

## THE ROLE OF PERCEIVED RISK IN DEBT DECISIONS

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### **Abstract:**

The literature on the important role of informal debt sector in the stock market has received little attention. Also, the relationship between perceived risk, choices among borrowing sources and debt decisions have unexplored.

We surveyed 420 Vietnamese individual investors and found perceived risk exerts an influence on choices among borrowing sources and use of informal debt for stock investment. Perceived risk causes investors to use higher levels of debt. Vietnam is an illustrative example as the use of informal debt for investing is common. These findings are robust after controlling for demographics and alternative approaches.

Our results imply that investors should take account of their risk concerns and choices among borrowing sources because a higher level of risk concern or a wider variety of borrowing sources can lead investors to use higher levels of debt. Importantly, since informal lenders are the primary lenders to investors, they should be aware that if their investment fails, their wider network may be adversely affected.

**Keywords:** Borrowing sources, debt decisions, formal debt, informal debt, perceived risk.

**JEL:** G4

## **I. Introduction**

Investors generally find it hard to make the right decision under conditions of risk or uncertainty because they are “normal” and can make mistakes in decision-making, particularly, cannot precisely predict possible outcomes (Statman, 2005). A risky decision to be made, consequently, is often based on the judgment on how risky an event is (Kahneman & Tversky, 1979; Shefrin, 2002). This can account for why literature is of much interest to *perceived risk* over the last decades.

What we are interested in perceived risk here is that investors are concerned not only about *financial risk* stated by finance theory but also about other aspects of risk including *safety risk*, *social risk*, *time risk*, *opportunity risk*, *choice risk*, and *leverage risk* stated by consumer behaviour framework. We argue that these facets of risk originated from consumer behaviour theory may affect investment decisions and provide useful insights into investor behaviour.

We are also interested in investors’ use of debt (*debt decisions*), especially informal debt sector in the stock market. The use of debt creates financial leverage to be common in many countries and often regarded as an essential part of the growth of financial markets. In terms of informal debt, many prior studies find the importance of informal debt in emerging stock markets, such as Peru, Egypt, and Vietnam (Barslund & Tarp, 2008; Diagne, 1999; Guirking, 2008; Mohieldin & Wright, 2000; Nguyen, 2008; Nguyen & Berg, 2014; Zeller, 1994), but none of them addresses this issue to individual investors. As with households, the main reasons to explain why investors prefer informal debt are that they may pay with low-interest rates or may avoid legal lending problems if they cannot pay the money back.

We argue that perceived risk has direct and indirect roles in debt decisions. Note that debt decisions are risky decisions no matter what kinds of debt are, informal or formal, because users of debt may face possible insolvency if they do not manage debt well. In the direct role, perceived risk has a positive impact on debt decisions. This emanates from the results of

scholars of finance that winners (who gained early) or losers (who lost early) are prone to be risk-taking (Nofsinger, 2008; Thaler & Johnson, 1990). Winners become risk-taking because they do not often consider their gains as their own money (referring to as the *house-money effect*), while losers turn into risk-taking because they expect to compensate their prior losses (known as the *trying-to-break-even effect*). As a consequence, most investors may be risk-taking regardless of prior winners or losers. Due to this risk-taking characteristic, although they are concerned about the risk of stock investment, they decide to use debt for their stock investment, indicating a positive risk-debt relationship.

In the indirect role, perceived risk links choices among borrowing sources to debt decisions. The choices among borrowing sources may influence debt decisions through perceived risk. It is a fact that investors can borrow money from many sources for stock investment. Formal lenders are often bankers, credit institutions, or brokerage firms. Informal lenders are mostly people who are their family members or non-family ones. Since banks, parents and friends are found to be the primary lenders of households (Barslund & Tarp, 2008; Diagne, 1999; Guirking, 2008; Mohieldin & Wright, 2000; Nguyen, 2008; Nguyen & Berg, 2014; Zeller, 1994), we first examine whether these lenders are also the primary lenders of individual investors, and then investigate whether perceived risk is a mediator between choices among borrowing sources and debt decisions. This is based on the results of some prior studies (Agarwal & Teas, 2001; Trang & Khuong, 2017) in which perceived quality affects perceived value through performance risk. Perceived sacrifice impacts on perceived value through financial risk. Extraversion had an impact on investment decisions through perceived uncertainty.

We also investigate if there is any difference in the impact of perceived risk on debt decisions between non-users versus users of borrowing sources, non-stockbrokers versus stockbrokers, and male versus female investors.

Our study has some main contributions to the literature. First, the informal debt sector plays a vital role in emerging stock markets, e.g. Vietnam. Second, investors' perceived risk of stock investment consists of seven facets: financial risk, safety risk, social risk, time risk, opportunity risk, choice risk, and leverage risk. Third, the relationship between perceived risk and informal debt is positive (a positive risk-debt link). Fourth, perceived risk links choices among borrowing sources to debt decisions, indicating perceived risk causes investors to use higher debt. Finally, the use of more borrowing sources leads to the use of higher debt.

The remainder of this study is as follows. Section II presents a literature review and hypothesis development. The methodology is shown in Section III. Section IV emanates the results, then the robustness check in Section V. Sub-group analysis is demonstrated in Section VI, and demographics are discussed in Section VII. The implication is presented in Section VIII. Section IX ends with conclusions and further research

## **II. Literature review and hypothesis development**

### **2.1 Perceived risk and its facets**

Different definitions of perceived risk exist, e.g. Cunningham (1967) defines perceived risk as "a person's subjective feelings of certainty to act in an uncertain environment". Following Peter and Tarpey Sr (1975), we characterise the *perceived risk of stock investment* (abbreviated to *perceived risk*) as "the subjective level of concern about the risk of stock investment". The concept of perceived risk in consumer behaviour focuses on more aspects of risk than that in finance theory. Consumers are concerned about many aspects of risk, including *financial risk*, *performance risk*, *safety risk*, *psychological risk*, *social risk* and *time risk* (Bauer, 1960; Hoyer, MacInnis, & Pieters, 2016; Mitchell, 1999). By contrast, in finance framework, investors are concerned only about gains or losses, i.e. financial risk (Ganzach, 2000; MacGregor, Slovic, Berry, & Evensky, 1999; Shefrin, 2001).

We do support consumer behaviour framework that decision-makers should concern many aspects of risk instead of only one financial risk in finance framework. This is because money (financial risk) is not the only concern of decision-makers. Instead, other concerns are private information safety, social standing, time loss, other opportunities loss, making wrong choices between stocks, and leverage risk if they borrow money for stock investment. Investors' perceived risk includes seven facets as summarised below. Among those, four facets of risk (financial risk, safety risk, social risk, time risk) are consistent with consumer behavioural framework. Three aspects of risk, including opportunity risk, choice risk, and leverage risk, are explored through our interviews. We argue that the facets of risk derived from consumer behaviour theory may influence investment decisions, and be usefully incorporated into the financial theory to provide additional insights into investor behaviour. The definitions of facets of risk are shown below:

Financial risk	The possibility that investors make a loss in their stock investment portfolio.
Safety risk	The possibility that investors' information is leaked by hackers or attacked by viruses.
Social risk	The possibility that investors are held in low esteem by a certain group because they make a large loss in stock investment.
Time risk	The possibility that investors spend a lot of time on stock investment and the results are not what they expect.
Opportunity risk	The possibility that investors miss out on other financial investment opportunities if they use all the money for stock investments.
Choice risk	The possibility that investors make a wrong decision on choosing stocks for their portfolio.
Leverage risk	The possibility that investors' investment returns are inadequate to cover your loan interest and principal at maturity.

## 2.2 A risk-return tradeoff

Traditional finance (e.g. Capital Asset Pricing Model (CAPM) or Morden Portfolio Theory) assumes that (a) investors are always rational and risk-averse in decision-making. Risk-averse investors always expect high returns from an increase in risk, meaning a positive risk-return tradeoff. Also, (b) investors expect higher returns from an increase in risk, meaning a positive risk-return tradeoff. These assumptions by traditional finance have received many debates from scholars of behaviour finance and consumer behaviour.

In the former (a), the literature argues that investors are not always rational on account of inadequate information, cognitive limitations, mental short-cuts, heuristics, or emotions, which can influence decisions making processes away what may seem strictly rational (Kahneman & Tversky, 1979; Ricciardi, 2008; Simon, 1955; Tversky & Kahneman, 1975). Investors also have a range of needs apart from maximising monetary outcomes, and thus they may choose a course of action to satisfy these needs instead of maximising the financial result (Kahneman & Tversky, 1979; Ricciardi, 2008; Simon, 1955; Tversky & Kahneman, 1975). They might accept a higher risk to avoid losses rather than to attain higher returns (Kahneman & Tversky, 1979; Tversky & Kahneman, 1975). In consumer behaviour framework, e.g. Bauer (1960) also argues that in real life, consumers have restricted sources of data and limited ability to calculate the risks involved accurately. Consequently, consumers tend to evaluate risk via their less than perfect judgement.

In the later (b), some scholars of behavioural finance and consumption theory find an inverse relationship between risk and return, e.g. (Agarwal & Teas, 2001; Diacon & Ennew, 2001; Ganzach, 2000; Shefrin, 2001). Other scholars, however, find a positive risk-return tradeoff, e.g. (Byrne, 2005; Diacon & Ennew, 2001; Ganzach, 2000; Trang & Tho, 2017). As a result, a risk-return association can be inverse or positive dependant on decision-makers' perspectives or specific characteristics of a product.

We do support classical finance and scholars of behaviour finance and consumer behaviour that the link between risk and return is positive. Note that our study does not address this relationship but implies a positive risk-return relationship because the use of debt aims to expect higher returns, meaning a positive debt-return association.

### **2.3 Hypothesis development**

Current research is of much interest to the risk-return association but little interest to the risk-debt link. As with prior studies on a positive risk-return association, we hypothesize that the

relationship between perceived risk, choices among borrowing sources and use of debt is also positive. This is because as already mentioned since most investors are prone to risk-taking no matter they early gained or lost (Nofsinger, 2008), they are more likely to use debt for stock investment, even though the risk of stock investment is perceived as risky.

*H1: The more the concern about the risk of stock investment, the wider the variety of borrowing sources used, or vice versa, the wider the variety of borrowing sources, the more the concern about the risk of stock investment.*

*H2: The more the concern about the risk of stock investment, the higher the levels of informal debt used.*

Hoff and Stiglitz (1993) argue that formal and informal credit markets are common in developing countries, e.g. in Madagascar (Zeller, 1994), Malawi (Diagne, 1999), Egypt (Mohieldin & Wright, 2000), Peru (Guirkinger, 2008), and Vietnam (Barslund & Tarp, 2008; Nguyen, 2008; Nguyen & Berg, 2014)). Based on limited literature on the impact of choices among borrowing sources on debt decisions, we hypothesise below:

*H3: The wider the variety of borrowing sources used, the higher the levels of informal debt used.*

*H4: The wider the variety of borrowing sources used, the higher the levels of financial leverage used.*

Some studies also find the mediating role of perceived risk. For example, there is an effect of perceived quality on perceived value through perceived risk (Sweeney, Soutar, & Johnson, 1999), and an impact of quality on value through performance risk (Agarwal & Teas, 2001). Moreover, extraversion affects investment decisions through perceived uncertainty (Trang & Khuong, 2017). Based on this evidence, we hypothesises the indirect role of perceived risk and borrowing sources as follows:

*H5: Perceived risk indirectly affects informal debt through borrowing sources.*

*H6: Perceived risk indirectly affects financial leverage through borrowing sources.*

*H7: Borrowing from many sources indirectly affects informal debt through perceived risk.*

### **III. METHODOLOGY**

#### **3.1 Research phases, seven risk facets, and sample size**

This research was undertaken through five phases that lasted two years (9/2017-8/2019), including a 1-month trial interview, an 11-month questionnaire design, a 3-month pilot test, a 4-month Human ethics approval, and a 5-month survey.

Firstly, the trial interviews with ten investors aimed to find what facets of risk investors are concerned. Of those, four facets of risk (financial risk, safety risk, social risk, time risk) are consistent with consumer behavioural framework. Three more facets of risk (opportunity risk, choice risk, and leverage risk) occur to only investors.

Secondly, based on trial interviews and literature, the scales were developed. To ensure the quality of questions on readability and understandability, we invited lay New Zealanders (native English speakers) to assess how understandable and straightforward our questionnaire is. After receiving feedback from these readers, the questionnaire was translated into Vietnamese and reexamined by a senior lecturer in Massey University, whose nationality is Vietnamese.

Thirdly, a pilot test was conducted in Vietnam. Five Vietnamese individual investors first re-examined the questionnaire to ensure that questions were readable and understandable in Vietnamese. Then the questionnaire was sent to 25 Vietnamese individual investors. The main feedback was that mutual funds do not apply to the Vietnam stock market. Alternatively, mutual funds should be changed to fund certificates.

Fourthly, after correcting based on the pilot feedback, the questionnaire was submitted to research ethics (the Massey University Human Ethics Committee). Finally, the questionnaire



was distributed to 600 individual investors through many instruments: Qualtrics Massey survey, social media: Facebook and Zalo, emails, workshops and paper-based survey, then elicited 420 responses, making up 70 per cent.

The data collection had two stages: 145 for the first stage, and the rest (275) for the second stage, which was supported by friends, colleagues, acquainted people, and many brokerage firms including RongViet, Phuong Nam, Saigonbank, Viet Capital, KimLong, Military Bank (MB), Mekong, Vien Dong, VnDirect, Asia Commercial Bank (ACB), Sacombank, Vietcombank, and DongA Securities Corporation.

Our sample size of 420 observation fulfils all the guidelines by (i) Hair, Black, Babin, and Anderson (2014, p. 177) in which the minimum ratio of observations to variables is 5:1, but the preferred rate is 15:1 or 20:1. Our model with nine variables conforms to the requirements of sample size (20 x 10 variables = 200). (ii) Krejcie and Morgan (1970) propose the sample size computed via the formula below. The number of individual investors trading on the Vietnamese stock market is approximately 1.5 million (Baomoi, 2016). The sample size required is 384<sup>1</sup>.

Vietnam was chosen because it has useful characteristics. (i) Individual investors are the predominant traders in the Vietnam stock market, which differs from developed stock markets. (ii) Vietnamese investors have experienced a range of market conditions, including the bubble of 2007 and the market crash of 2009. (ii) High levels of financial leverage are common. While Vietnamese law imposes a maximum lending ratio of 1:1, in some instances, individual

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$$^1 s = \frac{X^2 NP (1 - P)}{d^2 (N - 1) + X^2 P (1 - P)}$$
$$s = (3.841 \times 1,500,000 \times 0.5(1-0.5)) / \{0.05 \times 0.05(1,500,000 - 1) + 3.841 \times 0.5(1-0.5)\} = 384$$

Where:

s = required sample size;

X<sup>2</sup> = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841);

N = the population size;

P = the population proportion (assumed to be .50 since this would provide the maximum sample size);

d = the degree of accuracy expressed as a proportion (.05).

investors often use higher levels of debt, with the leverage ratio even up to 1: 4 (Vnexpress, 2010). This increases the risk of substantial losses when stock prices fall. (iv) Informal borrowing is conventional and is a primary borrowing source for Vietnamese households (Barslund & Tarp, 2008; Nguyen, 2008; Nguyen & Berg, 2014). These useful characteristics help expect Vietnamese individual investors to provide a better understanding of risk perception and an impact of perceived risk on decisions on borrowing in emerging stock markets.

### **3.2 Methods applied to test casual relationships**

We used SPSS and AMOS software to test the reliability, the validity of scales of variables, and the causal relationships between variables in the model<sup>2</sup>. We employed the primary method of the structural equation modelling (SEM) for our model because SEM can test concurrently direct and indirect (mediating) relationships between variables in the same model, while other methods such as multiple regression analysis, stepwise regression cannot (Hair et al., 2014).

*Mediating* variables are “prominent in psychological theory and research”, and the role of which is to transmit the impact of an independent variable on a dependent variable (MacKinnon, Fairchild, & Fritz, 2007, p. 593). The mediating variable also has other names such as mediator variable, intermediary variable, or intervening variable.

We also applied other techniques such as multiple regression, stepwise regression to re-test the direct relationships, and Hayes and Preacher’s approach to re-examine the indirect relationships by SEMs. We also analysed further about the differences of the impact of perceived risk on debt decisions between (i) non-users and users of borrowing sources, (ii) non-

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<sup>2</sup>. According to Hair et al. (2014)’s guidelines, ensure that a variable has sufficient reliability (the degree of consistency between multiple measurements of a variable), Cronbach’s alpha of variable each exceed a threshold of 0.6; or internal consistency: the item-to-total correlations exceed 0.5, and inter-item correlation exceeds 0.3. In addition, we tested criteria of a structural equation model fit by Hair et al. (2014), for example: Chi-square # 0, degree of freedom #0, normed chi-square < 5, Goodness-of-fit index (GFI) > 0.9, Tucker-Lewis index (TLI) > 0.9, Comparative fit index (CFI) > 0.9, Root mean square error of approximation (RMSEA) < 0.7.

stockbrokers and stockbrokers, and (iii) male and female investors. This analysis aimed to examine who has a stronger effect of perceived risk on debt decisions.

### 3.3 Measure of the variables in the models

The first variable is the perceived risk of stock investment. Mitchell (1999) assesses the model of Peter and Tarpey Sr (1975) as one of the good models (good understanding, prediction and validity, practicality and usability) in comparison with other models such as (Deering & Jacoby, 1972; Dowling & Staelin, 1994; Horton, 1976; Stone & Winter, 1987). Peter and Tarpey Sr (1975) suggest computing each facet of risk by multiplying the probability of loss (PL) by the importance of loss (IL), and perceived risk is computed by the sum of the results of all risk facets with the 5-point scales measure each. Based on the formula of Peter and Tarpey Sr (1975), we first used the rule of risk facets each for logarithm (e.g.,  $\ln(\text{SAF}_{1i} * \text{SAF}_{2i})$ ), then summed seven facets of risk together to form the overall perceived risk of stock investment (PERI).

$$\text{PERI} = \sum_{i=1}^n (\text{SAFR}_i + \text{SOCR}_i + \text{OPPR}_i + \text{TIMR}_i + \text{CHOIR}_i + \text{LEVR}_i + \text{FINR}_i) ^3$$

The second variable is the choices among borrowing sources. Borrowing sources include both informal and formal borrowing sources.

$$\text{FINFS} = \sum_{i=1}^n (\text{INBO} + \text{FBO}) ^4$$

<sup>3</sup> Where:

SAFR	: Safety risk; = $\ln(\text{SAF}_{1i} * \text{SAF}_{2i})$	CHOIR	: Choice risk; = $\ln(\text{CHO}_{1i} * \text{CHO}_{2i})$
SAF <sub>1</sub>	: probability of safety loss;	CHO <sub>1</sub>	: probability of choice loss;
SAF <sub>2</sub>	: importance of safety loss;	CHO <sub>2</sub>	: importance of choice loss;
SOCR	: Social risk; = $\ln(\text{SOC}_{1i} * \text{SOC}_{2i})$	LEVR	: Leverage risk; = $\ln(\text{LEL}_{1i} * \text{LEL}_{2i})$
SOC <sub>1</sub>	: probability of social loss;	LEL <sub>1</sub>	: probability of leverage loss;
SOC <sub>2</sub>	: importance of social loss;	LEL <sub>2</sub>	: importance of leverage loss;
OPPR	: Opportunity risk; = $\ln(\text{OPP}_{1i} * \text{OPP}_{2i})$	FINR	: Financial risk; = $\ln(\text{FIN}_{1i} * \text{FIN}_{2i})$
OPP <sub>1</sub>	: probability of opportunity loss;	FIN <sub>1</sub>	: probability of financial loss;
OPP <sub>2</sub>	: importance of opportunity loss;	FIN <sub>2</sub>	: importance of financial loss;
TIMR	: Time risk; = $\ln(\text{TIM}_{1i} * \text{TIM}_{2i})$	PERI	: Perceived risk of stock investment;
TIM <sub>1</sub>	: probability of time loss;		i: i <sup>th</sup> investor; n= 420.
TIM <sub>2</sub>	: the importance of time loss;		

<sup>4</sup> Where:

INBO: informal borrowing sources;  
 FBO: formal borrowing sources;  
 FINFS: borrowing sources;

The third variable is debt decisions involving two variables: informal debt (INFD) and financial leverage (LEVE). Note: informal debt over total assets. The following measures for debt decisions are:

$$\begin{aligned} \text{INFD} &= \sum_i^n (\text{INFD})_i \text{ }^5 \\ \text{LEVE} &= \sum_i^n (\text{LEVE})_i \end{aligned}$$

In terms of control variables, we asked respondents with simple questions related to gender, age, marital status, education levels and income levels. Financial literacy is measured through 16 questions by (Balloch, Nicolae, & Philip, 2014; Van Rooij, Lusardi, & Alessie, 2011). The scales of perceived risk, borrowing sources and debt decisions are attached in the Appendix.

## **IV: RESULTS**

### **4.1 Investor characteristics**

As summarised in Table 1, male investors dominate the sample, making up around 61 per cent. The number of single investors (about 62%) was higher than married investors (about 38%). Most investors had a university degree (around 86%), had higher levels of financial literacy than the average (around 59%), and had investment experience between less than three years and five years (about 77%). The majority of investors had levels of income between up to 10 million and 10-50 million VND per month (up to 500 USD and 500-2500 USD per month), and their investment amount was between less than 200 million and 200-500 million VND per year (10,000 USD and 10,000-25,000 USD per year). These investor characteristics are consistent with those of prior studies in Vietnam, for example (Tho, Trang, & Van Hoa, 2018; Trang & Tho, 2017).

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i: i<sup>th</sup> investors, n=420.

<sup>5</sup> Where:

INFD: informal debt ratios (%)

LEVE: levels of financial leverage (1: no leverage to 5: maximum leverage ratios).

i: i<sup>th</sup> investors, n=420.

We also find that most investors use borrowed money for investing, from informal lenders: family (around 73%) and non-family (about 60%), and formal lenders (about 81%). The primary lenders are parents, friends, and brokerage firms. In addition, 82 per cent of investors used debt for their stock investment. Of those, investors used informal debt (about 55%), formal debt (65%), and financial leverage (80%). Debt used for stock investment, on average, comprises informal debt (17%) and formal debt (20%).

<Insert Table 1 about here>

#### **4.2 Test of reliability**

We tested reliability coefficients (Cronbach's alpha) of seven facets of risk. As summarized in Table 2 below, all Cronbach's alpha of the facets of risk was more than 0.6, between 0.612 (choice risk) and 0.882 (leverage risk). Moreover, seven facets of risk composed perceived risk. The scale of perceived risk had Cronbach's alpha of 0.679 in the face of some inter-correlation being less than 0.3. Based on these results, all scales of seven facets of risk and perceived risk had acceptable or high internal consistency. This allows the use of these scales for testing causal relationships.

<Insert Table 2 about here>

#### **4.3 Test of correlations between variables**

We tested Pearson's correlation coefficients between variables. As shown in Table 3 below, most facets of risk variables positively inter-correlated at the significant levels ( $p < 0.05$ ). For example, safety risk had a positive correlation with social risk, opportunity risk, time risk, choice risk, leverage risk, and perceived risk. Perceived risk positively correlated with choices among borrowing sources and informal debt, showing that perceived risk increases as choices among borrowing sources and informal debt increase.

Overall perceived risk had correlations with its seven facets at significant levels, ranked in descending order, time risk, leverage risk, choice risk, opportunity risk, social risk, safety risk and financial risk.

<Insert Table 3 about here>

#### **4.4 Results of structural equation models**

We developed three structural equation models (SEM1, SEM2, and SEM3). SEM1 examined the direct and indirect impact of perceived risk on debt decisions through borrowing sources. SEM2 tested the direct and indirect effect of seven facets of risk on debt decisions through borrowing sources. SEM3 detected the direct and indirect influence of borrowing sources on debt decisions through perceived risk. The variable of borrowing sources is a mediating variable in SEM1 and SEM2, and the perceived risk is a mediating variable in SEM3. We tested three SEM models separately to ensure each model meeting the guidelines of a model fit. Each model includes the main variables and six control variables (gender, age, marital status, education, income, and financial literacy).

Our findings supported the hypotheses, as Figure 1, 2 and 3, and Table 4. Investors' overall perceived risk is composed of seven facets: financial risk, safety risk, social risk, time risk, opportunity risk, choice risk, and leverage risk.

In the direct impact, we find a direct impact of perceived risk, opportunity risk, and leverage risk on borrowing sources, and vice versa, an effect of borrowing sources on the perceived risk in support of H1. Moreover, Table 4 shows an effect of perceived risk on informal debt (H2), borrowing sources on informal debt (H3), and borrowing sources on financial leverage (H4).

In the indirect impact, Table 4 shows two indirect relationships (i) perceived risk (opportunity risk and leverage risk) indirectly affected informal debt (H5) and financial leverage (H6) through borrowing sources. The choices among borrowing sources acted as a mediator between

perceived risk (opportunity risk and leverage risk) and debt decisions. Borrowing from many sources can account for why investors tend to use higher levels of debt.

(ii) Choices among borrowing sources influence informal debt through perceived risk in support of H7. The role of perceived risk here is to explain why investors who prefer borrowing from many borrowing sources are prone to use higher levels of informal debt.

Our findings seem consistent with scholars who find a positive risk-return relationship, e.g. (Byrne, 2005; Diacon & Ennew, 2001; Ganzach, 2000; Trang & Tho, 2017). In the direct role of perceived risk, we add our findings alongside prior studies, e.g. Agarwal and Teas (2001) in which perceived risk is a mediator of the relationship between quality and value; Trang and Khuong (2017) who find no indirect roles of perceived risk in the relationship between personality traits and investment decisions.

<Insert Figure 1,2,3 and Table 4 about here>

## **V. ROBUSTNESS CHECK**

To test the robustness of the results, we applied some additional tests: multiple linear regression, stepwise, Hayes and Preacher approach, to the direct and indirect relationships.

### **5.1 Multiple and stepwise regression**

We denoted “a” for models with multiple regression and “b” for models with stepwise regression, as shown in Table 5.

Table 5 find a direct impact of (1) perceived risk and choices among borrowing sources on informal debt, (2) choices among borrowing sources on financial leverage, (3) perceived risk on the choices among borrowing sources, (4) choices among borrowing on perceived risk, and (5) opportunity risk and leverage risk on choices among borrowing sources.

In summary, both approaches reported the direct relationships between perceived risk, choices among borrowing sources, and debt decisions at a significant level, which are consistent with three SEM models.

<Insert Table 5 about here>

## **5.2 Applying Hayes and Preacher methodology**

We used the approach of (Hayes, 2017; Hayes & Preacher, 2010) to test the indirect effects of (i) perceived risk on debt decisions through the choices among borrowing sources, and (ii) the choices among borrowing sources on debt decisions through perceived risk. Because this approach cannot test the relationships of all facets of risk, choices among borrowing sources, and debt decisions concurrently, we denoted an independent variable as X, a mediating variable as M, and a dependent variable as Y. A model is seen as "X->M->Y". The results of the seven models are shown in Table 6.

All seven models reported the choices among borrowing sources and perceived risk acted as mediator variables, which are consistent with findings in SEMs. Model 1 through 6 indicate that choices among borrowing sources mediate (i) between perceived risk and informal debt in Model 1, and (ii) between perceived risk and financial leverage in Model 2, (iii) between opportunity risk and informal debt in Model 3, (iv) between opportunity risk and financial leverage in Model 4, (v) between leverage risk and informal debt in Model 5, and (vi) between leverage risk and financial leverage in Model 6. Moreover, (vii) perceived risk links the choices among borrowing sources to informal debt. These mediation analyses are in line with three SEM models.

<Insert Table 6 about here>

## **VI. SUB-GROUP ANALYSIS**

We examined the differences in the impact of perceived risk on informal debt on sub-groups, namely (i) non-users and users of informal borrowing sources, (ii) non-users and users of formal borrowing sources, (iii) non-stockbrokers and stockbrokers, and (iv) male and female investors. This analysis aimed to find out who has a stronger effect of perceived risk on informal debt.



Table 7 showed that perceived risk of (i) users of informal borrowing sources, (ii) users of non-users of formal borrowing sources, (iii) non-stockbrokers, and (iv) male investors positively affected the use of informal debt at a significant level. Among these groups, perceived risk of male investors has the highest effect on informal debt at a significant level, followed by non-users of formal debt, non-stockbrokers, users of formal borrowing sources, and users of informal borrowing sources. As a result, perceived risk plays a vital role in male investors and non-users of formal borrowing sources.

<Insert Table 7 about here>

## **VII. DEMOGRAPHICS**

We show that some demographics affected perceived risk, borrowing sources and debt decisions, as shown in Table 4 and Table 7. Surprisingly, we find no impact of education on debt decisions but a significant effect of financial literacy on debt decisions. This is perhaps because education focuses only on academics degrees, while financial literacy is measured through many questions of financial knowledge (Balloch et al., 2014; Van Rooij et al., 2011). The following control variables that affect debt decisions are:

- (i) Gender positively affects perceived risk, meaning that female investors have higher levels of perceived risk than male investors. This result is consistent with prior studies, for example, Tho et al. (2018) who found females are more likely to avoid risk or uncertainty.
- (ii) Age negatively influences perceived risk; that is, the older investors are, the lower the levels of perceived risk. This finding is in line with prior research (Frijns, Koellen, & Lehnert, 2008; Grable, 2000; Pålsson, 1996; Wang & Hanna, 1997) in which risk-taking increases when age increases.
- (iii) Marital status negatively affects informal debt, showing that single investors use higher levels of informal debt than married investors. This is consistent with that of Grable (2000) who argue that single people take more risk than married ones. In the sub-group analysis, we

also find single female investors have higher levels of informal debt than married female investors.

(iv) Income is inversely associated with the choices among borrowing sources and positively related to financial leverage, meaning that investors having higher income tend to use a fewer variety of borrowing sources, but use higher levels of financial leverage. This result appears rational because when they have sufficient money, their borrowing is likely to reduce. The finding of a positive relationship between income and financial leverage is in line with previous studies in which investors having higher income tend to take more risk (Grable, 2000; Hallahan, Faff, & McKenzie, 2003, 2004; Morin & Suarez, 1983; Riley Jr & Chow, 1992; Yao, Sharpe, & Wang, 2011). Importantly, the income of users of formal borrowing sources and non-stockbrokers have an inverse impact on informal debt at a significant level.

(v) Financial literacy positively influenced financial leverage, meaning that investors had higher scores of financial literacy use higher levels of financial leverage. This finding is similar to those of prior scholars who found people with higher financial knowledge/education/literacy are willing to take more risks (Grable, 2000; Hallahan et al., 2004; Kannadhasan, 2015; Riley Jr & Chow, 1992; Yao et al., 2011). Remarkably, we find an inverse effect of financial literacy of female investors on informal debt at a significant level, showing that the higher the levels of financial literacy, the lower the levels of informal debt used.

## **VIII. IMPLICATIONS**

Our study implies that investors should take account of levels of risk concerns because a higher level of risk concern can cause investors to borrow money from more sources and use higher levels of debt. Moreover, since informal lenders are the primary lenders to investors, investors should be aware that if the stock investment fails, the wider network may be adversely affected. Our findings also provide a better understanding of the fact of debt used by investors as well as highlight the critical role of informal debt sector in the emerging stock markets.

## **IX. CONCLUSIONS AND FURTHER RESEARCH**

Our study examines the relationship between perceived risk, choices among borrowing sources, and debt decisions. We find (i) perceived risk (opportunity risk and leverage risk) influences the choices among borrowing sources, and vice versa. Moreover, we also find (ii) an effect of perceived risk on informal debt, (iii) the choices among borrowing sources on debt decisions, (iv) perceived risk is a mediator between the choices among borrowing sources and debt decisions, and (v) the choice among borrowing sources is as a mediator between perceived risk (and opportunity risk and leverage risk) and debt decisions. These findings are robust after controlling for demographic variables and using additional techniques.

Since the theme of investors' use of informal and formal debt has not been examined sufficiently, more studies are required on unexamined aspects: (i) do informal lenders have any benefits (e.g. interest or proportions of investment outcomes) when lending money to investors? (ii) is the money lenders give investors their own money? (iii) In case, informal lenders help investors without conditions, how these informal lenders manage their money to take care of their family or their children. Last but not least, not only does the perceived risk affect debt decisions, but trust and risk tolerance may also be the essential factors driving debt decisions.

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## APPENDIX

1/ Thinking about borrowing **from family sources** such as parents, a spouse, sisters, brothers, and relatives, to invest in stocks (you can choose more than 1 answer):

- 1. Parents.
- 2. Grandparents.
- 3. Brothers/sisters.
- 4. Parents in law.
- 5. Brothers/sisters in law.
- 6. Cousins/nieces/nephews.
- 7. Husband/wife.
- 8. Other family sources: .....
- 9. I do not borrow from any family sources.

2/ If you have from two family sources, please choose ONE you use most:

1	2	3	4	5	6	7	8
Parents	Grand-parents	Brother /sisters	Parents in law	Brothers/ sisters in law	Cousins/ nieces/ nephews	Husband /wife	Other family sources

3/ Borrowing **from non-family** sources such as friends, teachers, co-workers, .. (you can choose more than 1 answer):

- 1. Friends
- 2. Girlfriends/boyfriends/partners
- 3. Teachers/lecturers
- 4. Colleagues/co-workers
- 5. Bosses/managers
- 6. Business partners
- 7. Neighbours
- 8. Other non-family sources: .....
- 9. I do not borrow from any non-family sources.

4/ If you have from two sources, please choose ONE you use most

1	2	3	4	5	6	7	8
Friends	Girl/boyfriends/ boyfriends/ partners	Teachers/ Lecturers	Colleagues/ co-workers	Bosses/ Managers	Business partners	Neighbors	Other non-family sources

5/ Borrowing **from formal sources** such as banks, credit institutions, brokerage firms,... (you can choose more than 1 answer):

- 1. Banks
- 2. Credit institutions
- 3. Brokerage firms
- 4. Other formal sources: .....
- 5. I do not borrow from any formal sources.

6/ If you have from two sources, please choose ONE you use most:

1	2	3	4
Banks	Credit institutions	Brokerage firms	Other formal sources

7/ Thinking about **the total money** for stock investment, how would you divide this amount between the borrowing and your own money?

The total money for stock investment:	%
Borrowing from informal sources	
Borrowing from formal sources	
My equity	
<b>Total</b>	<b>100%</b>

8A/ **How concerned** are you about your confidential information being leaked to others if you trade stocks online or you ask someone else (e.g. brokers, individuals or institutions) to trade for you?

(1: not at all concerned, 2: slightly concerned, 3: somewhat concerned, 4: moderately concerned, 5: extremely concerned).

1 2 3 4 5

8b/ **How important** is it to you if your confidential information is leaked to others?

(1: not at all important, 2: slightly important, 3: somewhat important, 4: moderately important, 5: extremely important).

1 2 3 4 5

9a/ **How concerned** are you about a negative impact of this loss on your social standing if you make a large loss in stock investments?

1 2 3 4 5

9b/ **How important** is it to you if you are held in lower esteem due to your large loss in stock investment?

1 2 3 4 5

10a/ **How concerned** are you about missing out on other financial investment opportunities if you used all the money for stock investments?

1 2 3 4 5

10b/ **How important** is it to you if you miss out on other financial investment opportunities?

1 2 3 4 5

11a/ **How concerned** are you about spending a lot of time on stock investment and the results are not what you expect?

1 2 3 4 5

11b/ **How important** is it to you If you spend a lot of time on stock investment and the results are not what you expect?

1 2 3 4 5

12a/ **How concerned** are you about your wrong choices when choosing stocks for your portfolio?

1 2 3 4 5

12b/ **How important** is it to you if you make a wrong decision on choosing stocks for your portfolio?

1 2 3 4 5

For those who borrow to invest in stocks:

13a/ **How concerned** are you about your investment returns being inadequate to cover your loan interest and principal at maturity?

1 2 3 4 5

13b/ **How important** is it to you if your investment results cannot cover your debt?

1 2 3 4 5

14a/ What ratios of loss over equity below make **you concerned**?

- ≤ 10%
- > 10% to 20%
- > 20% to 30%
- > 30% to 50%
- > 50%

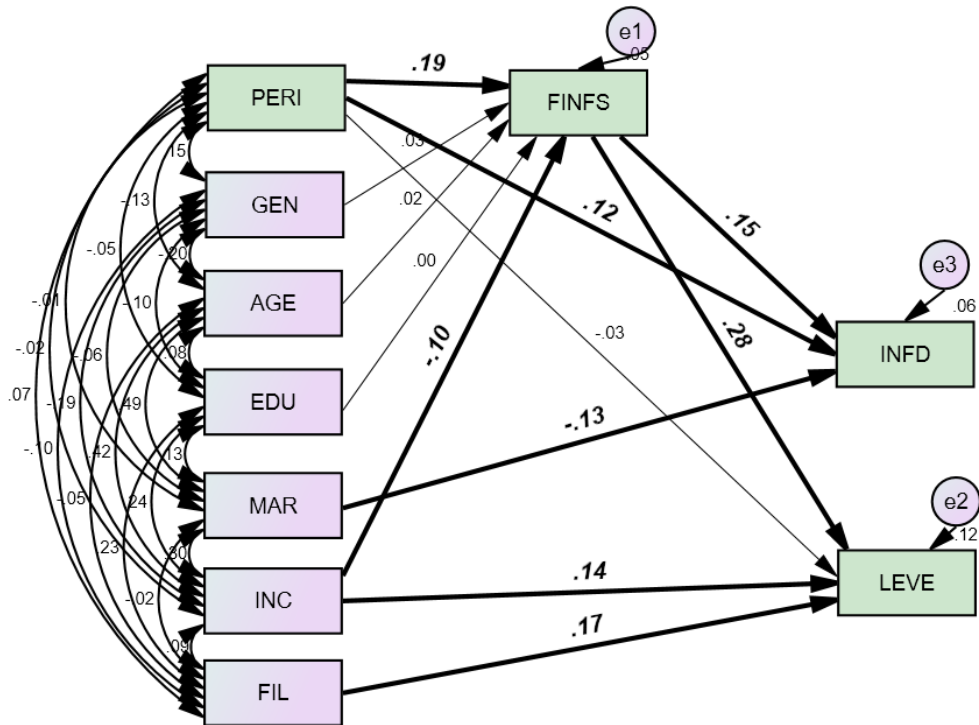
14b/ What ratios of loss over equity are **important** to you?

- ≤ 10%
- > 10% to 20%
- > 20% to 30%
- > 30% to 50%
- > 50%



**Figure 1. Structural relationships between perceived risk, choices among borrowing sources and debt decisions with six demographic variables (SEM1)**

SEM 1 found a direct impact of perceived risk on choices among borrowing sources, perceived risk on informal debt, and choices among borrowing sources on informal debt and financial leverage at a significant level. SEM1 also uncovered an indirect effect of perceived risk on both informal debt and financial leverage through borrowing sources at a significant level.

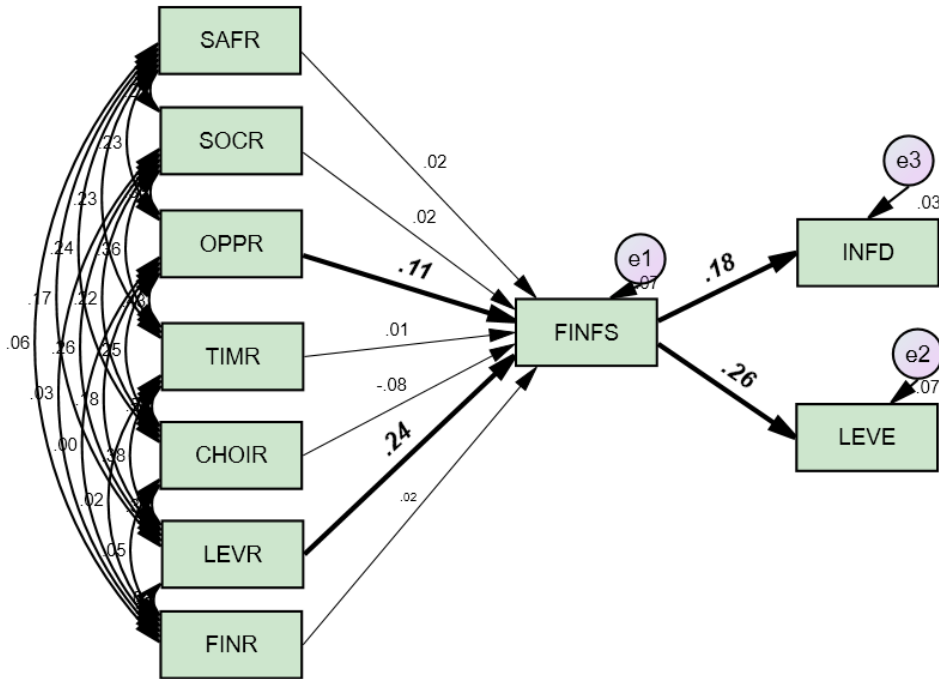


PERI: overall perceived risk, FINFS: choices among borrowing sources, GEN: gender, AGE: age, MAR: marital status, EDU: education levels, INC: income, FIL: financial literacy, INFD: informal debt, LEVE: financial leverage.

A model fit with criteria: Chi-square: 16.764, df: 12, GFI: 0.978, TLI: 0.904, CFI: 0.975, RMSEA: 0.053.

**Figure 2. Seven facets of risk, choices among borrowing sources and debt decisions (SEM2)**

SEM 2 revealed a direct impact of opportunity risk and leverage risk on choices among borrowing sources, choices among borrowing sources on informal debt and financial leverage at a significant level. Moreover, opportunity risk and leverage risk indirectly affected both informal debt and financial leverage through choices among borrowing sources at a significant level.

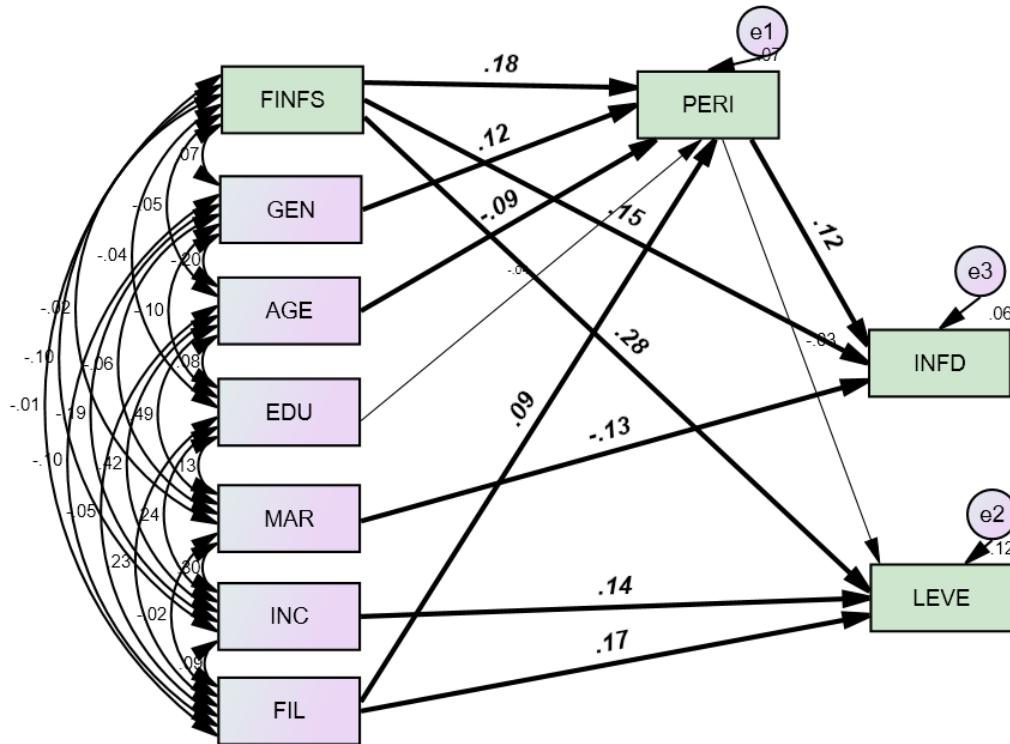


Model fit criteria: Chi-square: 22.676, df: 15, GFI: 0.990, TLI: 0.954, CFI: 0.985, RMSEA: 0.035.

SAFR: safety risk, SOCR: social risk, OPPR: opportunity risk, TIMR: time risk, CHOIR: choice risk, LEVR: leverage risk, FINR: financial risk, FINFS: choices among borrowing sources, INFD: informal debt, LEVE: financial leverage.

**Figure 3. Choices among borrowing sources, perceived risk, debt decisions and demographic variables (SEM3)**

SEM 3 indicated a direct impact of choices among borrowing sources on perceived risk, informal debt, and financial leverage, and perceived risk on informal debt at a significant level. SEM1 found no significant impact of perceived risk on financial leverage. In addition, choices among borrowing sources indirectly influenced informal debt through perceived risk at a significant level.



Model fit criteria: Chi-square: 14.181, df: 12, GFI: 0.993, TLI: 0.978, CFI: 0.994, RMSEA: 0.021.

FINFS: choices among borrowing sources, PERI: perceived risk, GEN: gender, AGE: age, EDU: education, MAR: marital status, INC: income, FIL: financial literacy, INFD: informal debt, LEVE: financial leverage.

**Table 1. Results of investor characteristics**

This table showed the following predominant investor characteristics: male investors, investors at the age of 25-35, single investors, investors having a university degree, less than five years of investment experience, income between 10 million to 50 million VND (500 – 2500 USD per month), trading frequency between one time per week and three times per month, investment amount between less than 200 million (10000 USD) per year, and having higher levels of financial literacy than the average.

<b>Characteristics</b>	<b>Freq.</b>	<b>%</b>	<b>Characteristics</b>	<b>Freq.</b>	<b>%</b>
<b>I. Gender</b>			<b>VI. Investment experience</b>		
Male	258	61.4	< 3 years	239	56.9
Female	161	38.4	3-5 years	86	20.5
Not determined	1	0.2	>5-10 years	51	12.1
<b>II. Age</b>			> 10- 20 years	44	10.5
<25	98	23.3	<b>VII. Income (VND)/ month</b>		
25-35	238	56.7	No income	22	5.2
36-45	68	16.2	Up to 10 million	151	36.1
46-55	7	1.7	10-50 million	224	53.3
>55	9	2.1	> 50 - 100 million	17	4.0
<b>III. Marital status</b>			> 100 million	6	1.4
Single	259	61.7	<b>VIII. Trading frequency</b>		
Married	155	36.8	At least once a day	48	11.4
Divorced	4	1.0	1 - 6 times/week	113	26.9
Widow(or)	2	0.05	1-3 times/month	158	37.6
<b>IV. Education levels:</b>			<b>IX. 1-2 times/quarter</b>	55	13.1
Up to secondary school	4	1.0	1-3 times/year	20	4.8
High school	13	3.0	Less than once a year	26	6.2
University	362	86.2	<b>X. Investment amount:</b>		
Master or more	41	9.8	<b>VND/year</b>		
<b>V. Financial literacy</b>			<200 million	263	62.6
Mean: 9.57			200-500 million	88	21.0
Less than Mean	164	39.0	501-1 billion	33	7.9
More than Mean	247	58.8	>1-3 billion	21	5.0
Not answered	9	2.1	>3 billion	15	3.6
<b>N</b>	<b>420</b>	<b>100</b>	<b>N</b>	<b>420</b>	<b>100</b>

**Table 2. Results of the reliability test of seven facets of risk and perceived risk**

This table examined the reliability coefficients (Cronbach's alpha) of each facet of risk and overall perceived risk. All variables had Cronbach's alpha greater than 0.6: safety risk (0.684), social risk (0.833), opportunity risk (0.802), time risk (0.798), choice risk (0.705), leverage risk (0.861), financial risk (0.835), and perceived risk (0.675). The results showed that all these variables had sufficient reliability.

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if item deleted
<b>Safety risk</b>					<b>0.684</b>
SAF1	3.97	0.972	0.521	0.272	
SAF2	3.36	1.151	0.521	0.272	
<b>Social risk</b>					<b>0.833</b>
SOC1	3.14	1.118	0.714	0.510	
SOC2	3.16	1.265	0.714	0.510	
<b>Opportunity risk</b>					<b>0.802</b>
OPP1	3.36	0.921	0.671	0.450	
OPP2	3.39	1.047	0.671	0.450	
<b>Time risk</b>					<b>0.798</b>
TIM1	3.59	0.855	0.664	0.441	
TIM2	3.51	0.877	0.664	0.441	
<b>Choice risk</b>					<b>0.705</b>
CHO1	3.87	0.859	0.545	0.297	
CHO2	3.59	0.876	0.545	0.297	
<b>Leverage risk</b>					<b>0.861</b>
LEV1	4.00	1.111	0.756	0.572	
LEV2	3.88	1.139	0.756	0.572	
<b>Financial risk</b>					<b>0.835</b>
FIN1	2.90	1.368	0.718	0.516	
FIN2	2.68	1.226	0.718	0.516	
<b>Perceived risk (PERI)</b>					<b>0.629</b>
SAFR	13.8752	6.114	0.315	0.109	0.600
SOCR	14.2139	5.426	0.390	0.192	0.575
OPPR	14.0422	5.782	0.389	0.232	0.577
TIMR	13.9028	5.654	0.561	0.425	0.534
CHOIR	13.8181	5.863	0.466	0.334	0.559
LEVR	13.7318	5.715	0.376	0.202	0.580
FINR	14.4890	6.593	0.046	0.006	0.702

SAF1: probability of safety loss, SAF2: importance of safety loss, SOC1: probability of social loss, SOC2: importance of social loss, OPP1: probability of opportunity loss, OPP2: importance of opportunity loss, TIM1: probability of time loss, TIM2: importance of time loss, CHO1: probability of choice loss, CHO2: importance of choice loss, LEV1: probability of leverage loss, LEV2: importance of leverage loss, FIN1: probability of financial loss, FIN2: importance of financial loss, SAFR: safety risk, SOCR: social risk, OPPR: opportunity risk, TIMR: time risk, CHOIR: choice risk, LEVR: leverage risk, FINR: financial risk, PERI: perceived risk of stock investment.

**Table 3. The correlations between seven facets of risk, perceived risk, choices among borrowing sources and debt decisions**

This table tested the correlation between eleven variables. Most variables had inter-correlation at a significant level. For example, safety risk correlated with social risk at 0.250, opportunity risk at 0.203, time risk at 0.2, choice risk at 0.2, leverage risk at 0.19, and perceived risk at 0.19. Perceived risk also positively correlated with ed and borrowing sources at 0.253, informal and formal debt at 0.310, leverage risk and borrowing sources at 0.174, perceived risk and informal and formal debt at 0.203, borrowing sources and informal and formal debt at 0.324, and informal over formal debt at 0.262.

	SAFR	2	3	4	5	6	7	8	9	10	11
<b>1.SAFR</b>	<b>1.000</b>										
<b>2.SOCR</b>	0.250**	<b>1.000</b>									
<b>3.OPPR</b>	0.203**	0.363**	<b>1.000</b>								
<b>4.TIMR</b>	0.200**	0.376**	0.481**	<b>1.000</b>							
<b>5.CHOIR</b>	0.200**	0.271**	0.307**	0.521**	<b>1.000</b>						
<b>6.LEVR</b>	0.190**	0.289**	0.237**	0.435**	0.440**	<b>1.000</b>					
<b>7.FINR</b>	0.084	0.009	-0.024	-0.002	0.056	-0.023	<b>1.000</b>				
<b>8.PERI</b>	0.458**	0.573**	0.576**	0.633**	0.578**	0.582**	0.306**	<b>1.000</b>			
<b>9.FINFS</b>	0.029	0.081	0.095	0.106*	0.052	0.217**	-0.004	0.190**	<b>1.000</b>		
<b>10.INFD</b>	0.047	0.117*	0.049	0.076	0.100*	0.112*	0.070	0.154**	0.176**	<b>1.000</b>	
<b>11.LEVE</b>	-0.075	0.016	-0.044	0.000	-0.027	0.076	-0.035	0.029	0.260**	-0.071	<b>1.000</b>
N	420	420	420	420	420	420	420	420	420	420	420

\*\* . Correlation is significant at the 0.01 level (2-tailed).

\* . Correlation is significant at the 0.05 level (2-tailed).

SAFR: safety risk, SOCR: social risk, OPPR: opportunity risk, TIMR: time risk, CHOIR: choice risk, LEVR: leverage risk, FINR: financial risk, PERI: perceived risk of stock investment, FINFS: choices among borrowing sources, INFD: informal debt, LEVE: financial leverage.

**Table 4. A summary of results of SEM1, 2 and 3 with six demographic variables**

SEM1 showed that perceived risk positively affected choices among borrowing sources and informal debt. Choices among borrowing sources positively affected informal debt and financial leverage. We found no direct impact of perceived risk on financial leverage at a significant level ( $p < 0.1$ ).

SEM2 exhibited the impact of opportunity risk and leverage risk on the choices among borrowing sources, choices among borrowing sources on informal debt and financial leverage at significant levels. Remarkably, choices among borrowing sources mediated between opportunity risk, leverage risk, informal debt, and financial leverage. SEM3 reported the impact of choices among borrowing sources on perceived risk at 0.177 ( $p < 0.01$ ), perceived risk on informal debt at 0.124 ( $p < 0.05$ ), and choices among borrowing sources on informal debt at 0.149 ( $p < 0.001$ ) and financial leverage at 0.283 ( $p < 0.01$ ). We also found perceived risk mediated between choices among borrowing sources and informal debt at 0.22 ( $p < 0.01$ ).

	Unstandardized Weights	Standardized Weights	S.E.	C.R.	P	Hypotheses	SEMs
<b>I. Direct impact</b>							
<b>FINFS</b> <--- <b>PERI</b>	0.042	<b>0.186</b>	0.011	3.829	<b>0.000***</b>	H1	SEM1
FINFS <--- GEN	0.039	0.031	0.063	0.616	0.538		
FINFS <--- AGE	0.016	0.021	0.041	0.386	0.700		
FINFS <--- EDU	-0.005	-0.003	0.076	-0.060	0.952		
FINFS <--- INC	-0.085	-0.097	0.047	-1.789	0.074*		
<b>INFD</b> <--- <b>FINFS</b>	0.051	<b>0.149</b>	0.017	3.092	<b>0.002***</b>	H3	
<b>INFD</b> <--- <b>PERI</b>	0.010	<b>0.124</b>	0.004	2.579	<b>0.010***</b>	H2	
INFD <--- MAR	-0.052	-0.130	0.019	-2.747	0.006***		
LEVE <--- INC	0.120	0.143	0.039	3.106	0.002***		
LEVE <--- FIL	0.031	0.168	0.008	3.641	0.000***		
<b>LEVE</b> <--- <b>FINFS</b>	0.272	<b>0.283</b>	0.045	6.030	<b>0.000***</b>	H4	
LEVE <--- PERI	-0.007	-0.034	0.010	-0.722	0.470		
<b>II. Indirect impact</b>							
FINFS <--- SOCR	0.013	0.017	0.041	0.323	0.747		SEM2
FINFS <--- SOCR	0.013	0.017	0.041	0.323	0.747		
<b>FINFS</b> <--- <b>OPPR</b>	0.097	<b>0.107</b>	0.049	1.997	<b>0.046**</b>	H1	
FINFS <--- TIMR	0.010	0.009	0.067	0.149	0.882		
FINFS <--- CHOIR	-0.083	-0.078	0.061	-1.354	0.176		
<b>FINFS</b> <--- <b>LEVR</b>	0.209	<b>0.242</b>	0.045	4.594	<b>0.000***</b>	H1	
FINFS <--- FINR	0.012	0.017	0.034	0.356	0.722		
FINFS <--- SAFR	0.019	0.019	0.048	0.386	0.699		
<b>INFD</b> <--- <b>FINFS</b>	0.060	<b>0.176</b>	0.017	3.650	<b>0.000***</b>	H3	
<b>LEVE</b> <--- <b>FINFS</b>	0.250	<b>0.260</b>	0.045	5.514	<b>0.000***</b>	H4	
<b>PERI</b> <--- <b>FINFS</b>	0.776	<b>0.177</b>	0.208	3.738	<b>0.000***</b>	H1	SEM3
PERI <--- GEN	0.672	0.121	0.270	2.486	0.013**		
PERI <--- EDU	-0.289	-0.043	0.329	-0.879	0.379		
PERI <--- AGE	-0.289	-0.085	0.164	-1.765	0.077*		
PERI <--- FIL	0.079	0.094	0.041	1.935	0.053*		
<b>INFD</b> <--- <b>PERI</b>	0.010	<b>0.124</b>	0.004	2.579	<b>0.010**</b>	H2	
<b>INFD</b> <--- <b>FINFS</b>	0.051	<b>0.149</b>	0.017	3.092	<b>0.002***</b>	H3	
INFD <--- MAR	-0.052	-0.130	0.019	-2.747	0.006***		
LEVE <--- INC	0.120	0.144	0.039	3.106	0.002***		
LEVE <--- FIL	0.031	0.168	0.008	3.641	0.000***		
LEVE <--- PERI	-0.007	-0.034	0.010	-0.722	0.470		
<b>LEVE</b> <--- <b>FINFS</b>	0.272	<b>0.283</b>	0.045	6.030	<b>0.000***</b>	H4	
PERI->FINFS->INFD	0.002	<b>0.028</b>			***	H5	SEM1
PERI->FINFS->LELE	0.011	<b>0.053</b>			***	H6	
OPPR->FINFS->INFD	0.006	<b>0.019</b>			***	H5	SEM2
OPPR->FINFS->LEVE	0.024	<b>0.028</b>			***	H6	
LEVR->FINFS->INFD	0.013	<b>0.042</b>			***	H5	

	Unstandardized Weights	Standardized Weights	S.E.	C.R.	P	Hypotheses	SEMs
I. Direct impact							
LEVR->FINFS->LEVE	0.052	<b>0.063</b>			***	H6	
FINFS->PERI->INFD	0.008	<b>0.022</b>			***	H7	SEM3

Note: \*: p<0.1, \*\*: p<0.05, \*\*\*: p<0.01

PERI: perceived risk, GEN: gender, AGE: age, EDU: education, MAR: marital status, INC: income, FIL: financial literacy, FINFS: choices among borrowing sources, INFD: informal debt, LEVE: financial leverage.

SAFR: safety risk, SOCR: social risk, OPR: opportunity risk, TIMR: time risk, CHOIR: choice risk, LEVR: leverage risk, FINR: financial risk.



**Table 5. Results of direct relationships from multiple regression and stepwise regression**

This table re-tested direct relationships through two approaches: multiple regression (a) and stepwise regression (b).

This table showed the direct impact of perceived risk, choices among borrowing sources, and marital status on informal debt at a significant level in Model 1a and 1b. In Model 2a and 2b, choices among borrowing sources, income, financial literacy significantly affected financial leverage. Perceived risk and income also influenced choices among borrowing sources at a significant level in Model 3a and 3b. Model 4a showed the impact of choices among borrowing, gender, age, and financial literacy on perceived risk while Model 4b found only choices among borrowing and gender affected perceived risk at a significant level. Both Model 5a and 5b discovered the opportunity and leverage risk exerted an influence on choices among borrowing sources at a significant level.

Independent Variables	Multiple linear regression (a) and stepwise (b) (Dependent variables)										
	1a	1b	2a	2b	3a	3b	4a	4b	Model 5	5a	5b
	INFD	INFD	LEVE	LEVE	FINFS	FINFS	PERI	PERI	IVs	FINFS	
PERI	<b>0.133***</b> (0.019)	<b>0.124**</b> (0.01)	-0.029 (-0.006)		<b>0.187***</b> (0.043)	<b>0.188***</b> (0.043)			SAFR	0.019 (0.019)	
FINFS	<b>0.141***</b> (0.048)	<b>0.149***</b> (0.051)	<b>0.284***</b> (0.273)	<b>0.276***</b> (0.265)			<b>0.181***</b> (0.796)	<b>0.180***</b> (0.793)	SOCR	0.017 (0.013)	
GEN	-0.001 (-0.001)		-0.052 (-0.063)		0.029 (0.037)		<b>0.124**</b> (0.690)	<b>0.133***</b> (0.739)	OPPR	<b>0.107**</b> (0.097)	<b>0.104**</b> (0.095)
AGE	-0.007 (-0.002)		0.004 (0.003)		0.019 (0.015)		<b>-0.139*</b> (-0.472)		TIMR	0.009 (0.010)	
MAR	<b>-0.108*</b> (-0.043)	<b>-0.130***</b> (-0.052)	0.023 (0.026)		0.00 (0.001)		0.057 (0.289)		CHOIR	-0.078 (-0.083)	
EDU	0.048 (0.026)		-0.056 (-0.083)		0.00 (0.00)		-0.061 (-0.413)		LEVR	<b>0.242***</b> (0.209)	<b>0.225***</b> (0.194)
INC	-0.088* (-0.026)		<b>0.138***</b> (0.116)	<b>0.144***</b> (0.121)	<b>-0.096*</b> (-0.084)	<b>-0.095**</b> (-0.083)	0.067 (0.259)		FINR	0.017 (0.012)	
FIL	-0.056 (-0.004)		<b>0.177***</b> (0.033)	<b>0.165***</b> (0.03)	-0.013 (-0.003)		<b>0.092*</b> (0.077)				
Adj. R <sup>2</sup>	0.056	0.056	0.109		0.03	0.041	0.062	0.049	Adj. R <sup>2</sup>	0.037	0.065
F,df	(4.1, 8) ***	(6.6,1)**	(7.4,8)***		(2.9,7)**	(3.9,1)**	(4.9,7)**	(7.7,1)***	F,df	(3.3,7)***	(4.7,1)***
N	420	420	420		420	420	420	420	N	420	420

\*: p<0.1, \*\*: p<0.01, \*\*\*: p<0.001, PERI: perceived risk of stock investment, FINFS: choices among borrowing sources, GEN: gender, AGE: age, MAR: marital status, EDU: education levels, INC: income, FIL: financial literacy, SAFR: safety risk, SOCR: social risk, OPPR: opportunity risk, TIMR: time risk, CHOIR: choice risk, LEVR: leverage risk, FINR: financial risk, INFD: informal debt, LEVE: financial leverage.

**Table 6. Results of indirect effects – Hayes and Preacher approach**

This table tested the indirect relationships between perceived risk and seven facets of risk, choices among borrowing sources and debt decisions, via the approach of Hayes and Preacher. The results indicated that only opportunity risk mediated between choices among borrowing sources and informal and formal debt at a significant level ( $p < 0.1$ ) in Model 11.

Models	Unstandardized value	Se	LowerCI	UpperCI	z
1.PERI->FINFS->INFD	0.0023*	0.0009	0.0007	0.0038	2.4007
2.PERI->FINFS->LEVE	0.011***	0.0035	0.0053	0.0167	3.1755
3.OPPR->FINFS->INFD	0.0075**	0.0034	0.0019	0.0132	2.1978
4.OPPR->FINFS->LEVE	0.0335***	0.1290	0.0122	0.0548	2.5908
5.LEVR->FINFS->INFD	0.0114***	0.0043	0.0044	0.0185	2.6766
6.LEVR->FINFS->LEVE	0.0505***	0.0141	0.0274	0.0736	3.5924
7.FINFS->PERI->INFD	0.0082**	0.0039	0.0018	0.0146	2.1121

LLCI: lower level confidence interval, ULCI: upper-level confidence interval. PERI: perceived risk, OPPER: opportunity risk, LEVR: leverage risk, FINFS: choices among borrowing sources, INFD: informal debt, LEVE: financial leverage.

**Table 7. Results of the causal relationships between non-users and users of borrowing sources, non-stockbrokers and stockbrokers, and male and female investors**

Table 9 indicated the following groups that had an impact of perceived risk on informal debt at a significant level: users of informal borrowing sources, non-users and users of formal borrowing sources, non-stockbrokers, and male investors.

Variables	Non-users of IFS	Users of IFS	Non-users of FS	Users of FS	Non-stockbrokers	Stockbrokers	Male	Female
<b>Dependent variable: INFD</b>								
<b>PERI</b>	0.111 (0.007)	<b>0.129**</b> <b>(0.011)</b>	<b>0.235*</b> <b>(0.021)</b>	<b>0.143***</b> <b>(0.011)</b>	<b>0.171***</b> <b>(0.014)</b>	0.113 (0.008)	<b>0.237***</b> <b>(0.017)</b>	0.009 (0.001)
GEN	-0.038 (-0.016)	0.005 (0.002)	0.07 (0.041)	-0.025 (-0.01)	0.038 (0.018)	0.002 (0.001)		
AGE	-0.02 (-0.004)	-0.024 (-0.007)	0.103 (0.03)	-0.043 (-0.011)	-0.007 (-0.002)	-0.035 (-0.011)	-0.027 (-0.007)	0.069 (0.021)
MAR	0.067 (0.024)	<b>-0.144**</b> <b>(-0.056)</b>	0.006 (0.003)	<b>-0.135***</b> <b>(-0.049)</b>	-0.084 (-0.036)	-0.132 (-0.048)	-0.065 (-0.025)	<b>-0.182*</b> <b>(-0.076)</b>
EDU	-0.04 (-0.021)	0.063 (0.031)	0.008 (0.005)	0.051 (0.026)	0.069 (0.033)	0.034 (0.023)	0.042 (0.019)	0.075 (0.052)
INC	-0.037 (-0.011)	-0.065 (-0.019)	0.023 (0.009)	<b>-0.142***</b> <b>(-0.039)</b>	<b>-0.16**</b> <b>(-0.052)</b>	-0.071 (-0.02)	-0.083 (-0.025)	-0.140 (-0.044)
FIL	-0.125 (-0.008)	-0.026 (-0.002)	-0.009 (-0.001)	-0.06 (-0.004)	-0.02 (-0.001)	-0.049 (-0.003)	-0.008 (0.000)	<b>-0.141*</b> <b>(-0.01)</b>
Adj. R <sup>2</sup>	-0.053	0.032	-0.032	0.061	0.052	0.004	0.05	0.035
F	(0.3,7)	(2.6,7)***	(0.7,7)	(0.2,7)***	(2.9,7)***	(1.09,7)	(3.3,6)***	(1.97,6)*
N	92	328	79	341	251	169	258	161

\*:  $p < 0.1$ , \*\*:  $p < 0.05$ , \*\*\*:  $p < 0.01$ , IFS: informal borrowing sources, FS: formal borrowing sources, PERI: perceived risk of stock investment, GEN: gender, AGE: age, MAR: marital status, EDU: education levels, INC: income, FIL: financial literacy, INFD: informal debt.