MEASURING IMPACT OF PSYCHOLOGICAL FACTORS
ON STOCK MARKET IN VIETNAM

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ABSTRACT

In attempted to provide the first evidence about how investors' psychology impacts on trading volume on stock market in Vietnam, this article uses data of individual stocks listed on the VN30 Index with 21,329 observations during 3 years from January 23, 2017 to December 13, 2019, and regression analysis on SPSS20 as well as Monte Carlo simulation analysis on JMP. The research results show that human psychology drives the trading volume more than the rationality. The hypothesis of rationality losses of significance for trading volume on Vietnam’s stock market. Psychological factors experience a positive impact on trading volume. Investors on stock market in Vietnam is the most effected by the optimism bias. Overconfident and pessimistic investors have lower influence on trading volume than optimistic ones.

Keywords: Psychological factors, rational investors, optimistic investors, pessimistic investors, overconfident investors, stock market in Vietnam.

1. INTRODUCTION

Data from Vietnam Securities Depository shows that the number of individual investors’ accounts has an overwhelming proportion on Vietnam’s stock market. As of March 31, 2019, the number of domestic trading accounts reached 2,204,866 accounts, of which the number of trading accounts of individual investors was 2,195,374 while the number of accounts held by institutional investors just 9,492 accounts.

Individual investors are mostly amateur people, who have little capital and do not have time to follow the fluctuations of the market. Therefore, individual investors, though participating in a large number, have a lower level of portfolio diversification, smaller scale and transaction volume compared to institutional investors. They often do not have long-term investment strategies and do not follow specific investment philosophies, so they are vulnerable and easily affected by many factors.
For Vietnam, the impact of psychological factors on the market in the past years has been very complicated, causing negative consequences that threaten macroeconomic instability and financial security. However, up to now, researches on behavioral finance of investors and the impact of psychological factors on Vietnam’s stock market are very few, especially quantitative studies.

Due to that reason, the paper aims to measure the impact of psychological factors on the stock market in order to propose a number of recommendations for contributing to the stable and sustainable development of Vietnam’s stock market. Inheriting the research model of Dhaoui et al. (2013), when studying the impact of investor psychology on the French stock market, the paper intends to use linear regression on SPSS20 and Monte Carlo simulation analysis on JMP to achieve the research goals.

The paper consists of 5 parts, of which part 1 is an introduction. Part 2 provides a literature review on behavioral finance and the main psychological factors affecting individual investors. Part 3 is methodology. Part 4 presents the empirical results. Part 5 proposes some discussions and conclusions.

2. LITERATURE REVIEW

Effective market theory is the core of traditional financial models, strategies and policies (Jasman and Zamri, 2016)). Effective market theory is based on the principle that all rational behavior has the same purpose of maximizing benefits and that financial assets are reasonably priced because market information is accurately and fully reflected in asset prices (Toma, 2015).

However, since the birth and development in the 1960s to present, there has been a lot of fierce debate about this theory (Ackert and Deaves, 2010; Shefrin, 2007). Especially now, effective market theory with rational investors no longer exists firmly because there are big gaps between theory and practice. The decline in efficiency of traditional financial theories has led to the emergence of a new financial theory called behavioral finance.

Behavioral finance is the combination of many different sciences such as finance, psychology, and sociology (Ricciardi and Simon, 2000). From a financial perspective, behavioral finance uses basic human psychological theories to explain irregularities in the financial market. According to the definition of Goldberg and Von Nitzsch (1999), behavioral finance is the theory of financial markets in which individuals act rationally within a certain framework. Thaler (1999) points out that behavioral finance is an integration of classical economics and standard financial theory (Thaler, 1999) and behavioral finance tries to complement standard financial theory through the inclusion of psychological factors in the decision-making process (Ritter, 2003).

To explain the psychology of investors, we focus on such four main types of psychological factors as (1) Overconfidence; (2) Conservatism or a psychology of fear of failure; (3) Herding psychology; (4) Availability bias or Heuristic bias. Each psychological element has its own specific concepts and manifestations.

\[
\text{Stock Market, } \tau = \alpha + \beta_1 \text{RatExpect, } \beta_2 \text{Optim, } \beta_3 \text{Pessim, } \beta_4 \text{Overconf} + \epsilon
\]
actually are (Trivers, 1991). An overconfident investor often sees himself better than other investors. He appreciates himself more than others value him and often exaggerates his own understanding. This behavior may lead overconfident investors to make trading more frequently than other investors (Wang, 1998; Glaser and Weber, 2007; Liu and Du, 2016).

When macro or microeconomic conditions change, the conservative investors, who are afraid of failure, tend to be slow to respond to those changes and they often associate their views with the overall situation of previous time. That is, when there is news of the economic downturn, conservative investors think that the weakness of the economy is only temporary and the economy will continue to go up in the long term without noticing that this could be the start of a multi-year recession. However, when the economic situation has not shown any improvement after a period of time, conservative investors will quickly fail to maintain the belief that the market may recover so they will have extreme reactions. Conservatism according to Edwards (1968) also makes investors quite conservative in receiving new evidence that changes their perception.

The herding effect in financial markets is a term that indicates that investors and fund managers can adopt a risky investment strategy in the market without collecting sufficient information just because many other investors do so (Bikhchandani and Sharma, 2000). However, many investors copy the behavior of other investors in an unreasonable and sometimes completely irrational way (Economou, F., Katsikas, E., G. Vickers, 2016), (Bensaïda, 2017), (Kabir, M., S. Shakur, 2018).

Representativeness biases occur when investors hope that the outcome of a sequence of events generated by a random process can represent a certainty that will occur (Tversky and Kahneman, 1974). When investors have representativeness bias, they tend not to pay much attention to long-term factors, but often focus on short-term situations. In other words, investors with representativeness bias tend to place too much emphasis on information about current situations, ignoring the need to use their previous knowledge (Liu and Du, 2016).

In Vietnam, the topic of behavioral psychology of investors has attracted the attention of some researchers since 2010. The majority of previous researches focus on factors affecting investment decisions of investors in the Vietnam's Stock Market such as the research conducted by University of Economics in Ho Chi Minh City in 2013, the study of Khoa Cuong Phan and Jian Zhou (2014) or the research of Pham Ngoc Toan and Nguyen Thanh Long (2018). In addition, there are a few studies that systematize theoretical basis or perform general qualitative analysis, which are quite not detailed about 04 psychological factors (including overconfidence, heuristic bias, herding behavior and conservatism), such as studies conducted by such authors as Ngo Thi Xuan Binh (2010), Dang Van Dan (2010), Nguyen Trong Tai (2016), Nguyen Ngoc Tu Van (2018). The research team found only three quantitative analysis studies, including those made by Xuan Vinh Vo and Dang Bao Anh Phan (2017) on herding behavior and by Duc Hien et al. (2012) on deviations in the behavior of investors in Vietnam's Stock Market. It can be said that up to the present time, researches on behavioral finance as well as impact of psychological factors on
investors and Vietnam's Stock Market are very little. Particularly, there are few studies using quantitative methods.

3. METHODOLOGY

3.1. Data

Instead of using data of all listed securities (both on Ho Chi Minh Stock Exchange and Hanoi Stock Exchange), the research team will focus on stocks in the VN30 basket. In fact, although there are only 30 companies, due to being selected as the largest companies, VN30 index always covers more than 80% of the total market capitalization (VN-Index) and 60% of the total transaction value of the whole market. The VN 30 index was deployed by Ho Chi Minh Stock Exchange (HOSE) on February 6, 2012. The composition of VN30 index will be reviewed every 6 months by HOSE’s advice council in July of the year and January of the following year. The time series used during the review period are specified after the closing of the last trading session of June and December.

Thus, in order to serve the purpose of measuring the impact of psychological factors on Vietnam’s stock market, the study will use secondary data on trading volumes of 30 largest stocks by market capitalization and liquidity on HOSE from January 23, 2017 to December 13, 2019. So, there are 722 trading days for 30 individual stocks for each period of six months, making 21,329 observations.

3.2. Research Model

Price and trading volume are two inseparable factors, allowing a comprehensive reflection of the market. Specifically:

(i) When prices are rising, a low trading volume reflects little of the scarcity of goods on market;
(ii) When prices are falling, a low trading volume reflects the situation that goods on the market are underestimated;
(iii) When prices are "fluttering" with small volume of transactions, the market is frozen;
(iv) When prices "swing" with a large transaction volume, there is a possibility of a changing trend in the near future but it is difficult to predict.

In other words, the agreement to buy and sell on stock market is reflected not only by the price balance between supply and demand but also by the volume of successful matching transactions.

Firstly, the study will measure the impact of psychological factors on the stock market in terms of trading volume. The research model consists of 4 independent variables and 01 dependent variable, following below equation:

\[ \text{Stock Market}_t = \log(\text{trading volume at day } t) \]
\( \text{RatExpect}_{i,t}, \text{Optim}_{i,t}, \text{Pessim}_{i,t}, \text{Overconf}_{i,t} \) respectively represent the stock i's returns expected by rational investors, optimistic investor, pessimistic investors and overconfident investors in the time \((t)\) considering available information in the time \((t-1)\).

Concerning psychological factors, there are some definitions as bellow:

Rational investors always follow market trend (MT). Bourouis et al (2013) consider MT as a signal for rational expectation and give a formula measuring as follows:

Investors must be optimistic when individual stock price exceeds the average price during a given period. Therefore, the variable, which represent the yield expected by optimist investors at the time of transaction \(t\) based on available information on market at time \(t-1\), is determined as return rate of stock \(i\) at time \(t\) in case close price is bigger than average price during the research period.

Investors must be pessimistic when the price decrease under the average level. Therefore, the variable, which represents the yield expected by pessimist investor at the time of transaction \(t\) based on available information on market at time \(t-1\), is computed as return rate of stock \(i\) at time \(t\) in case close price is smaller than average price during the research period.

According to Boynton et al (2009) and Ulessever et al (2011), overconfidence effect is controlled by historical return on trading volume. This effect can be observed using this relation as follows: \( \ln(\text{Trading volume}_t) = f(R_{t-1}) \) with \( R_{t-1} \) is return on investment at period \(t-1\). In this research, return on investment at period \(t-1\) is used to measure overconfidence effects on stock market.

- There are 04 hypothesis need to be verified, including
  - Hypothesis H1: Rational expectation (RatExpect) has impact on trading volume on Vietnam's stock market.
  - Hypothesis H2: Optimistic expectation (Optim) has impact on trading volume on Vietnam's stock market.
  - Hypothesis H3: Pessimistic expectation (Pessim) has impact on trading volume on Vietnam's stock market.
  - Hypothesis H4: Overconfident expectation (Overconf) has impact on trading volume on Vietnam's stock market.

Secondly, the study will evaluate the sensitivity of trading volume (output variable) to psychological factors of investors (input variables) on stock market in Vietnam by using Monte Carlo analysis on JMP software. This research will investigate trading volume sensitivity to all psychological factors as well as trading volume sensitivity to the couple of input variables.
4. EMPIRICAL EVIDENCE

Table 1 shows descriptive statistics about independent variable (Ln(volume)) and independent variables (including: RatExpect, Overconf, Optim and Pessim). Table 2 indicates that Sig of Ln(volume) and dependent variables such as RatExpect, Overconf, Optim and Pessim is always smaller than 0.05. This means that independent variable and dependent variables have a statistically significant linear relationship (p < 0.01). They are positively correlated. In other words, the direction of the relationship is positive, meaning that these variables tend to increase together.

It is clearly seen that Sig of Optim and Overconf and Sig of Optim and Pessim are 0.999 and 0.877, bigger than 0.05. However, collinearity Statistics show that VIF ratios are always less than 2 [Table 3]. That’s why the study decides to keep these variables in the next regression analysis.

Table 1. Descriptive Statistics

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ln(volume)</td>
<td>21329</td>
<td>7.00</td>
<td>17.70</td>
<td>13.591</td>
<td>1.3834</td>
</tr>
<tr>
<td>RatExpect</td>
<td>21329</td>
<td>0%</td>
<td>100%</td>
<td>49.0141%</td>
<td>34.92673%</td>
</tr>
<tr>
<td>Overconf</td>
<td>21329</td>
<td>-70.48%</td>
<td>40.94%</td>
<td>0.0029%</td>
<td>2.20276%</td>
</tr>
<tr>
<td>Optim</td>
<td>21329</td>
<td>-41.79%</td>
<td>40.94%</td>
<td>0.0503%</td>
<td>1.57312%</td>
</tr>
<tr>
<td>Pessim</td>
<td>21329</td>
<td>-70.48%</td>
<td>7.00%</td>
<td>-0.0520%</td>
<td>1.56576%</td>
</tr>
</tbody>
</table>

Valid N (listwise) 21329

Source: Correlation Analysis extracted in SPSS

Table 2. Correlations

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
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<td>-0.0520%</td>
<td>1.56576%</td>
</tr>
</tbody>
</table>

Valid N (listwise) 21329

Source: Correlation Analysis extracted in SPSS

**. Correlation is significant at the 0.01 level (2-tailed).
Table 3. Anova & Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>99.915</td>
<td>4</td>
<td>24.979</td>
<td>13.082</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>40716.402</td>
<td>21324</td>
<td>1.909</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>40816.316</td>
<td>21328</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Dependent Variable: Ln(volume)

<sup>b</sup> Predictors: (Constant), Pessim, Optim, Overconf, RatExpect

Table 3 indicates obviously that Sig of RatExpect is 0.589, more than 0.05. This means that impact of RatExpect on trading volume is not clear. RatExpect should be rejected from the research model. Optim has the highest standardized coefficients beta of 0.036. This shows a very significant impact of optimistic investors on trading volume on Vietnam's stock market. The next places are overconfident investors (0.027) and pessimistic investors (0.20) [Table 4].

The research model can be explained as bellow:

\[
\text{Ln}(TV)_i = \alpha_0 + 0.036 \times \text{Optim}_i + 0.020 \times \text{Pessim}_i + 0.027 \times \text{Overconf}_i + 13.590
\]

Table 4. Model Summary & Anova & Coefficients after excluding RatExpect

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>R Square Change</th>
<th>F Change</th>
<th>df1</th>
<th>df2</th>
<th>Sig. F Change</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.049&lt;sup&gt;a&lt;/sup&gt;</td>
<td>.002</td>
<td>.002</td>
<td>1.3818</td>
<td>.002</td>
<td>17.327</td>
<td>3</td>
<td>21325</td>
<td>.000&lt;sup&gt;b&lt;/sup&gt;</td>
<td>.200</td>
</tr>
</tbody>
</table>

<sup>a</sup> Predictors: (Constant), Pessim, Optim, Overconf

<sup>b</sup> Dependent Variable: Ln(volume)

ANOVA<sup>a</sup>

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>99.252</td>
<td>3</td>
<td>33.084</td>
<td>17.327</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>40717.064</td>
<td>21325</td>
<td>1.909</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>40816.316</td>
<td>21328</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Dependent Variable: Ln(volume)

<sup>b</sup> Predictors: (Constant), Pessim, Optim, Overconf
<table>
<thead>
<tr>
<th>Model</th>
<th>Model 1</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td>Tolerance</td>
</tr>
<tr>
<td>(Constant)</td>
<td></td>
<td>13.590</td>
<td>.009</td>
<td></td>
<td></td>
<td>1434.849</td>
</tr>
<tr>
<td>Overconf</td>
<td></td>
<td>.017</td>
<td>.004</td>
<td>.027</td>
<td>3.878</td>
<td>.000</td>
</tr>
<tr>
<td>Optim</td>
<td></td>
<td>.032</td>
<td>.006</td>
<td>.036</td>
<td>5.293</td>
<td>.000</td>
</tr>
<tr>
<td>Pessim</td>
<td></td>
<td>.017</td>
<td>.006</td>
<td>.020</td>
<td>2.880</td>
<td>.004</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Ln(volume)

Source: Correlation Analysis extracted in SPSS

Figure 1 shows the sensitivity of trading volume (output variable) to psychological factors of investors (input variables). It is clearly seen that results are similar to regression analysis on SPSS that the research mentioned as above. The trading volume experience the most important sensitivity to optimistic psychology.

Source: Extract from JMP

Figure 2: Volume sensitivity to the couple of input variables (Optimism and Overconfidence; Pessimism and Overconfidence; Optimism and Pessimism)

Source: Extract from JMP
Figure 2 indicates the trading volume sensitivity to the couple of input variables. It is obviously seen that trading volume is positively sensitive to all psychological factors, including: optimistic factors, overconfident factors and pessimistic factors. In particular, the presence of optimistic investors experiences the most significant influence on trading volume. In contrast, the impact of pessimism is less important than both that of optimism and overconfidence.

5. DISCUSSION AND CONCLUSIONS

The regression analysis indicates that the hypothesis of rationality losses of significance for trading volume on Vietnam’s stock market. This result is totally consistent with what Bourouis et al (2013) confirm in their research about stock market in France. This means that human psychology drives the trading volume more than the rationality. The relationship between trading volume and psychological factors are positive. In addition, it is clearly seen that optimism drives more significantly the evolution of stock market in Vietnam, than overconfidence and pessimism. This means that investors on stock market in Vietnam is the most effected by the optimism bias.

In terms of trading volume sensitivity to input variables, the presence of more optimistic investors influence more significantly the trading volume than it is the case for the overconfident and pessimistic investors. And the range of influence of high overconfidence is larger than that of pessimism. This observation is totally with conformity to a report given by The Conference Board®Global Consumer Confidence in 2018. The Vietnamese people are ranked at 4th place among the most optimistic countries in the World, with Consumer Confidence Index of 122 points, after India, Philippines and Indonesia.

The research results highlight the most important effect of optimism on trading volume in Vietnam as well as significant impact of overconfidence and pessimism. The presence of rational investors doesn’t experience any impact on trading volume on stock market in Vietnam. This is the first empirical evidences about the impact of psychological factors on the stock market in Vietnam, contributing to enrich the existing empirical evidence on influence of investor’s psychology in emerging countries like Vietnam. The study results are also significant in the context where Vietnamese individual investors are mostly amateur people, who have little capital and do not have time to follow the fluctuations of the market and they are vulnerable and easily affected by many factors. Investors as well as policy makers can refer these proofs to have more appropriate long-term investment strategies and make decision on contributing to the stable and sustainable development of Vietnam’s stock market.

However, it is obviously seen that the research is executed in a short period of three years and only focus on individual stocks of VN30. Therefore, the research results cannot fully reflect the total nature of investor’s psychology on Vietnam’s stock market. There is a need for further follow-up studies with deep analysis, highly specific recommendations and longer (richer) sample of data as well as different complicated financial behaviors of investors who are trading in Vietnam Stock Market.
REFERENCES


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