

Factors Influencing Individual Investor Behavior: An Empirical Study of the Vietnamese Stock Market

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Yet some experimental studies on market efficiency recently show evidence supporting the fact that VN-Index does not follow the random walk, which implies the fact that stock prices are predictable. One of the reasons for this phenomenon is identified as the existence of psychological factors having impacts on behavioral decisions made by individual investors in the stock market. Accordingly, the crucial purpose of this study is to use the theory of planned behavior (TPB) as a conceptual lens for exploring factors influencing individuals' investment behavioral intention in the Vietnamese stock market. By employing the Structural Equation Modeling (SEM) with support of AMOS 20.0 software for analyzing data collected from a national survey with 472 individual investors, the results indicated that the impact level of the given factors on individuals' behavioral intention, which supports the hypotheses that an individual's investment intention is significantly affected by his attitude towards investment, subjective norm and perceived behavioral control. What is more, the study has also provided strong evidences for the existence of psychological factors which supports the hypothesis that four psychological factors (overconfidence, excessive optimism, psychology of risk and herd behavior) do have significant impact on the individuals' attitude towards investment. Concurrently the study has found supporting evidence for the argument that gender has a strong moderation affect in the relations between the psychological factors and the attitude towards investment, between the attitude and behavioral intention, between subjective norms and behavioral intention as well as between perceived behavioral control and behavioral intention of Vietnamese individual investors. Findings found from this study have provided both academic and practical contributions.

Keywords: individual investors, psychological factors, behavioral intention, attitude, subjective norm, perceived behavioral control

Introduction

Vietnamese stock market is among the emerging stock markets with its first transaction on July 28th 2000. Starting with only two types of stocks, it reached the number of 704 by the end of 2012¹. With a small market capitalization in the area, after more than 13 years in operation Vietnamese stock market's efficiency has been improved evidently with a rapid increase in market capitalization. Significantly individual investors have gradually become more professional in their investment. Yet some experimental studies on market efficiency show evidence supporting the fact that VN-Index does not follow the random walk, which implies the fact that stock prices are predictable (Truong 2006, Nguyen 2011). This is clearly demonstrated when the market fluctuates and stock prices are similarly adjusted increasingly or decreasingly hardly with any differences between good and bad stock prices. One of the reasons for this phenomenon is identified as

the existence of psychological factors having impacts on behavioral decisions made by individual investors in the stock market (Phan and Zhou 2014). Accordingly investors' decision-making is not always based on rational factors but also influenced by the psychological ones (Sehgal/Singh, 2012; Murgea, 2008). In fact, psychological factors may leave significant impact on their attitude and behavior; namely when people are in good mood, they become more optimistic in their judgments but when they are not, they turn more pessimistic. As a result, studying the influence of psychological factors on behavior is becoming more important in investment behavior prediction and hence is of our interest.

Principally, conventional financial theories, especially the market efficiency hypothesis, assume that investors with their reason always optimize the expected values hence their behavior does not include psychological factors. As a result, behavioral finance is taken as a new approach to explain individuals' behavior in the market. At the same time it

supplements the conventional finance theory by introducing the behavioral aspect in the decision-making process. Behavioral finance recognizes human being from a practical lens accordingly individuals in the market are human hence are either partly or fully influenced by psychological factors (Richard H. Thaler, 2005). Studying factors impacting investors' behavior in the market, especially the psychological ones, has always been attracting many researchers' interest. However currently there is not much study on this topic particularly in Vietnam compared with other countries in the region as well as all over the world.

Recently, studies on investment behaviors have been conducted employing several different approaches. The theory of reasoned action (TRA) and the theory of planned behavior (TPB) have proved to be relatively effective in predicting various human behaviors (Sheppard, Hartwick et al. 1988). Specially TPB, founded based on TRA more than 20 years ago, has demonstrated as one of the strong theories with a wide range of impact and use in studying human behaviors (Hung, Lai et al. 2010). TPB, however, has not been widely employed in researches on investors' behaviors in the stock market where their investment behaviors are usually influenced by such internal factors as education background, experience, gender, culture and especially the impact of psychological factors.

Accordingly, this study's objective is to employ TPB to investigate the impact of attitude toward the behavior, subjective norm and perceived behavioral control respectively on individuals' investment intentions in Vietnamese market. The study also seeks to explore the influence of psychological factors on individuals' behaviors and how each factor affects their investment behaviors. On the other hand, their attitudes towards investment behaviors are influenced by such various factors as dividend, online trading, their awareness and psychology, experiences from successful investors, etc. and attitude is identified as having the most impact on the behavioral intention. Experiments show that psychological factors have a significant and direct influence on attitude towards investment behavior made by individuals (Sehgal and Singh 2012, Phan and Zhou 2014). That is the reason why in this research the attitude towards investment will be further discussed with its chosen antecedents of overconfidence, excessive optimism, herd behavior and psychology of risk (Phan and Zhou 2014). Whereby a more suitable model interpreting individuals' investment intention can be recommended. Results found from the research are expected to bring about significant managerial implications in Vietnamese stock market.

Literature Review

The theory of planned behaviour (TPB) introduced by Ajzen (1985,1991, 2002) is regarded as one of the most well known theories in social psychology that is widely used in anticipating human behaviour. It was developed from the theory of reasoned action (TRA) by (Ajzen and Fishbein 1980).

The theory of reasoned action considers behavioural intention as the immediate motivator for individuals to perform the behaviour. Behavioural intention, in turn, is a function of two determining factors, namely attitude toward the behaviour (AT) and subjective norm (SN.) that relate to conducting the behaviour (Ajzen and Fishbein 1980). Attitude toward the behaviour is defined as one's general feelings indicating their favourableness or unfavourableness to the behaviour. Subjective norm is defined as one's perception regarding whether their significant others think the behaviour should be performed or not. (Ajzen and Fishbein 1980). Despite the fact that TRA is widely accepted in literature, this theory still contains limitations. It does not anticipate accurately behaviours constrained by a lack of opportunities or resources such as skills, time or capital, etc. This is even when individual would otherwise be favourable of and socially urged to perform the behaviour (Ajzen 1991). To overcome this limitation, Ajzen (2002) added another variable into the original TRA model, namely perceived behavioural control (PBC), introducing the theory of planned behaviour. This new model is presented in Figure 1.

Perceived behavioural control is defined as one's perception of the ease or the difficulty in conducting the concerned behaviour, relating to the existence or absence of necessary resources and opportunities (Ajzen 2002). The theory of planned behaviour also claims that perceived behaviour control could influence behaviours in two ways: (1) PBC could affect the intention to perform behaviour; (2) PBC could directly affect the behaviour, in a way dependent from the concerned intention. Both of these two control influences could involve in the investors' process of decision-making and in their behaviours. Such control influences could include internal factors, such as individual knowledge, experience, skills or emotions, etc., and external factors, namely financial resources, time or partners' cooperation, etc. (Ajzen 2005). The significance in explaining behaviour of the three basic elements of TPB, including attitude toward the behaviour, subjective norm, and perceived behavioural control have been claimed in multiple studies (Sommer 2011).

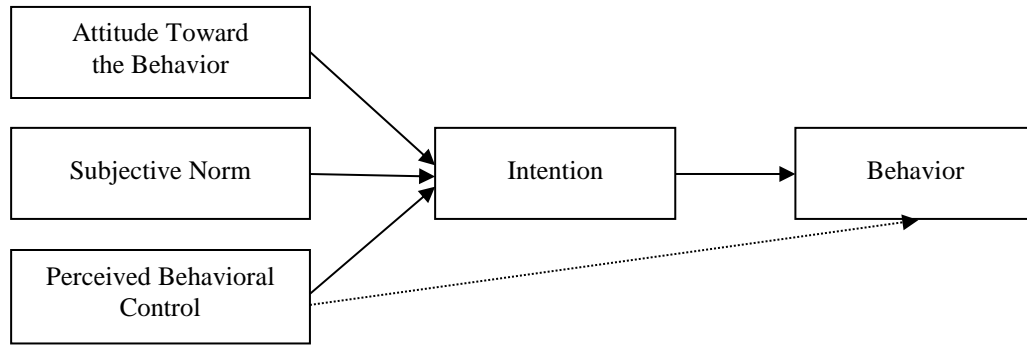


Figure 1. Theory of planned behavior. Source: (Ajzen 1991).

Over the past 20 years, the theory of planned behaviour has been validated and experimentally supported by hundreds of studies that apply and examine the theory (Armitage and Conner 2001, Michael 2011). The theory of planned behaviour has been widely used to predict business behaviours (Krueger and Carsrud 1993), unethical behaviours (Chang 1998), or intention to quit smoking (Hu and Lanese 1998), as well as to examine public service motivation (Perry, Brudney et al. 2008). Cordano and Frieze (2000), Carpenter and Reimers (2005) apply the theory in estimating managerial decisions, while others (Ryu, Ho et al. 2003, Lin and Lee 2004, So and Bolloju 2005, Hung, Lai et al. 2010) use it to predict knowledge sharing behaviour in organisations. The theory also has various applications in analysing behaviours within information system literature, such as forecasting Internet usage (Hsieh, Rai et al. 2008), consumer adoption of e-commerce (Pavlou and Fygenson 2006), or consumer adoption of household technology (Brown and Venkatesh 2005). The predicting applications also include information technology ethical behaviour intentions (Leonard, Cronan et al. 2004) and factors influencing the convenience use of credit card (Rutherford and DeVaney 2009). Regarding its application in finance market and stock market, (Gopi and Ramayah 2007)) utilise TPB to predict intention to trade online. The study proved the positive impacts of AT, SN and PBC on behavioural intention of Internet stock trading and that TPB could be a useful model for explaining changes in behavioural intention and actual usage. In another research by East (1993) on stock investment decision in privatized British industries, TPB was also proved to accurately foresee investment decision which was indicated by

measured intention. Intention was in turn predicted by attitude, subjective norm, perceived control and past behaviour. Specifically, the research demonstrated a significant impact from such factors as friends, relatives and the importance of easy access to funds, as well as financial indices and investors' safety. Besides, TPB was also applied in analysing banking behaviour in using information technology such as internet banking (Chan and Lu 2004, Shih and Fang 2004) and analysing intention of tax payers in electronic tax filing (Fu, Farn et al. 2006). In a word, results from experiments with TPB provided evidences of its predicting power regarding behavioural intention (Chatzisarantis, Hagger et al. 2007). In other word, it presented a comparatively complete model of motivation.

According to Ajzen (2005), in the short term, TPB shows that "people intend to perform a behaviour when they evaluate it positively, when they experience social pressure to perform it, and when they believe that they have the means and opportunities to do so". This view of motivation indicates a possibility to explain the principal factors influencing individual investing behaviour. Nevertheless, aforementioned literature review also reveals very few researches on impacts of specific psychological elements on behavioural intention of stock investors, especially on the Vietnamese stock market. This is what our research is attracted to. These mentioned literatures form a theoretical background for analysing factors influencing decision-making process of individual investors on the Vietnamese stock market. The conceptual framework applying the theory of planned behaviour into our studied problems is illustrated in Figure 2.

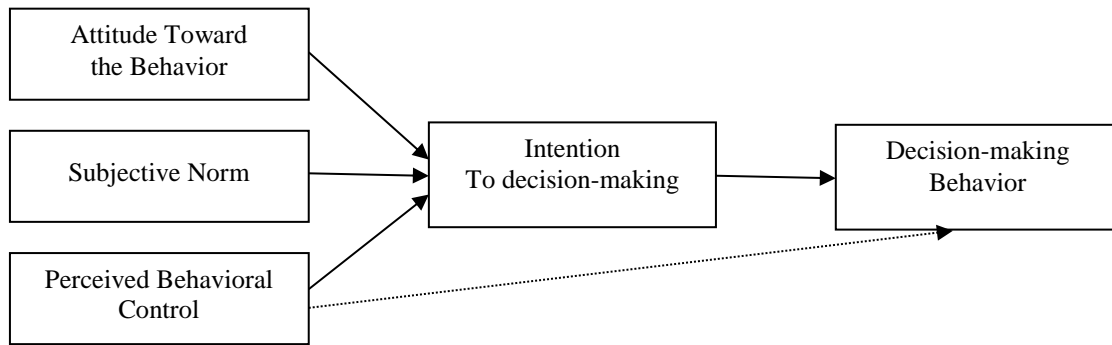


Figure 2. Conceptual framework of the determinants of individual investors' behavior

As can be seen in the conceptual framework presented in Figure 2, TPB provides a theoretical lens to examine factors influencing individual investing behaviour. According to the framework, investing intention of individuals on stock market is affected by their attitude toward the behaviour, subjective norm and their perceived behavioural control regarding conducting the behaviour. From this, we develop a research model that includes the most dominant elements hypothesised to determine investing intention of individuals on the Vietnamese stock market. Among them, of special interest are the investors' psychological elements.

Research model and Hypotheses

As aforementioned, TPB has a wide range of applications in analysing human behaviour, which have been validated with multiple experimental evidences over the past years. In this section, based on the developed theoretical framework, we suggest a research model examining factors that could influence investing intention of individual on stock market. The main purpose of the research is to determine influencing factors and to suggest hypotheses revolving relationships among the studied constructs. The focal point is to evaluate the hypotheses relating to the major elements of TPB model. Besides we identify some key constructs from relevant literatures that could be immediate determinants of individual investing intentions, specifically psychological determinants that directly affect behavioural intentions (Phan and Zhou 2014). The suggested research model and hypotheses are presented in the next part of this section.

Intention to make decision among individual investors

The theory of planned behaviour considers behavioural intention as immediate antecedent right before the future behaviour. This relationship has been proved and strongly supported by many previous experimental studies (Sheppard, Hartwick et al. 1988, Armitage and Conner 2001). Ajzen (1991) defines behavioural intention to be "assumed to capture the motivational factors that influence a behaviour; they are indications of how hard people are willing to try, of how much of an effort they are planning to exert, in order to perform the behaviour". This makes behavioural intention a common dependent variable in many experimental studies that use TPB as theoretical background. Many studies also claim the strong involvement of intention in behaviour performance in a way that increases the chance of the behaviour being conducted. At the same time, they also agree that individual's intention strongly affect behaviour and may lead he/she will perform his/her behaviour. (East 1993, Harrison, Mykytyn Jr et al. 1997, Brown and Venkatesh 2005, Song and Zahedi 2005, Michael 2011). In the case of investment on stock market, behavioural intention is considered to present individual investor's motivation to make a specific investing decision.

Determinants of behavioural intention

The theory of planned behavior defines three immediate determinants of investing intention among individual investors, namely attitude toward the behaviour, subjective norm, and perceived behavioural control. Each of these motivational constructs is hypothesised to have a significant relationship with individual investing decision. Based on results from previous studies, we discuss below the hypotheses regarding these relationships.

Attitude toward the behaviour

Attitude has long been identified to be a predictor of future behaviour. In the theory of reasoned action, attitude is defined as evaluative effect of individual positive or negative feelings toward conducting a specific behaviour (Fishbein and Ajzen 1980). However, behavioural intention is recently defined as individual's favourableness or unfavourableness toward psychological object. (Ajzen and Fishbein 2000). If an individual has a more favourable attitude toward a specific behaviour, the chances are higher that they will have an intention to conduct the behaviour. On the other hand, if they are more unfavourable of the behaviours, they are likely to not have the intention (Ajzen and Fishbein 1980). Many studies have claimed a significant effect of attitude on behavioural intention (Mathieson 1991, Teo and Pok 2003, Shih and Fang 2004, Ramayah and Suki 2006, Michael 2011). As a result, in the context of individual investment, it is reasonable to assume that if an individual investor is more favourable of the investment, they are more motivated to take the action than those who are less favourable. This relationship is presented in the following suggested hypothesis:

Hypothesis 1: Attitude toward investment of the individual investor is positively correlated with investing intention (H_1).

Subjective norm

The subjective norm is one of the two original constructs from TRA. It captures individual's perception regarding whether most of their significant others think they should or should not conduct the behaviour (Ajzen and Fishbein 1980). The subjective norm is considered to be one of the immediate determinants of behavioural intention in TRA and TPB. According to TPB, if a person, for instance an individual investor on stock market, sees that those who are more important to them think they should perform certain behaviour, it is highly likely that they will intend to do so. On the other hand, it is believed that if their significant others do not agree with performing the behaviour, chances are higher that they will not have the intention. This means, even if an individual is not favourable of the behaviour, he may conduct it anyway under social pressure and influence (Venkatesh and Davis 2000). Many experimental studies show the significant relationships between subjective norm and intention (Venkatesh and Davis 2000, Fu, Farn et al. 2006), while other studies prove insignificant links between the two constructs (Lewis, Agarwal et al. 2003). However, the mixed conclusions regarding the predicting power of subjective norm on intention could still hint a considerable link between them. It is

rational to predict that if an individual investor perceives supporting subjective norms, they may have an intention of investing more than those that do not feel similar pressure. The hypothesis is defined as following:

Hypothesis 2: The subjective norm that favours investment is positively correlated with investing intention (H_2).

Perceived behavioural control

The control belief in TPB is represented by perceived behavioural control. The PBC construct is added to overcome the limitations in TRA model and to apply in contexts where individuals do not have the full control of resources in order to conduct the behaviour (Ajzen 2002). Ajzen (2005) defines PBC as individual's perception of the ease or the difficulty in conducting certain behaviour. This means, within TPB model, the stronger one's PBC is, for instance that of an individual investor, the more likely they would conduct the behaviour (Ajzen 2005). And vice versa, the chances will be less. Consequently, the performance of behaviour is correlated with one's confidence in their ability to conduct the behaviour. Part of PBC is built from past experience and part is from old information acquired via communication with relatives, family, friends and via factors that help control the perceived ease or difficulty in behaviour performance (Ajzen 1991). Additionally, increased availability of resources like time, money or opportunities would improve the perceived control and hence the possibility of performing behaviour (Ajzen 1991). Many experimental studies show that PBC could be accounted for considerable variance in intention and behaviour, and also prove positive link between PBC and intention (Mathieson 1991, Shih and Fang 2004, Fu, Farn et al. 2006). In this research, it is expected that individual with higher PBC would be more likely to have investing intention than those with less PBC. The hypothesis is defined as:

Hypothesis 3: Perceived behavioural control of individual investors is positively correlated with investing behavioural (H_3).

Besides, according to TRA and TPB, as well as experimental results, there is a relationship between AT and SN (Ajzen and Fishbein 1980, Sheppard, Hartwick et al. 1988). Therefore, in the context of investment on the Vietnamese stock market, we observe possible impacts from social pressure on individual investing attitude. The hypothesis is presented as:

Hypothesis 4: Subjective norm is positively correlated with investing attitude of individual investors (H_4).

Decomposing the theory of planned behaviour

As aforementioned, the three important determinants of behavioural intention are identified as AT, SN and PBC. Besides, TPB indicates that each of these determinants is influenced by a collection of elementary belief structures. Ajzen (1991) believes that AT is regulated by attitudinal belief, SN by nominal belief and PBC by control belief. Authors of TPB provide a detailed protocol to elicit and measure dominant belief structures from individuals according to above formulation. However, different studies reveal that this original formulation only provides a limited view of the actual relationships among belief structures and of the determinants of intention. Besides, when categorising belief structures into a certain construct, we may ignore the fact that the belief structures can be present in other constructs. This limit the ability of the theory to generalise reality (Taylor and Todd 1995[a], Taylor and Todd 1995[b]). In order to overcome these limitations, researchers have introduced an innovative approach to identify and measure belief structures in the original TPB model. A study by Taylor and Todd (1995) has provided a tool to measure belief structures by decomposing the attitudinal belief, nominal belief and control belief into multi-dimensional concepts. This decomposed approach helps identify the scope of concerned concepts that could affect the beliefs in specific contexts. The concepts then can be used in models as separate variables influencing the specific determinants of behavioural intention within TPB.

Ever since it is introduced, the decomposed approach to TPB has been verified and strongly supported by many experimental studies about predicting human behaviour in many different contexts (Flannery and May 2000, Riemenschneider, Harrison et al. 2003, Stevens, Kevin Steensma et al. 2005, Pavlou and Fygenson 2006). This approach has definitely been proved to have certain advantages over the traditional one (Michael 2011). It creates a better understanding of the basic relationships among the variables in the model. Hence it provides better predicting power (Taylor and Todd 1995a).

The decomposed approach to TPB with its advantages has been widely applied in many contexts. Therefore, in this study, our proposed research model of the determinants of individual investors' behaviour is based on this approach. Apart from identifying the three important determinants of behavioural intention in TPB, each determining factor is influenced by a collection of basic belief structures. However, within the limit of this research, we focus only on the belief structures that affect the attitude toward behavioural intention in TPB model. This was developed based

on a qualitative research using TPB in analysing individual investing behaviour on the Vietnamese stock market (Phan and Zhou 2014). Results from this study indicate the direct link between some psychological features among Vietnamese individual investors and their attitude towards investment. The psychological features include overconfidence, excessive optimism, herd behaviour, and psychology of risk (Phan and Zhou 2014). These will become the key constructs used to decompose the attitudinal belief structures in our model.

Decomposing attitudinal belief structures

Regarding attitude toward behaviour, Ajzen and Fishbein (1980) believe that attitude toward any concepts can be described as general feelings about one's favourableness and unfavourableness to the concerned concepts. Therefore, regarding investing decisions on stock market, it is expected that general feelings of an individual investor about their favourableness or unfavourableness be influenced by the benefits gained from the decisions. Meanwhile, the investor is the one responsible for the final results. Therefore, it can be assumed that they are most favourable of investments with greatest benefits. The research by Phan and Zhou (2014) has provided a framework for evaluating the impacts of psychological elements on attitude toward behavioural intention of individual investors. This is the tool for decomposing the attitude towards investing decision. Phan and Zhou (2014) have listed four psychological elements that directly influence behavioural intention, namely overconfidence, excessive optimism, herd behaviour, and psychology of risk. Therefore, attitude toward behavioural is decomposed into four psychological constructs as following.

Overconfidence

Many researches about psychology on stock market have shown that investors tend to be overconfident about their behaviours (Barberis and Thaler 2003). One typical aspect of overconfidence is the better-than-average effect, where people believe their skills are better than the average and think unrealistically of themselves (Taylor and Brown 1988). It was proved in many studies that many investors also tend to believe that they are better than others at selecting the best shares, as well as the best time to enter and withdraw from the market. They, at the same time, believe that they work with above-average efficiency, which indicates overconfidence exists or even plays important roles in their activities (Odean 1998, Wang 2001, Gervais, Heaton et al. 2002, Grinblatt and

Keloharju 2009, Montier 2009). Therefore, when investors are overconfident about their investing activities, their investment attitude is directly influenced. Besides, the level of overconfidence also changes with gender, even though it exists among both male and female investors. A study show that overconfidence is of greater level among male investors and they actually have higher investment frequency than women (Barber and Odean 2001, Wu, Johnson et al. 2008). An overconfident investor would trade too frequently and hence increases trading volume and market volatility while decreasing their expected profit (Gervais, Heaton et al. 2002). Therefore, overconfidence about one's ability directly affects investing attitude, leading to more frequent trading. This is captured in the following hypothesis:

Hypothesis 5: Overconfidence is positively correlated with investing attitude among individual investors (H_5).

Excessive optimism

Overconfident investors usually overestimate the role of their own information and therefore excessively trust their capacity. Excessive optimism usually comes from overconfidence and captures the perception that future incidents would be better and more positive than present situation. Over-optimistic investors may believe that bad investment would not harm their portfolio and therefore expect too much from the market and from investing opportunities (Wang 2001, Gervais, Heaton et al. 2002, Johnsson, Lindblom et al. 2002). Excessive optimism also has positive impacts on investing attitude and encourage people to invest, since too much risk aversion would decrease trading volume (Gervais, Heaton et al. 2002). However excessive optimism has negative effects when it leads to highly risky investment. Moreover there exists a link between overconfidence and excessive optimism as indicated by (Johnsson, Lindblom et al. 2002). Therefore, the hypothesis is defined as:

Hypothesis 6: Excessive optimism is positively correlated with investing attitude of individual investors (H_6).

Herd Behaviour

On the stock market, herd behaviour is when investors follow others' behaviours, even when their private information tells them to act otherwise. In other word, it is when investors copy each other (Banerjee 1992, Bikhchandani and Sharma 2000, Hwang and Salmon 2004). If only one investor behaves irrationally, it does not affect stock price.

However if the irrationality is systematic, meaning when a large group behave in the same irrational way, price will be determined wrongly and probably over a long period. Experimental studies also reveal the fact that investors tend to have irrational behaviour at or around certain point of time. In that case, individual investments are not considered as separate transactions but rather a behaviour by a huge organisation that strongly affects the market, causing inaccurate stock pricing (Barber, Odean et al. 2009). Besides, herd behaviour is not only in the sense of copying the crowd but also not acting in the opposite direction of the crowd's behaviour regardless of what their own information tells them. This is a direct influence on investing attitude. From that, the hypothesis is defined as:

Hypothesis 7: Herd behaviour is positive correlated with investing attitude of individual investors (H_7).

Psychology of risk

There are many definitions of risk in finance, but most arguments contain the concepts of unexpected results and uncertainty. Tversky and Kahneman (1974) reveal that predicting and forecasting under uncertainty do not usually follow probability rules. The prospect theory by Tversky and Kahneman claims that people tend to be risk averse in the "profitable zone" and risk seeking in the "losing zone" (Tversky and Kahneman 1992). Therefore, deviating from the standpoint of standard finance, behavioural finance also examines subjective factors, where observed risks include both emotional and perceptual aspects. Two main attitudes toward risk are risk aversion and risk seeking, both could manifest in one individual under different circumstances (Olsen 2007, Olsen 2008). It was proved that one of the important factors influencing investing attitude is investors' tolerance for risk (Bennet 2011). During the period of this study, Vietnamese economy suffers from recession, which creates risk aversion among investors on the Vietnamese stock market. Therefore, the related hypothesis is defined as:

Hypothesis 8: Risk aversion is negatively correlated with investing attitude of individual investors (H_8).

Research model

From literature review and discussion above, the research framework and hypotheses are presented in Figure 3.

The theory of planned behaviour claims that intention is simultaneously determined by (1)

Investor's attitude indicating positive feelings toward conducting the behaviour, (2) Subjective norm, reflecting individual perception of whether their significant others think they should perform the behaviour or not, and (3) Perceived behavioural control captures the internal and external constraints on conducting the behaviour (Ajzen 1991). Besides, four psychological antecedents, namely overconfidence, excessive optimism, herd behaviour and psychology of risk, together determine individual

attitude toward investment. Additionally we also expect investing attitude of individuals on the Vietnamese stock market to be affected by subjective norm. In this research, we assume that investors will perform an investing behaviour if they have a positive intention towards the investment. They also do so if their closed ones want them to invest and that they think they have enough needed resources to invest.

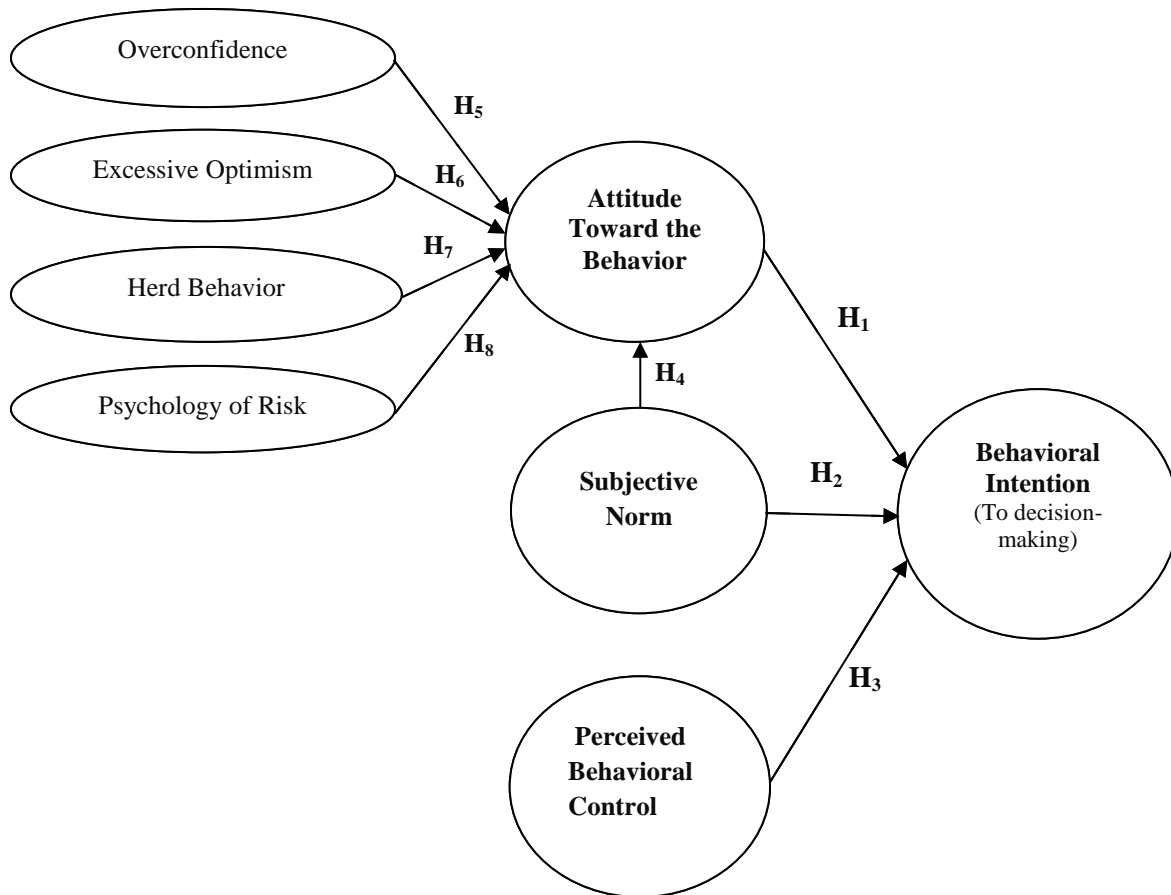


Figure 3. Research model of the determinants of individual investors' behavior

Research Methodology

Research constructs

In order to ensure the accuracy and sufficiency of proposing and designing the model, some in-depth interviews with individual investors are conducted prior to the large scale survey. Such interviews follow the guidelines recommended by Ajzen and Fishbein (1980) and Ajzen (1985, 1991) to explore psychological factors influencing an individual's attitude towards a certain behavior. Based on the interview results and literature review, a model for studying factors having impact on behavioral intention and related hypotheses is proposed in Picture No.3. Built on the concepts made by Ajzen and Fishbein (1980), Ajzen (1991, 2001), and Ajzen and Madden (1986) and some other related studies (East 1993, Shiller 1999, Singhvi 2001, Bock and Kim 2002, Ryu, Ho et al. 2003, Shih and Fang 2004), the research constructs are designed as follows: the attitude towards behavior is scaled using five items, subjective norms are scaled using three items, PBC is scaled using five items and behavioral intention is scaled using 4 items. The fact that overconfidence is scaled using six items, excessive optimism is scaled using five items, psychology of risk is scaled using five items and herd behavior is scaled using five items results from findings of the quantitative study as well as previous related studies (Shiller 1999, Barber and Odean 2001, Singhvi 2001, Olsen 2007, Barber, Odean et al. 2009). After consultation with seven experienced individual investors, the constructs are adjusted and supplemented to fit in the study background. Finally, the questionnaire with 38 observation items with the five-point Likert type scale is employed to measure from (1) *completely disagree* to (5) *completely agree*. In addition, in order to minimize misunderstanding, the questionnaire is pretested with 30 individual investors to ensure the meaning and wording of the questions and then adjusted before the official survey.

Data collection

Data for this study is collected through the questionnaires in the period of May 2013 to November 2013. The questionnaires are sent to 570 individuals on the trading floors in three main cities of Vietnam which are Ha Noi, Da Nang and Ho Chi Minh in two ways: (1) the researcher directly send the questionnaires to the individuals on the trading floors, and (2) the researcher asks stock brokers, relatives and friends to send and then collect the questionnaires to and from individual investors.

There are cases when the informants answer right away and there are other cases when they promise to answer later as they all are rather busy. In order to raise the feedback rate, we ask for phone numbers or email address of individuals in the latter cases and some are reminded to reply via phone or email afterwards.

The results, 509 questionnaires are collected and screened and 37 of them are excluded because the informants do not provide sufficient nor relevant information. Accordingly the number of questionnaires used for data analysis in this study is 472 (81.4%).

Data analysis

Data analysis was carried out in accordance with the use of the structural equation modeling (SEM), supported by AMOS 20.0 software. By using the maximum likelihood approach, model estimation in this study was performed (Lei and Wu 2007). Data analysis proceeded in two stages: first, we assess the overall measurement quality by using confirmatory factor analysis (CFA) to test research instrument reliability and validity, after that an analysis of structural model was also conducted for finding whether the model would fit results of the proposed theoretical models.

To assess model fit, this study used some criteria: the chi-square to degrees of freedom ratio (chisq-df-ratio), the comparative fit index (CFI), Tucker-Lewis index (TLI), residual mean squared error of approximation (RMSEA), and root mean squared residual (RMR). For CFI and TLI, their values above 0.90 indicate good model fit. As for RMSEA and RMR, their values below 0.05 for each indicate close fit, while values below 0.08 indicate an adequate fit (Browne, Cudeck et al. 1993).

Results and Discussion

Sample characteristic description

Among the analyzed 472 questionnaires, 191 of the answerers are female taking up to 40.5% of the total. The informants' age mainly ranges under 50 (92.4%) and 54% of them have been on the trading floor for 1–5 years. The stock transaction frequency is divided into two main groups with nearly 26% making transactions everyday and 45.2% making transactions every week. Information on the sample characteristics is provided specifically in Table 1.

Table 1. Sample characteristics

Characteristics	Frequency	% of Sample	Cumulative (%)
* Gender			
Male	281	59.5	59.5
Female	191	40.5	100
* Age			
< 25 years old	68	14.4	14.4
25 – 35 years old	259	54.9	69.3
36 – 50 years old	109	23.1	92.4
> 50 years old	36	7.6	100
* Time joining in security investment (year)			
< 1 year	90	19.1	19.1
1 – 3 years	149	31.6	50.6
3 – 5 years	107	22.7	73.3
> 5 years	126	26.7	100
* Frequency of security investment			
Daily	122	25.8	25.8
A few times per week	157	33.3	59.1
One time per week	56	11.9	71.0
2 – 3 times/month	78	16.5	87.5
2 – 3 times per year	37	7.8	95.3
Others	22	4.7	100

The measurement model

To assess consistency reliability of all constructs scale, the Cronbach's alpha and item to total correlations are two in among criteria considered in this analysis. Results for each construct are shown in Table 2. We dropped 6 items in some constructs named Overconfidence (OC) [OC1, OC3, and OC4], Excessive optimism (OP) [OP3], Herd Behavior

(HB) [HB3] and Perceived Behavior Control (PBC) [PBC5] from further analysis due to their values of item-total correlation were lower than the recommended value of 0.60 for field studies. For remaining items, the values of cronbach's alpha ranged from 0.825 (for HB construct) to 0.927 (for AT construct). This implies that the validity and reliability of the scales was deemed adequate.

Table 2. Overall Measurement Model Analysis

Constructs/Scale items	Cronbach's alpha	Standardized loading	t-value	Composite Reliability	Average variance extracted
Over Confidence (OC)	0.844			0.825	0.618
OC2		0.588	13.055		
OC5		0.872	18.773		
OC6		0.866	-		
Excessive Optimism (OP)	0.880			0.88	0.69
OP1		0.832	17.269		
OP2		0.821	17.071		
OP4		0.833	17.300		
OP5		0.731	-		
Herd Behavior (HB)	0.825			0.82	0.542
HB1		0.764	15.076		
HB2		0.792	15.513		
HB4		0.644	12.857		
HB5		0.739	-		
Psychology of Risk (PR)	0.848			0.848	0.529
PR1		0.745	21.901		

PR2		0.805	22.918		
PR3		0.752	28.546		
PR4		0.666	28.160		
PR5		0.659	-		
Attitude (AT)	0.927			0.928	0.722
AT1		0.778	13.044		
AT2		0.797	14.196		
AT3		0.888	13.535		
AT4		0.883	12.294		
AT5		0.897	-		
Subjective Norms (SN.)	0.868			0.869	0.69
SN1		0.857	18.909		
SN2		0.854	18.859		
SN3		0.78	-		
Perceived Behavior Control (PCB)	0.904			0.903	0.701
PCB1		0.842	21.383		
PCB2		0.845	21.466		
PCB3		0.831	21.000		
PCB4		0.832	-		
Behavioral Intention (BI)	0.87			0.870	0.628
BI1		0.872	14.145		
BI2		0.875	16.677		
BI3		0.717	16.654		
BI4		0.689	-		

Notes: All t-value are significant at $p < .001$.

(a) Composite reliability = (square of the summation of the factor loadings)/{(square of the summation of the factor loadings) + (summation of error variances)}. (b) Average variance extracted = (summation of the square of the factor loadings)/{(summation of the square of the factor loadings) + (summation of error variances)}.

The CFA model fit the data well with chi-square/df = 2.141; GFI = 0.888; CFI = 0.943; TLI = 0.935; RMSEA = 0.049 and RMR = 0.036. Based on all statistics, the model fits the data very well, generating a good fit to the current data.

In order to provide a strong evidence of measurement model, some global measures of fit were examined. First, convergent validity of each construct need to be considered. In this study, we used three criteria named Cronbach's alpha values, Composite Reliabilities (CR) and Average Variance Extracted (AVE) for assessing measurement reliability. The results in Table 2 indicated that

Cronbach's alpha values and CR of all constructs in this study were highly exceeded 0.80 indicating scale reliability (Nunnally and Bernstein 1978, Hair, Anderson et al. 1998). In addition, the standardized factor loadings of all items significantly ranged from 0.588 (OC2) to 0.897 (AT5) exceeding the recommended level of 0.5 (Hair, Anderson et al. 1998) and the AVE of all latent constructs were in the range between 0.529 (PR construct) and 0.722 (AT construct) which were above the recommended threshold of 0.50 (Fornell and Larcker 1981). It revealed that all constructs in this study have adequate convergent validity.

Table 3. Discriminant Validity of Constructs

Constructs	OC	OP	HB	PR	AT	SN	PBC	INT
1. Overconfidence (OC)	0.618							
2. Excessive Optimism (OP)	0.539	0.69						
3. Herd Behavior (HB)	0.036	(0.14)	0.542					
4. Psychology of Risk (PR)	0.087	(0.46)	0.202	0.722				
5. Attitudes (AT)	0.095	0.243	0.464	0.292	0.529			
6. Subjective Norms (SN.)	0.172	0.062	0.517	0.334	0.370	0.69		
7. Perceived Behavior Control (PBC)	0.150	0.157	0.174	0.032	0.213	0.191	0.701	
8. Behavioral Intention (BI)	0.099	0.213	0.229	0.128	0.398	0.261	0.235	0.628

Notes: AVE is represented on the diagonal and the square correlation is represented on the matrix entries

Next, we examined discriminant validity by comparing the squared correlations between constructs and variance extracted for a construct. It can be verified that the average variance extracted for each construct is higher than its correlations with all other constructs indicating discriminant validity of the measures (Fornell and Larcker 1981). As shown in Table 3, all diagonal elements (AVE) were larger than inter-construct correlations implying that discriminant validity of measures is proved. Moreover, this study also used a chi-square difference test where the chi-square statistics for two models are compared (Suh and Han 2003). Thirty-two comparisons in this chi-square difference test were made, as a result, it was suggested that each pair of constructs was indeed distinct ($p < 0.0001$). In short, the fit indices demonstrated a good overall fit between the measurement model and the data. It is concluded that the demonstrated measurement model is of adequate reliability, convergent validity and discriminant validity.

The structural model

The hypothesized structural model represented good

fit to the current data. The fit statistics, $\chi^2 = 1106.409$ and $df = 446$ (p -value = 0.000); $\chi^2/df = 2.481$; RMSEA = 0.056; RMR = 0.084; CFI = 0.925; TLI = 0.916;) were all indicative of a good fit. The explanatory power of the research model was shown in Figure 4 in which the model of behavioral intention and attitudes account for 44.6% and 53.1% of variance (R^2), respectively. All these statistics showed that the model does a good job of explaining the current data.

As shown in Table 4, all structural regression coefficients presented in the model were statistically significant. This implies that all hypotheses tested were supported by empirical data collected. In the other words, it states that overconfidence, excessive optimism, herd behavior has positively affected individual investor's attitude, as well as psychology risk has negatively affected individual investor's attitude which in turn affected their behavioral intention. What is more, the results also reveal that attitudes, subjective norm and perceived behavior control have positively relationships with individual investor's behavioral intention. This result also complies with findings from studies by East (1993) and Gopi and Ramayah (2007).

Table 4. Results of the structural model analysis

Paths/Hypothesis	Standardized Estimate	t-value	Conclusion
1. Attitudes → Intention (H_1)	0.533	6.494 ***	Supported
2. Subjective Norms → Intention (H_2)	0.112	2.251 *	Supported
3. Perceived Behavior Control → Intention (H_3)	0.151	3.106 **	Supported
4. Subjective Norms → Attitudes (H_4)	0.152	3.373 ***	Supported
5. Overconfidence → Attitudes (H_5)	0.134	2.351 *	Supported
6. Excessive Optimism → Attitudes (H_6)	0.331	5.688 ***	Supported
7. Herd Behavior → Attitudes (H_7)	0.378	7.373 ***	Supported
8. Psychology of Risk → Attitudes (H_8)	(0.205)	(4.223) **	Supported

Note: Path significance: *** $p < 0.001$; ** $p < .01$; * $p < .05$.

Accordingly, hypotheses H_1 , H_2 , H_3 , H_5 , H_6 , H_7 , and H_8 of this research are all supported by empirical data. Meanwhile, the result also indicates a positive correlation between the subjective norm and individual investors' attitude, which supports hypothesis H_4 . This in line with the studies by Ajzen and Fishbein (1980) and Sheppard, Hartwick et al. (1988).

The result hence reveals that the application of TPB by Ajzen (1991) is appropriate in studying the determinants of behavioural intention among

Vietnamese investors. To be more specific, the behavioural intention of individual investors is influenced by attitude toward investment ($\beta = 0.533$), perceived behavioural control ($\beta = 0.151$) and subjective norm ($\beta = 0.112$), the three determinants are arranged in descending order regarding their levels of influence. This study finds that attitude toward investment to have the most significant impact on behavioural intention, which complies with the results from previous studies about applications of TPB (East 1993, Gopi and Ramayah 2007, Hung,

Lai et al. 2010). The result explains the fact that all investment activities of individual investors are self-determined and mostly guided by their attitude. Those investors take responsibility for their own behaviours. Therefore, if such attitude is positive, it is likely that they will perform the investment behaviour. Moreover, it is crucial that investors can control their behaviour when making investment decision. The longer investors participate in investment activities, the more experienced they become and they hence know when to make investment. It is understandable that experience and investment environment constitute the second most important determinant in this study since they allow investors to gain control over their behaviour. Finally, the result from the study indicates that the possibility to make investment behaviour increases when the investor believes that most people important to him/her want him/her to invest in the stock market.

In this paper, a research model to investigate psychological factors of individual investors on the stock market is designed to explain the behavioural intention of individual investors during their investment decision-making process. A collection of four psychological factors is added in the TPB model, namely overconfidence, excessive optimism, psychology of risk, and herd behaviour to clarify their impacts on investment attitude of individual investors. The result from testing hypothesis H₅ ($\beta = 0.134$; t-value = 2.351) confirms a positive correlation between individual investors' excessive optimism and attitude toward the investment of a specific stock on the stock market. This result complies with the study by Gervais, Heaton et al. (2002). This indicates that when investors are excessively optimistic about their knowledge and capacity when considering investment in a certain stock, they will have a clear and positive attitude

toward that stock, which often leads to an investment intention or actual investment behaviour. Similarly, the results of testing hypothesis H₆ ($\beta = 0.331$; t-value = 5.688) and H₇ ($\beta = 0.378$; t-value = 7.373) with all regression coefficients greater than 0 indicate that excessive optimism and herd behaviour are positively correlated with investment attitude of individual investors. This means that the increase in the level of optimism and herd behaviour encourages individual investors to believe that the investment is profitable. This result complies with studies by Gervais, Heaton et al. (2002) and Hwang and Salmon (2004). The regression coefficient of hypothesis H₈ is less than 0, which reveals that when the individual investors' risk and loss aversion increase, they are less likely to make investment on the market. This quite agrees with our prior in-depth interview with some individual investors for a qualitative research when Vietnamese economy suffers from recession (Phan and Zhou 2014) and also complies with another study by Olsen (2007, 2008).

Moreover, gender-based difference in investment motivation is also a factor to consider. (Hofstede 1998). It has been proved that there exists differences in perception (Carol 1982) and in communication (Tannen 1991) among male and female investors. Therefore, in this research, we also examine whether there is deviation between the two groups regarding the process of performing investing behaviour, especially in a society of "masculinity" like Vietnam. We use multiple group analysis method to analysis the influence of gender. The aspects to investigate are the impacts of psychological elements on investment attitude, as well as of attitude, subjective norm and perceived behavioural control on behavioural intention among individual investors. Comparison results between male and female investors are presented in Table 5.

Table 5. Test of Moderating Effects of Gender

Paths	Standardized Coefficient		Subgroup Comparison (Unconstrained)		
	Male	Female	Constrained ($\chi^2 = 1705.106$)	χ^2 difference ($\chi^2 = 1667.279$)	Results
1. AT - BI	0.378 ***	0.272 ***	1858.394	178.692 ***	Supported
2. SN - BI	0.093 ns	0.145 ns	1833.798	166.519 ***	Supported
3. PBC - BI	0.072 ns	0.240 **	1920.323	253.044 ***	Supported
4. SN - AT	0.141 *	0.169 *	1780.740	113.461 ***	Supported
5. OC - AT	0.120 ns	0.188 *	1809.480	142.201 ***	Supported
6. OP - AT	0.337 **	0.347 ***	1705.205	37.926 ***	Supported
7. HB - AT	0.383 ***	0.367 ***	1717.147	49.868 ***	Supported
8. PR - AT	(0.224) ***	(0.176) *	1738.839	71.560 ***	Supported

Note: Path significance: *** $p < 0.001$; ** $p < .01$; * $p < .05$; ns: Non-significant

The result of Chi-square (χ^2) difference testing between constrained and unconstrained model with the p-value = 0.000 indicates the differences among the male and female groups regarding relationships between psychological elements and investment attitude, as well as between attitude – behavioural intention, subjective norm – behavioural intention and perceived behavioural control – behavioural intention. At the same time, this study also tested one by one relationship in the model (path) for finding out the difference of Chi square (χ^2). This result indicates highly statistical significance in all studied relationships (p-value = 0.000). This indicates the very significant gender-based differences pertaining the mentioned relationships among Vietnamese individual investors.

Among the three immediate determinants of behavioural intention as presented in Table 5, attitude toward investment is proved to have stronger impacts on male investors than on the female group. This

means under the same effect of positive attitude toward investment, there is a clearer trend of performing the behaviour among men than in women. Additionally, between the two groups show deviations in the levels of influences that the psychological elements exert on investing attitude. It is shown that male attitude toward investing is more driven by herd behaviour than that of the women, while overconfidence and excessive optimism play larger roles in forming female investing attitude than the other group. This indicates external environment usually alters the investing attitude among men more than among women. In the mean time, while being affected by overconfidence, and hence becoming excessively optimistic, the female investors' behaviour may therefore be less regulated by herd behaviour, which complies with findings from studies by Gervais, Heaton et al. (2002) and Johnsson, Lindblom et al. (2002).

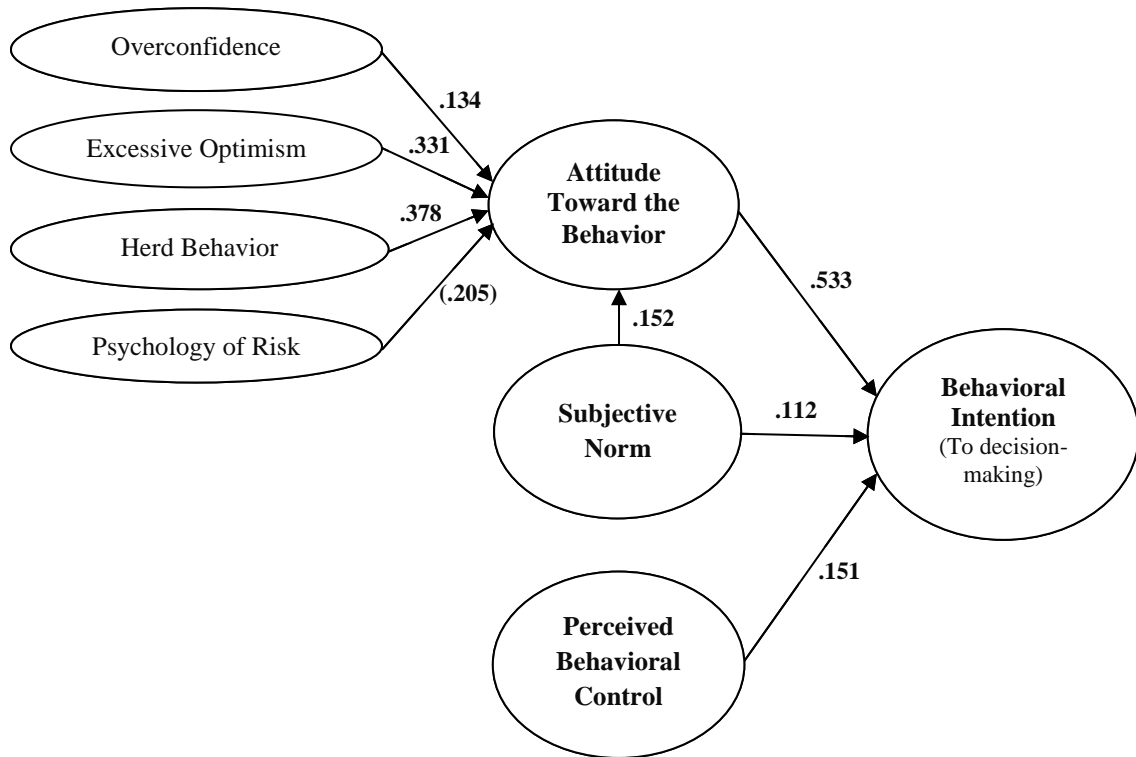


Figure 4. Assessment of the Structural Model

On the other hand, this research on the Vietnamese stock market does not find men to be more overconfident than women as in studies on other markets (Barber and Odean 2001, Wu, Johnson et al. 2008). Moreover, the research also reveals that female investors on the Vietnamese stock market tend to be more precautious in making investment decisions than the male group.

Conclusions

Analyses of the determinants of stock investors' behaviour are among the critical topics recently. Such investigations have a potential of valued contributions to studies on stock investment and management. Therefore, this research mainly aims to identify the relevant factors exerting influences on behavioural intention of individual investors. We use TPB as conceptual lens to examine investing motivations and its manifesting levels among individuals on the Vietnamese stock market. We identify the specific antecedents guiding individual investment behaviour on the basis of systemised related literature and theories and from careful examination of Vietnamese individual investors, from which we suggest a research framework and corresponding hypotheses.

We apply Structural Equation Modelling (SEM) with assistance from AMOS 20.0 as a tool to analyse data. The research succeeds in determining the factors influencing behavioural intention of individual investors, which complies with TPB. Research findings support the hypotheses that investment intention among individuals is considerably driven by attitude toward investment, subjective norm and perceived behavioural control. According to that, attitude toward investment has the strongest impact, followed by perceived behavioural control and lastly by subjective norm. Using the theory of planned behaviour as a tool, multiple researchers have come to the conclusion that individual's intention to perform behaviour is guided by their general feelings indicating their favourableness or unfavourableness toward the behaviour. In general, those investors who tend to favour the investment behaviour are highly likely to invest (Ajzen and Fishbein 1980, Ajzen 1991). Similarly, they tend to do so if they feel that their significant others think they should. This is a key finding that helps validate the importance of subjective norm in motivational processes among individual investors. Perceived behavioural control is also pinned down as positive force in driving investors' behavioural intention, ranking after attitude only. Ajzen (1991) proves that the influences

of attitude, subjective norm and PBC could manifest to the extent that it could change behaviour and the concerned situations. Additionally, this research also defines a positive relationship between subjective norm and attitude toward investment. This captures the observations that investment attitude among Vietnamese individuals investors is affected by whether their closed ones think they should invest or not.

Identification of the relative importance of the three determinants of behavioural intention is one essential step in studying individual investors intention in conducting behaviour. However, this research only examines the antecedents, specifically the psychological ones, of the attitude toward investment. The research findings provide a deep understanding of elements that influence the general feelings of favouring, or not, the behavioural intention of certain investment. The studies proved that individual investment intention is guided by four psychological elements, namely overconfidence, excessive optimism, psychology of risk and herd behaviour. Each of the element plays as a determinant of attitude toward behaviour, which has never been examined in any previous studies. Experimental evidences found in other studies strongly claim the existence of the psychological determinants, and this supports the hypotheses that the four elements would have considerable impacts on Vietnamese individual investors attitude toward investment. These confirmed hypotheses refer to the findings that the more overconfidence, excessive optimism and herd behaviour manifest among the individual investors, the more assured and proactive they become when considering certain stock, and this usually leads to investment intention or actual investing behaviour. These experimental evidences are also compliant with conclusions from another study on the movement in Vietnam's stock prices during the "bloom" period of 2006 and 2007, which denies the existence of rational bubbles on the Vietnamese stock market (Gunji and Miura 2009). Additionally, another finding in this research reveals that increasing risk aversion undermines investing intention, and in that case chances are less that they will perform the investment.

Moreover, our study also construct evidences supporting the proposition that gender-based differences among Vietnamese individual investors exist when examining the relationships between behavioural intention and its determinants, as well as between psychological elements and investment attitude. All these relationships exhibit highly statistical significance. Our findings prove that gender could create great deviation regarding the links between psychological elements and investment attitude, attitude and behavioural intention, subjective

norm and behavioural intention, as well as between perceived behavioural control and behavioural intention. However, we do not observe a stronger overconfidence among male investors than among female investors on the Vietnamese stock market during the studied period, which differs from conclusions of some previous studies on other markets (Barber and Odean 2001, Wu, Johnson et al. 2008).

Consequently, it seems that the psychological elements may exist inherently within each investor without their awareness, even though the factors considerably influence their behavioural intention. Our revelation regarding these impacts, therefore, would help individual investors from falling into the "psychological trap" during their participation in the market. As a conclusion, behavioural finance in general and TPB would equip researchers and individual investors with new conceptual lens to better understand and hence behave accordingly to avoid the "psychological trap" due to human perception and emotions. When investors are aware of psychological elements that may interfere with their behaviour and how these negative interferences may occur, they tend to be more precautionary in making judgement and decision, and hence minimise the unwanted influences.

While results found from this research provide an interesting insight to factors deciding behavioral intention of an individual investor, there are still limitations. Firstly, investigating factors influencing individuals' investment behaviors based on TPB is rather new, particularly in Vietnam; as a result, the sample size and the study scope are restricted in only three cities of Ha Noi, Ho Chi Minh and Da Nang of Vietnam. In addition, samples are from individuals with experience in stock transaction, not just from individuals who just decide to make stock investment. Thirdly, this study has just reached decomposing attitudinal belief structures. Finally, findings of this research rely mainly on the honesty of the informants on the relevant issues. Findings as well as limitations of this study will provide a framework for future researches on this topic.

Note

According to the Annual Report 2012 of Ho Chi Minh Stock Exchange and Hanoi Stock Exchange.

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