy confidence (*FLC*) did significantly affect the frequency of gambling by informal labourers, whereas the financial literacy level did not. For every unit increase in financial literacy confidence and every unit increase on risk tolerance, the odds of At-Risk gamblers changed by a factor of 1.250 and 1.678 respectively. It could be said that the more financial literacy confidence and risk tolerance they had, the more frequently they would gamble.

The Case of Social gamblers

$$\text{Logit (P)} = -0.915 - 0.386 \text{ Gender} - 0.563 \text{ Status} + 0.105 \text{ FLC} \qquad (2)$$

In summary, from equation 2 and Table 5, the set of coefficients represents comparisons between Probable Pathological gamblers and the Social gamblers. There is *Gender, Status and FLC* as significant predictors in the model, as person scoring higher on financial literacy confidence (*FLC*) is likely to gamble more frequency. On the other hand, a person scoring higher on *Gender (0 = male; 1 = female)* and *Status (0 = single; 1 = not single)* is likely to gamble less frequently. For a unit increase in *Gender*, the odds of a Social gamblers changed by a factor of 0.680. It was found that the female informal labourers would gamble 32 % less, similar to those who were married would gamble 43 % less. For a unit increase in *Status*, the odds of being a Social gamblers changed by a factor of 0.680. The study by Dixey and Talbot (1982) revealed that the gender affects the decision to gamble. In Thailand, the study by Piriyarangsan et al. (2003) found that the females are inclined to gamble in number guessing type games, while the males loved gambling that requires skill or knowledge. And the study by Ariyabuddhiphongs (2011) also found that the majority of those buying the government sponsored lottery or underground lottery were females. At present, the lottery purchasing behaviour is not limited within those grassroots, according to the survey by TMB, of 12 million people being interviewed there were 7.6 million people (or about 63 %) who purchased the lottery at least once a month with the average spending amount of 420 baht. From this same survey, there were 3.2 million people (or about 26 %) who bought the lottery "just for fun" with the spending amount of 225 baht per month,

while there were 1.3 million people (or about 11 %) who never fail buying the lottery in every period with the spending amount as high as 800 baht per month (TMB Analytics, 2019). However, we found that for every unit increase in financial literacy confidence (*FLC*), the odds of being a Social gamblers changed by a factor of 1.110. As the financial literacy confidence increased, the Social gamblers would gamble 1.105-fold more; the more they feel that they have a good financial literacy, the more frequently they would gamble. This supports the concept that beliefs about skill, luck and optimism correlate positively with frequency of lottery gambling (Pravichai & Ariyabuddhiphongs, 2015; Rogers & Webley, 2001).

5.   CONCLUSION

The discourse *"the poor buy lottery, the rich buy stocks"* reflects the fact in Thai society that the poor or those with a low income proportionally the spending on lottery is greater relative to their income than for the rich with high income (Lang & Omori, 2009; Welte et al., 2002). As a result, the poor are affected by gambling more than the rich, like Albers and Hübl (1997) reported that unemployment and lower formal education increased gambling participation – a finding that has been confirmed in the United State (Clotfelter & Cook, 1990). The objective of this study was to investigate the factors associated with gambling behaviours, by considering the frequency of purchasing lottery tickets. The majority of respondents were female and single, possessed lower than bachelor's degree, got income below US$ 500 per month, and mostly had a debt burden. The study divided the gamblers into 3 groups by their frequency of purchasing lottery tickets: (1) *"Probable Pathological gamblers"* – the ones that buy lottery at every draw date, (2) *"At-Risk gamblers"* – the ones that buy lottery frequently but not every draw date, and (3) *"Social gamblers"* – the ones that buy lottery only once in a while. Cunningham-Williams et al. (2005) noted that the Problem and Pathological gamblers were the type that got the most effect from purchasing the lottery tickets. They usually were those with low socio-economic status, represented by low educational standards, low income and unemployment. The measurement of the respondents' financial knowledge suggested that the majority of the gamblers proportionately gave wrong answers more often than right ones in all questionnaires. After all, regarding the level of financial knowledge in general, most of the gamblers were equipped with a low Financial Literacy Index.

The results from this study revealed that gender, age, education, risk tolerance, and financial literacy confidence were all factors affecting the gambling behaviour. They contributed to the frequency in gambling. The higher the education level of the gamblers, the less they will buy the lottery. This finding is consistent with that of Clotfelter et al. (1999). Also the study by Kaplan (1988) found that those with a lower education level and the blue collar labour enjoy more buying the lottery. Besides, the study by Grable and Lytton (1999) also found that people with a low education, despite being risk averse or basically disliking risks, still love buying the lottery. Moreover, having high levels of financial literacy confidence and risk tolerance caused more frequent lottery purchases. It was clear that if one's self-perceived financial literacy is high, a higher level of risk tolerance resulted in buying lottery more often, or a higher level of addiction to gambling. It is worth noting that the level of financial literacy had no significant effect on the frequency of buying lottery, instead the financial literacy confidence was the factor that significantly affected the frequency of buying lottery by the informal labourers. The financial literacy confidence is a psychological factor related to the human emotions, and as Halicka and

Krawczyk (2014) indicate, mood plays a big role in people's decision to buy lottery tickets. Raising positive or negative emotions in people affects their behaviour of buying lottery tickets. Bruyneel et al. (2005), find that bad mood positively influences spending on lotteries. Burger et al. (2016) supports the theory of positive emotions leading up to the drawing time being cause for buying lottery tickets.

The results from our study highlight the role of the governmental sector including the related agencies in considering psychological factors that could influence the level of financial confidence of each individual. If the government wishes to decrease the lottery purchasing among the low-income people, the financial education should help equip them with both financial knowledge and financial cognition that would later enhance their financial literacy confidence. In this context, various education programs to improve the financial literacy level will probably raise the financial confidence. However, the demographic findings may be a guide for setting the priorities in policy making. Therefore, relatively more financial education programs for young people and women should be organized. Further studies can be conducted with different sample groups to see whether the findings change or not, depending on the sample. Last but not least, other regions of Thailand could also be surveyed to gain a more complete picture of the national situation.

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