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DETERMINATION OF FINANCIAL RISK TOLERANCE AMONG DIFFERENT HOUSEHOLD SECTORS IN SRI LANKA

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Abstract

This study examined the financial risk of tolerant behavior at the household level with particular emphasis on different household sectors in Sri Lanka. The analysis measured, the household willingness to take financial risk or risk tolerance based on a questionnaire survey. Financial risk tolerance was measured with the help of a likert-scale and a composite index was developed using the values for the answers. The study used descriptive statistics and also the one-way analysis of variance (ANOVA) test to compare the risk tolerance between the three main household sectors, i.e. urban, rural and estate. The effects of socio-econ-demographic factors upon financial risk tolerance of households were investigated using Tobit regression analysis. The results revealed that a majority of respondents exhibited an above average (high) risk tolerance as a whole and demonstrated significant differences in risk tolerance preferences of households at sectoral level. The results indicate that gender, age, education, occupational status, income, income diversification, distance to a financial institute and financial literacy are significant in the determination of the financial risk tolerance. The findings provide inputs for designing policies for the development of the financial markets in the Sri Lankan context.

Keywords: Financial risk tolerance, risk assessment, financial planning

1. INTRODUCTION

Understanding financial risk tolerance behavior within the context of developing countries is vital for policy making and implementation towards the development of financial markets. This paper reviews the financial risk tolerance behavior at household level with particular emphasis on different household sectors in Sri Lanka. Generally, risk refers to the uncertainties that are detrimental or disadvantages to the well-being of the households while it can remain in different forms. Hence, household will make certain decisions in anticipation of risk or in order to minimize the threat of failure to his (and his dependents) well-being. The behavior of risk taking individuals is such that they tend to work more in risky environments (Shaw, 1996). Theoretically, individuals who are more risk tolerant can earn more money and become more productive people like entrepreneurs who can contribute to the national income (Cramer *et al.,* 2001). The rationale behind this is that a country needs more risk tolerant people to activate the economy towards a higher economic growth. When the people are not naturally risk tolerant, there should be some ways of bringing them to such a behavior.

The economy of Sri Lanka is more often divided into three socio-economic sectors or communities such as urban, rural and estate. The people for different economic activities which need risk tolerance should come from these three different sectors. Although the prime concern of human

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beings is avoidance or mange of the risks that threaten their existence and look forward for security, the people in one sector can be lower in risk tolerance than that of the other sectors. If this happens to be correct, the contribution to economic growth from that sector also turns out to be low. As such, understanding the risk tolerance behavior of the communities in different sectors is very useful for necessary policy actions to be taken to develop risk tolerance behavior of the people. However, the sector-wise financial risk taking or tolerance behavior has not been investigated in Sri Lanka. Therefore, this study focuses on analyzing the risk tolerance behavior of the people in the three different sectors of Sri Lanka with a view to help improve the financial market and their products and services.

2. THE OBJECTIVE OF THE STUDY

The main objective of this study was to analyze the effects of socio-econo-demographic variables on the financial risk tolerance behavior at household level, with particular emphasis on different household sectors in Sri Lanka. The specific objectives were:

a. To discover if there is any relationship between risk tolerance and socio-econ-demographic factors.
b. To identify key factors which determine the risk tolerance behavior or the factors that affects the household risk appetite.
c. To draw policy implications for the improvement of risk tolerance behavior of the people in different communities of Sri Lanka.

3. LITERATURE REVIEW

There is no large body of literature pertaining to the risk tolerance behavior of people. However, the available literature is helpful to understand how to conduct a research in this regard using the deductive approach to reach conclusions. This section reviews some conceptual evidence and selected studies which have been specifically focused on the risk tolerance behavior of people.

Financial risk tolerance can be defined as a person's willingness to take financial risk. Conceptual evidence shows that the society faces different forms of risks and there are new types of risks to which the society exposed to. Among these different types, financial risk is a one risk, which our society has faced. Since the society is made of individuals, personal financial management determines the success of the society as a whole. Furthermore, financial risk tolerance plays a major role within the personal financial management. Personal financial risk tolerance has been defined as an indication of a person's attitude towards accepting risk (Hallahan *et al.,* 2004). Theoretically, risk tolerance behavior is accepted to be the inverse of an economist's concept of risk aversion (Faff *et al.,* 2008; Hanna *et al.,* 2001). Identifying an individual's financial risk tolerance level is recognized as being an important part for financial market policy designing and implementation.

Having identified the financial risk tolerance, measuring financial risk tolerance and understanding the relationship between risk tolerance and characteristics are also important for financial management within the larger context of personal financial planning and investment recommendations. Financial service providers and researchers have used two frameworks to measure risk tolerance, i.e. objective and subjective financial risk tolerance, as assessment approaches to financial risk tolerance. The objective approach employs the Arrow-Pratt utility framework in order to derive a measure of risk aversion by determining the ratio of risky assets to wealth (Chang *et al.,* 2004). On the other hand, the subjective measure of risk tolerance is based on posing hypothetical questions to individuals requiring them to choose between risky alternatives (Hanna & Lindamood, 2004). These approaches have been used by different researchers to measure the financial risk tolerance. Meanwhile, a significant number of empirical studies have been conducted to investigate how financial risk tolerance is affected by the individual and socio-economic characteristics at different contexts. The following factors have been identified by researchers to be effective in differentiating among levels of individuals risk tolerance.

Gender: The relationship between the role of gender and risk tolerance has been widely examined and analyzed. It was considered as an important risk tolerance classification factor. A great number of studies reporting higher financial risk tolerance for males in comparison to that of females (Dohmen *et al.,* 2010; Chaulk *et al.,* 2003; Grable *et al.,* 2004; Van de Venter & Michayluk, 2009; Gilliam *et al.,* 2010). However, there are a few studies that found that there was no significant difference in financial risk tolerance between males and females (Andersen *et al.,* 2008). Dreber and Hoffman (2010) suggest that gender difference in risk tolerance can be partly explained by the exposure to sexual orientation (cited in Cárdenas *et al.,* 2012). The findings of these studies are sufficient to take 'gender' as one of the influential factors of risk tolerance.

Age: Another widely considering factor that has been incorporated in explaining the risk tolerance is "age". A number of studies show that there is a link between age and risk tolerance. Some of these studies reveal that financial risk tolerance decreases with age. It's assumed that older individuals have less time to recover losses than younger individuals do, and as such, risk tolerance will decrease with age (Fan & Xiao, 2006; Van de Venter & Michayluk, 2009). Moreover, some evidence suggests that risk tolerance has a nonlinear relationship with age (Hallahan *et al.,* 2004; Grable *et al.,* 2006). However, in contrast, Wang and Hanna (1997) found that the relative risk tolerance increases with age. Another two researchers have observed a moderately increasing relative risk aversion with respect to age (Bellante & Green, 2004). Therefore, age also seems to be an important factor to be included in the analysis of risk tolerance behavior.

Civil Status: Generally marital status or civil Status (i.e., married, single - never married, divorced, separated, and widowed) of individuals are also considered as an effective factor that affect risk tolerance (Arano *et al.,* 2010). Some studies show that, married individuals are probably being less risk tolerant and more risk averse than single (Sund´en and Surette, 1998). Moreover, Lazzarone (as cited in Grable, 2000) argued that single individuals have less to lose by accepting greater risk compared to married individuals who often have responsibilities for themselves and dependents. Some other studies have suggested that married individuals, not singles, possess greater risk-taking propensities, although others have failed to find any statistically significant relationship between marital status and risk tolerance (Haliassos & Bertaut, 1995). Sung and Hanna (1996) highlighted that risk tolerance tends to have an increasing trend associated with being single. As such, civil status can also be considered as an explanatory factor of risk tolerance.

Education: Another factor which can influence risk attitudes is education (i.e., formal attained academic training). The level of education is widespread in the factor that influences an individual's willingness to take financial risk. Some researchers have found that people with higher education usually show more risk tolerance behaviour compared to others. With the level of education, people become capable of assessing the risk and benefits more carefully than those who are with less education. There is evidence to suggest that higher education encourages people to take more financial risks and a person who is more educated is more risk tolerant than a person with lower level of education (Grable & Lytton, 1999; Grable, 2000; Christiansen *et al.,* 2006; and Al-Ajmi, 2008). In contrast, Hallahan *et al.,* (2003) found that education was not a significant determinant of a person's risk tolerance behavior. However, these findings have created an increased interest in including 'education' as a variable that explain financial risk tolerance.

Occupation: Evidence show that another factor that seems to influence the risk tolerance is person's occupation status. Researchers have found that the people employed in professional occupations tend to be more risk tolerant than those in nonprofessional occupations (Grable & Lytton, 1998). However, Sung and Hanna (1996) found that there was no significant effect of occupation on risk tolerance. Some researchers have concluded that higher ranking occupational status can be used as a classification factor related to risk tolerance. Grable and Lytton (1998) highlight that characteristics corresponding to occupational status and self-employment have been significant in differentiating among levels of risk tolerance. It is generally considered that business sector individuals and other entrepreneurs typically lead to higher levels of risk taking than employers who are on a straight

salary or wage. This situation compels the researchers to include occupation in studies that analyses the individual behavior of risk tolerance.

Number of dependents: Another attribute to explain the amount of risk aversion is the number of dependents of the person in question. The primary explanation that the effect of dependents on risk tolerance is based on survival needs. The general postulation on the impact of financial risk tolerance is that individuals with more dependents are less risk tolerant than the persons with less dependent. Chaulk et al. (2003) also reveals that financial risk tolerance decreases as the number of children or dependents in their household increases. However, Faff et al. (2008) argues that financial risk tolerance increases with the number of dependents. However, Hallahan et al. (2003) and Bellante and Green (2004) found that the relationship between number of children or dependents and risk tolerance was insignificant. Considering all the above evidence, it seems that including the number of dependents factor, in an analysis of risk tolerance is vital and would provide a good initiation.

Income: Income factor (income factor consists of income from various income sources) is also to be found effective in discriminating among levels of risk tolerance. Some researchers have pointed out a relationship between income and risk tolerance which prevails in the form that increasing income levels are associated or potentially affect person's desire or appetite for risk (Tanaka et al., 2010). Grable and Lytton (1998), Hallahan et al., (2004); Watson and McNaughton (2007) found that risk tolerance increases with income which means that individuals with higher incomes tend to take greater risks than individuals with lower incomes. There are some negative relationship between financial risk tolerance and income also found (Faff et al., 2008). Moreover, Grazier and Sloane (2008) pointed out that income uncertainties negatively affect risk tolerance. This reveals that the existing evidence is sufficient to include the level of income in an analysis of risk tolerance.

Income diversification: Income diversification has also been can found to be an important determinant of risk tolerance by some researchers. It plays as a strategy of stabilizing incomes of risk taking individuals. Furthermore, diversification of the sources of household incomes has been put forward as one of the risk management strategies that households use to minimize the variability of household income and to ensure a minimum level of income (Alderman & Paxson, 1992). Using this factor as a strategy of risk management implies that it has a relationship with risk tolerance in the form that greater income sources are more prepared to take risks. However, there is no evidence in the existing literature on income diversification factors as determinants of risk tolerance or attitudes. By using this factor, the different risk preferences between people with diversification of income sources can be explained.

Distance to a financial institute: In the literature, some researchers suggest that new factors that contribute towards financial risk tolerance are particularly relevant to attributes of improved financial services in the finance industry. They point out that the access to financial services as a consequence of bank branch expansion significantly increases the income, output and employment (Burgess & Pande, 2005; Bruhn & Love, 2009). In addition, the distance to a financial institute has been found to be a very significant factor in determining functional financial literacy towards financial inclusion (Heenkenda, 2014). Distance to a financial institute (distance to the nearest financial institute from home) is a crucial factor due to many reasons. When the financial services are close to households, it could motivate the families to go for risk taking decisions caused by relative efficiency of communication with the financial institute, improved accessibility and reduction of information asymmetries, etc. Therefore, it is rational to include this variable also in an analysis of risk tolerance.

Financial literacy: Another factor, which has been taken into consideration by some researchers, is the financial knowledge or financial literacy, which can influence risk tolerance. Financial literacy possesses a greater confidence in individuals analytical and decision making skills on financial matters. Grable (2000) included the financial literacy factor in the study to see the association on financial risk tolerance and found that respondents with higher levels of financial knowledge were

more risk tolerant than respondents with less knowledge. Therefore, this factor too should be included in risk tolerance analyses.

Spatial differentiation: Barsky *et al.,* (1997) attempt to analyse the difference in risk tolerance preferences of individuals in terms of spatial differentiation using a choice dilemma study in the USA and found some significant differences (cited in Van de Venter & Michayluk, 2009). Despite the analytic importance of conventional socio-econo-demographic parameters, they identified an association between the spatial context and financial risk tolerance behavior which is vital to design financial products and policies to eliminate the inequality across settlement types. As such, based on this evidence, the variable 'spatial differentiation' can be included in risk tolerance analyses.

4. METHODS

4.1. Introduction
The study is solely dependent on the quantitative method of analysis designed under the positivist approach. This section presents the methods employed in order to identify the determinants of risk tolerance in the study in detail. It includes the measurement of variables, methods of analysis and the data base of the study.

4.2. Study area and the sample
Sampling was carried out with the objective of covering three main residential sectors, urban, rural and estate, as classified by the Department of Census and Statistics of Sri Lanka[2]. The sample was selected from each of these sectors taking a sector as an estate strata using multi-stage sampling technique related to cluster sampling. Three districts and six Divisional Secretariat Divisions (DSDs) were chosen for data collection. This was done after considering the spread of urban, rural and estate populations residing at divisional basis. Approximately 12 Grama Niladhari Divisions (GNDs)[3] were randomly selected from each DSDs and approximately 100 households were randomly selected from each GN division with the expectation of obtaining information from approximately 1100 households. It should be noted that the number of observations in each sample was not proportionate to the population and considered as disproportionate random sampling method since this method was perceived as advantageous since it allows for comparisons across sectors.

4.3. The questionnaire survey
The survey mainly focused on determining how the financial risk tolerance behavior of households is determined in different household sectors in Sri Lanka. The survey consisted of questions derived from previous surveys as well as questions developed by the present researcher. A fixed or structured response question format was used for the questionnaire. The questionnaire was prepared somewhat similar to that of the questionnaire developed by OECD for measuring financial literacy (OECD INFE, 2011). The questionnaire for the main survey tried to cover key areas of financial risk tolerance of individuals who take decisions for the households. It was also important to collect detailed information about the respondents' personal characteristics so that it is possible to identify which groups of people had better and worse levels of financial risk tolerance.

It should also be noted that the questionnaire was prepared in such a way that the data could be used for different study purposes by constructing different variables from the same or selected sets of data of the main data base. This is one of the studies that the same set of data was used for the analysis of financial risk tolerance of households.

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2 Urban Sector: Area governed by either Municipal Council (MC) or Urban Council (UC) is considered as Urban Sector, Estate Sector: Plantation areas, which are more than 20 acres of extent and having not less than 10 residential laborers, are considered as the estate sector, Rural Sector: Residential areas, which do not belong to the Urban sector or Estate sector described above, are considered as the Rural sector (Household Income and Expenditure Survey - 2012/13, p.4. Department of Census and Statistics of Sri Lanka, 2013)
3 Grama Niladari Division is the smallest unit of public administration in Sri Lanka.

4.4. Measurement of variables

Several studies attempted to identify the association between socio-econo-demographic factors and financial risk tolerance. Some studies have employed subjective and objective measures of risk tolerance to investigate the relationship between various socio-econo-demographic characteristics. Literature reveals difference kinds of measures of risk tolerance under two main categories, subjective and objective measures of risk tolerance (Hanna & Chen, 1997). As such, subjective risk tolerance is often articulated as an attitude towards risk and is simpler to measure than objective risk tolerance, which assesses the actual quantifiable risks taken. This study adopts the position of subjective risk tolerance as a measure of risk tolerance. The analysis used the stated (or subjective) measure of household risk tolerance based on each household's response to a survey question inquiring how much financial risk that the households are willing to take.

Financial risk tolerance can be measured with the help of a scale. Risk tolerance levels are indicators of an individual's outlook towards life and his investment behavior. Risk preference information was obtained from a household survey which specially focused on the functional financial literacy of the respondents as at the date of questionnaire survey in December 2013. However, the risk preference questions were also included in survey questionnaire. The survey selected 986 sample units for representing the three main communities based on settlement types in the form of urban, rural and estate sectors using multi-stage sampling technique related to cluster sampling.

The survey consisted of questions for risk tolerance designed based on previous research while a format of fixed response for the questions was used. One of the most common and widely used assessment instruments in the risk tolerance literature is a single-question measure from consumer finances surveys. The following questions were used to obtain responses to risk tolerance from each of the respondents.

1. Which of the statements come closest to the amount of financial risk that you and your (spouse/partner) are willing to take when you save or make an investment? (Answer options: 4 = Take substantial financial risks expecting to earn substantial returns, 2 = Take above average financial risks expecting to earn above average returns, 3 = Take average financial risks expecting to earn average returns, 4 = Not willing to take any financial risks. The above are the same questions suggested by Grable and Lytton (1998).

However, Roszkowski and Grable (2005) argue that having clients assessed themselves may be beneficial when financial advisers are assessing risk tolerance. The magnitude of the correlations between self-estimated and actual risk tolerance is "quite high" for clients relative to their ability to estimate other personality characteristics. The following question, no. 2, was also incorporated in the questionnaire since it is resplendent with the most predictive power for risk tolerance assessment when analyzing the clients' self-ratings.

2. What degree of risk have you assumed on your investments in the past? (Answer options: 1 = very small, 2 = small, 3 = medium, 4 = large, 5 = very large).

Furthermore, the study used the multidimensional financial risk tolerance scale developed and suggested by Grable and Lytton (1999) in order to examine the risk tolerance behavior in terms of the answers obtained to the following two questions.

3. In general, how would your best friend describe you as a risk taker? (Answer options: 4= A real gambler, 3 = willing to take risks after completing adequate research, 2 = Cautious, 1 = A real risk avoider).
4. When you think of the word "risk", which of the following words comes to mind first? (Answer options: 1= Loss, 2 = Uncertainty, 3 = Opportunity, 4 = Thrill).

However, the dependent variable of risk tolerance was created using the answers to the above four survey questions on how much risk they were willing to take. The responses were combined into a

composite index of risk tolerance. In order to place respondents in appropriate risk tolerance categories, answers were given a weight according to the riskiness of the response. Higher points indicated a higher level of risk tolerance whereas lower points indicated a lower level of risk tolerance. The total scores were calculated for each respondent based on the weights by adding the individual items score and the scores served as a measure of risk tolerance.

The literature suggested socio-econo-demographic factors were incorporated with some logically relevant factors which are needed to examine on how these characteristics influence a person's willingness to take financial risk. Financial risk tolerance index was used as the dependent variable while eleven independent variables were considered as a hypothetical association. The eleven variables are 'gender', 'age', 'age (squared)' (included the squared term because the variable 'year' might be non-linearly related to the outcome),'civil status' (married, single), 'education' (not attended school, primary, secondary and tertiary), 'occupational status'(agricultural, government, private , business), 'number of dependents in the family' (below 18, and above 65 years), 'income quartile', 'income diversification' (number of income sources), 'distance to a financial institute' (distance to the nearest financial institute from home) and 'financial literacy'. A composite index was constructed in order to represent financial literacy.

4.5. Method of analysis
The study used both descriptive statistics and one-way analysis of variance (ANOVA) test in order to compare the risk tolerance of deferent settlement types (sector). Once the responses to the functional financial literacy survey from household interviews had been checked, recorded and transformed, selected statistical tests were used to identify the relationships between variables. In the first instance, descriptive statistics were calculated for risk tolerance index and variables' relating to the socio-econo-demographic characteristics of respondents and the regression analysis was used to estimate the impact of variables. The effects of socio-econo-demographic variables upon financial risk tolerance levels of respondents were investigated using Tobit regression analysis since it is the more appropriate statistical technique for examining the censored dependent variable (The financial risk tolerance index is in the range 0-100 scale) (Gilliam *et al.,* 2010).

5. RESULTS

This section presents the results of the estimated risk tolerance index and the variables that influence risk taking behavior. Results are organized into two main parts namely, descriptive statistics with sample structure analysis and factors influencing risk taking behavior or regression analysis. The descriptive statistics and analytical results which provide a general explanation extend the understanding of behavior of risk tolerance in Sri Lankans.

The descriptive statistics of each settlement type of risk tolerance index are presented and discussed in this section. Table 1 shows that the respondents' total risk tolerance index scores change between 0.141 and 99.999 while the mean was 67.31546 (standard deviation 28.61042). The size of the mean centered coefficient of variance indicates that there is variation within each of the communities in terms of the risk tolerance index scores. The mode score of financial risk tolerance index shows that a similar pattern is exhibited in the urban and rural sectors.

The distribution of the risk tolerance index in terms of the risk tolerance scales with regard to the respondents by settlement types is to be unveiled. The risk tolerance index was such that it was constructed for each respondent taking the total number of points that reflects his/her risk tolerance capacity into account. The number of points received by each respondent in the scale was used for understanding and interpreting the general pattern of risk tolerance behavior of people. Table 2 shows the proportion of respondent's   risk tolerance scales by settlement types.

Table 1: Descriptive statistics of the risk tolerance index

Descriptive statistics	Household sector			Total Risk tolerance index
	Urban	Rural	Estate	
Mean	75.868	67.031	59.265	67.315
Median	84.389	79.217	70.895	79.217
Mode	89.329	89.329	82.102	89.329
Standard Deviation	24.926	27.204	30.649	28.610
Minimum	0.141	0.141	0.141	0.141
Maximum	99.999	93.606	94.700	99.999
Count	326.000	332.000	337.000	926.000
Confidence Level (95.0%)	2.716	3.303	3.284	1.845

Source: Author constructed

The risk tolerance scale shows that around 43 percent of the urban sector respondents consider themselves as very high in risk tolerance. Similarly, around 27 percent of the rural sector participants assess themselves as very high in risk tolerance capacity while this percentage is 18 percent in the estate sector. However, when considering all the sectors, 29 percent of the respondents assess themselves as they are very high in risk tolerance capability. The results show that a significant number of respondents falls into the above average (high) level of risk tolerance category. Only 5 percent of the respondents represent the average position in risk tolerance. A significant percentage (36 percent) of respondents in the estate sector shows an unwillingness to take risks while this is 27 percent for the rural sector. As a whole, the risk tolerance index of respondents shows a higher risk-tolerance behavior across all settlement types.

Table 2: Distribution of risk-tolerance index categories by settlement types

Risk-tolerance categories	Index scale	Household sector			
		Urban	Rural	Estate	Total
Low risk tolerance	Index scores between 0 and 19	7%	11%	18%	12%
Below average risk tolerance	Index scores between 20 and 49	9%	16%	18%	14%
Average risk tolerance	Index scores between 50 and 69	4%	5%	5%	5%
Above average (high) risk tolerance	Index scores between 70 and 89	37%	41%	41%	40%
Very high risk tolerance	Index scores between 90 and 100	43%	27%	18%	29%

Source: Author constructed

Differences between the settlement types were identified using the One-way Analysis of Variance (ANOVA) of risk tolerance index (d.f. = 2, F = 29.64987, p<0.0001). It helps to understand that there are significant differences between the settlement types. The respondents in the urban area show a higher risk tolerance behavior than the respondents in the rural and estate sectors.

Table: 3 Results of ANOVA tests for differences between settlement types against risk tolerance index

Source of Variation	Sum of Squares (SS)	Degrees of Freedom (df)	Mean Square (MS)	F statistic (F)	Significant
Between Groups	45708.726	2	22854.36	29.6499	0.010
Within Groups	711455.950	984	770.808		
Total	757164.676	986			

Source: Author constructed

5.1. The Relationship between the determinants of risk tolerance behavior

Descriptive statistics indicated the general patterns of the respondents' risk tolerance behavior. The correlation calculations through the Pearson test for all factors suggest that the financial risk tolerance attitudes are a function of socio-econo-demographic characteristics. The pattern of correlations among all variables is shown in Table 4. Since most of the correlation coefficients

among variables were significant (P≤0.01 or P≤0.05), correlation coefficients may be contributory factors. Therefore, the regression analyses were used in order to understand the inherent risk tolerance capacities.

Table 4: Correlation matrix for all study variables

	1 Gender	2 Age	3 Civil Status	4 Education	5 Occupation	6 Dependents	7 Income	8 Income diversification	9 Distance	10 Financial literacy	11 Risk Tolerance
1.000	1.000										
2.000	0.101	1.000									
3.000	-0.166	0.030	1.000								
4.000	0.078	0.017	0.044	1.000							
5.000	-0.207	-0.198	0.075	-0.289	1.000						
6.000	-0.004	-0.023	-0.293	0.045	0.042	1.000					
7.000	-0.013	-0.093	-0.057	0.228	-0.025	0.193	1.000				
8.000	-0.029	0.121	0.042	0.003	-0.089	0.105	0.137	1.000			
9.000	-0.032	-0.037	0.009	0.076	0.108	-0.056	-0.059	-0.082	1.000		
10.000	0.205	-0.038	0.089	0.289	-0.128	-0.011	0.313	0.046	-0.058	1.000	
11.000	0.063	-0.048	-0.037	0.184	-0.186	0.035	0.370	0.023	-0.079	0.333	1.000

Source: Author constructed

5.2. Factors influencing risk taking behavior - regression analysis

The Tobit regression analysis was used in order to examine the factors associated with risk tolerance behavior index in three household sectors, using a set of socio-econo-demographic characteristics as control variables. Table 5 presents the results of risk tolerance associated with socio-econo-demographic variables.

The first hypothesis tested was whether there was a difference between the risk tolerance level of the males and females by settlement types. The coefficient of gender in the urban area was found to be not statistically significant. However, in the rural and the estate sectors, gender variable was found to be statistically significant at the ten percent level, suggesting that gender does play a role in determining the risk tolerance levels of respondents. The sign of the coefficient, being negative, suggested that females were less risk tolerant than males in the estate sector. However, rural sector coefficient of gender suggests that the males were less risk tolerant than females. It implies that gender has an important impact on risk tolerance in the rural and estate sectors in Sri Lanka.

The second hypothesis was that age was statistically significant at the ten percent level and a sign that coefficient is positive. This finding suggests that there is a positive relationship between age and risk tolerance which indicates that younger respondents are less risk tolerant than older respondents in the urban and rural sectors. However, in the estate sector, age variable was not statistically significant suggesting that age has no effect on risk tolerance in that sector. The negative sign of coefficient suggests that there is an inverse relationship between age and risk tolerance which indicates that older respondents are less risk tolerant than younger respondents. Meanwhile, age-squared coefficient and the sign reveal an interesting finding which indicates an inverse U-shaped relationship in the urban and the rural sectors. Lower average age of the respondents and elderly respondents are less likely to risk tolerance than others. The results indicate that the increase in age with the risk tolerance index score is likely to go up to a peak at the age of 60 years and age at 49 years, respectively in the urban and the rural sectors. Age-squared coefficient had a positive sign and was not statistically significant in the estate sector.

Third hypothesis, which was used to test the relationship between civil status (Married or Single) and the risk tolerance, obtained the results revealing that civil status was highly insignificant and, therefore, had no effect on risk tolerance levels in all household sectors. Although the negative sign of coefficient was not significant, it suggests that single status respondents are less risk tolerant than married respondents. This situation particularly visible in the estate sector.

Table 5: Regression results of financial risk tolerance index

Explanatory variables	Household sector		
	Urban	Rural	Estate
Constant	2.871	26.94	56.88**
	(0.0968)	(1.132)	(2.321)
Gender	-1.647	6.004*	-1.324*
(Compared to Female)	(-0.587)	(1.842)	(-0.391)
Age	0.675*	0.546*	-0.722
	(0.477)	(0.406)	(-0.775)
Age-squared	-0.006*	-0.005*	0.005
	(-0.475)	(-0.673)	(0.500)
Civil status (Reference : Single)			
Married	1.880	6.993	-7.836
	(0.457)	(1.136)	(-1.354)
Education (Reference : Not attended school)			
Primary	49.91	17.57*	7.692
	(1.593)	(1.862)	(1.462)
Secondary	18.45	11.22	14.92***
	(0.834)	(1.333)	(2.905)
Tertiary	17.77	5.680	30.24
	(0.799)	(0.454)	(1.644)
Occupation (Reference : Agriculture)			
Government	15.64***	0.0580	-10.60
	(3.242)	(0.013)	(-0.992)
Private sector	6.578	3.242	-4.898
	(1.356)	(0.560)	(-0.956)
Business	9.649*	-1.632	-1.066
	(1.895)	(-0.391)	(-0.178)
No. of dependents	-0.303	-0.110	1.416
	(-0.259)	(-0.075)	(1.234)
Income quartile (Reference : Income Q1 Lowest)			
Income Q2	13.51**	2.129	-1.366
	(1.743)	(0.480)	(-0.387)
Income Q3	22.65***	13.01***	-1.962
	(3.051)	(2.958)	(-0.404)
Income Q4	30.60***	15.16***	8.030
	(4.113)	(2.783)	(1.121)
Income diversification	-1.815	-0.858	5.789**
	(-1.083)	(-0.399)	(2.492)
Distance	-0.0002	0.0001**	0.0009**
	(-0.370)	(0.413)	(2.115)
Financial literacy index	0.325***	0.393***	0.529***
	(4.118)	(3.373)	(3.389)
Sigma	21.72***	24.33***	27.56***
	(25.53)	(22.85)	(26.00)
Observations	326	322	338

Source: Author constructed. t-statistics in parentheses *** $p<0.01$, ** $p<0.05$, * $p<0.1$

The fourth hypothesis recognized a correlation between education and risk tolerance capacity. In the case of urban sector, the results indicate that education level had no significant effect on the level of risk tolerance of respondents. However, in the rural sector, estimated coefficient value was positive for the primary education variable and statistically significant at a ten percent level indicating that the primary educated people are more risk tolerant than the other categories of respondents under education status. When considering the education factor in the estate sector, estimated coefficients of education were positive and statistically significant and at a very high level ($p<0.001$) on secondary

level education which means that respondents who had a secondary level education dominated in the sphere of risk tolerance, especially compared to the group of respondents who never attended school.

The fifth hypothesis considered 'occupation' which is another factor which would influence risk tolerance. The variable 'occupational status of the respondents' was a dummy variable and had an estimated coefficient positive value for the Government sector and the business sector. It revealed that the occupational status of the respondents could affect risk tolerance positively. The employees in the Government sector and also in the business sector tend to have a higher risk tolerance. Furthermore, the analysis revealed about the kind of relationship that the occupation had with risk tolerance in the urban sector. However, it found that occupational status of the respondents was highly insignificant and, therefore, had no effect on risk tolerance levels at rural and estate sectors.

The sixth hypothesis, which expressed the relationship between the 'number of dependents' and the risk tolerance, tested and revealed that there was no such relationship. However, the sign of the coefficient being negative in the urban and the rural sectors implies that the respondents with lesser number of dependents in their family tended to score higher at the risk tolerance index than the respondents who had more dependents. Results from the estate sector suggest that the number of dependents had no significant effect on the risk tolerance levels of respondents. The sign of the coefficient, being positive, suggests that respondents with greater number of dependents tend to score higher at risk tolerance than the respondents having lesser dependents.

The seventh hypothesis tested on the income and risk tolerance revealed that income had a highly significant effect on risk tolerance levels in the urban sector. Estimated coefficient values were positive, especially for income quartile levels; quartile 2, quartile3 and quartile 4 levels, while the variables were statistically significant at $p<0.05$, $p<0.01$ and $p<0.01$ levels respectively. Furthermore, the results indicate that compared to the lowest income quartile, the highest income quartile performed well in risk tolerance. As respondent's income increases there is a greater capacity for them to take higher risks and, therefore, their risk tolerance level increase with their income levels. The level of income of respondents is a strong contributor to risk tolerance in the rural sector also. The result shows that the coefficients of the income variable had positive values for the income quartile 3 and 4. This implies that an increase in the level of people's income will increase the risk tolerance capacity in rural sector as well. This relationship seems plausible as it shows that respondents who fall in the lower income categories are less willing to face risk. However, the income variability was found to be not statistically significant in the estate sector. The positive coefficients of income quartile 4 reveal that when the respondents move into higher income levels, their risk tolerance increases, though it is not significant. However, the sign of the coefficient has been negative for the income quartile 2 and 3of the estate sector suggesting that there is a negative relationship between income level and risk tolerance. This indicates that middle income earners are less risk tolerant than the others in the estate sector.

The eighth hypothesis was set in order to test whether there was any relationship between risk tolerance levels and income diversification. The coefficients of the income diversification variable were found to be statistically insignificant at the urban and rural sectors. It suggests that income diversification does not play a role in determining risk tolerance levels of respondents in these two sectors. However, in the estate sector, the estimates show a statistically significant positive association of the income diversification variable with the risk tolerance at ($p<0.05$) indicating that those who are lower in income diversification tend to have a lower risk tolerance capacity relative to those who are higher.

The ninth hypothesis was set to test the degree of risk tolerance in relation to the distance to a financial institute. It was found that the distance to a financial institute was insignificant and had no effect on risk tolerance levels in the urban sector. However, in the case of rural and estate sectors, the relationship between these two was found to be significant with positive coefficients. It implies that the respondents who had a higher distance to a financial institute tended to get less risk tolerance than the respondents having less distance to a financial institute. It predicates that the distance to a

financial institute is positively associated with the risk tolerance capacity of the respondents who live in the rural and estate sectors.

The last hypothesis attempted to identify the significance of the association of financial literacy of respondents with risk tolerance. The regression results showed that financial literacy of respondents is statistically highly significant and had a positive sign for the co-efficiency of all sectors. This relationship seems plausible as it demonstrates that with the increase in the respondents' financial literacy, their tolerance to take risk becomes high. Therefore, it shows that the risk tolerance increases with financial literacy.

6. CONCLUSIONS

The conclusions of the paper can be drawn from the results with respect to the determinants of risk tolerance behavior of people by settlement type or household sectors in Sri Lanka. A significant percentage of respondents in all sectors falls into the above average (high) risk tolerance category. However, significant differences can be identified between settlement types, for e.g., the respondents in the urban sector show a higher risk tolerance compared to the respondents in the rural and the estate sectors.

When considering the gender variable, it shows an important association in the risk tolerance behavior of the people in the three sectors. The males are more risk tolerant in the rural sector, while it is vice versa in the case of the estate sector. However, gender is not significant in determining the risk tolerance in the urban sector while the age variable has not been significant but the kind of relationship it has with risk tolerance is important to be highlighted. The younger people are less risk tolerant than the older people in both urban and rural sectors. The inverse U-shaped relationship between 'age-squared' and the risk tolerance in the urban and the rural sectors indicate that after a certain age, people become risk averse. Civil status (Married or Single) is also not a significant factor of risk tolerance in all sectors. However, the kind of relationship between the civil status and risk tolerance has been such that single status respondents are less risk tolerant than married respondents in the estate sector.

Furthermore, education also has no significant association with the level of risk tolerance in the case of the urban sector while respondents educated up to the primary level are more risk tolerant than the other levels of education. The secondary level education is significant and highest in risk tolerance in the case of the estate sector. The occupation of people is also an important factor that determines risk tolerance. The special feature that has been identified in this regard is that the government employees in the urban sector are more risk tolerant compared to that of the other sectors and there is no difference in risk tolerance across the occupational status groups in the rural and estate sectors. The variable 'number of dependents' has been insignificant in determining the risk tolerance of people. The results reveal that respondents with lesser number of dependents in their family show a higher risk tolerance than respondents who have more dependents in the urban and the rural sectors, comparatively to the estate sector which shows that when people have more dependents, they tend to have a higher risk tolerance. The variable 'income' is substantially significant and positively associated with the risk tolerance in the urban sector. Compared to the lowest income quartile, the highest income quartile performed well in risk tolerance. Even though the level of income has a significant association with the risk tolerance in the rural sector, the estate sector is less risk tolerant than the others. Comparatively, the relationship between risk tolerance levels and income diversification has not been significant. This means that the income diversification does not play a role in determining risk tolerance of people in the urban and the rural sectors. However, in the estate sector, those who are lower in income diversification tend to show a lower risk tolerance compared to others. In addition, 'Distance to a financial institute' variable is also insignificant in determining the risk tolerance in the case of the urban sector and in the rural and estate sectors, people with a longer distance to a financial institute tended to be less risk tolerance than the others. Finally, the variable, 'financial literacy' has been significant to all sectors, the greater the financial literacy, greater is the capacity to take risk.

This research attempted to determine the socio-economic and demographic characteristics affecting financial risk tolerance of people in different household sectors of Sri Lanka. The determinants identified with specific relationships are important for policy makers while providing implications for further research.

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