Presented at the DLSU Research Congress 2017
De La Salle University, Manila, Philippines
June 20 to 22, 2017

Finding Gender Differences in Trading Behavior: A Priming Approach

Paul Cabual, Ma. Isabel Fernandez*, Shannen Mae Lee, Jeffrey Benjamin Yu
De La Salle University
**Corresponding Author: ma_isabel_fernandez@dlsu.edu.ph*

Abstract: Does investment behavior change when gender identities are more pronounced? This paper investigates the social and individual-level effects of the gender dichotomy on two contending mechanisms of the disposition effect. The first being asymmetric risk attitudes of prospect theory; the second being belief in mean reversion. Although traditional economics assume that people behave rationally, investors' hastily securing profits from winning stocks while clinging onto losses from failing ones is a global phenomenon. Through an experiment, we empirically examined how asymmetric risk attitudes and belief in mean reversion prompt the disposition effect when individually primed for gender salience and surrounded by the same sex. We found that the disposition effect was more pronounced in masculine males. We also affirm that men are more risk-seeking and optimistic in gains while women were more focused on reducing their losses. Notably, our male participants were more competitive when grouped amongst each other while their presence prompted women to take in more risk, especially when it came to profits.

Key Words: Gender identities; asymmetric risk attitudes; disposition effect; belief in mean reversion; trading behavior

1. INTRODUCTION

Under the standard neoclassical framework, it is assumed that people behave rationally and make decisions that maximize their expected utility. However, studies reveal that people are programmed with distinct biases (see Tversky and Kahneman (1974)). In the financial market, stock traders have had a tendency to dispose a stock of increasing value too early while holding onto stocks of decreasing value for too long (Barberis & Xiong, 2006; Frazzini, 2006; Kaustia, 2011; Odean, 1998; Talsepp, et al., 2014). Shefrin and Statman (1985) were the first to prove the disproportion of more realized winners relative to losers across different kinds of asset classes and investors, and termed it the disposition effect. Exhibiting the disposition effect has lead to lower gains, and persistent trading despite the losses incurred.

We aim to bridge the gap by investigating gender differences and two contending mechanisms for the disposition effect – that is, the irrational belief that prices mean revert, and asymmetric risk attitudes in the domain of gains and losses. For gender differences, we look into masculinity and femininity, and their effect at the individual and social level.

Now, the dichotomy of gender is ubiquitous across the globe and it differs from place to place. This dichotomy can be spread into a multidimensional range called gender identities. Behaviors that stem from this are learned and picked up from social norms, institutions, and cultural products while growing up. In fact, they can also be triggered using priming methods. However, because the effect of primed gender identities is automatic and momentary, selecting a female for a secretary's position for example becomes, in a sense, natural, as it originates from primal thought processes (Banaji et al., 2005). The problem with ingrained gender stereotypes is

that it can lock people only onto a subset of possibilities, hampering their decision-making skills.

In fact, studies have proven that stock-trading behavior and performance actually do differ between genders (see Lewellen et al., 1977; Barber & Odean, 2009; and Zhang et al., 2014). Men tend to invest more aggressively (Barber & Odean, 2001), tend to be more competitive (Niederle & Vesterlund, 2007), and are significantly more risk tolerant than women (D'Acunto, 2015).

Findings reveal that men or individuals who have a high degree of masculinity have a tendency to gamble with their gains, taking in more risk for a chance of higher returns. On the other hand, women or individuals who have a high degree of femininity exhibited more conservative behavior, avoiding risk whenever possible (see Barber & Odean, 2001; Niederle & Vesterlund, 2007; D'Acunto, 2015). Thus, under good economic conditions, it is expected that men fare much better than women in the financial market, reaping higher rewards from their riskier investments. Likewise, under bad economic conditions, it is expected that men are the first to be affected and suffer more from the negative shocks. Women would then be more likely to carry the costs of a financial crisis, and can act as a "cushion" for corporations.

Unfortunately for men, the higher risk they are taking may not necessarily be correlated with higher returns. Going back, Barber and Odean (2001) had shown that while women usually adhere to a buy-and-hold strategy, men engaged in more frequent trading so their returns were being offset by the transaction costs. Moreover, their aggressive behavior can be a symptom of overconfidence or excessive optimism, which can lead men to take uncalculated risks without the necessary compensation. Even hormones play an important role with (a) excessive testosterone, linked to higher risk tolerance but unchanged level of skills, occurring during a bull market, and (b) higher cortisol, linked to higher risk aversion, occurring during a bear market (Coates et al., 2010). This means men suffer from irrational optimism and tend to undertake dangerous levels of risk under periods of growth and increasing prices while they suffer from irrational pessimism under periods of uncertainty and economic decline, impairing their ability to effectively allocate risk capital. For Coates et al. (2010), the markets may become more stabilized if there were more women and older men than young men. More alarmingly, Nelson (2012) concluded that the masculine culture developed in business and finance had denigrated proper caution and care, and is partly to blame for the global financial crisis.

In another context, Unite et al. (2015) showed that, in the Philippines, while male corporate executive officers (CEOs) are more well-off (i.e. they have longer tenures, better relationships with the firm owners, larger firm ownership, and higher book value in total assets of the firm compared to females), their performance trailed behind the female CEOs based on the return on assets.

So, why is there a larger proportion of men in trading floors? Indeed, trading is considered a male-dominated occupation. The Commission on Banking Standard and Christine Lagarde of the International Monetary Fund had noted the disparity present in many countries (Cooper, 2013). For example, trading floors in the United States are swamped with male traders while women are few and far in between. Likewise, men own more than half of the accounts in the Philippine Stock Exchange.

We attempt to shed more light on this gender discrepancy through the use of a two-staged experiment. With an experiment, we are able to assess the direct effects without other factors unknowingly influencing our results (i.e. our data would be exogenous). The first stage assesses our participants risk parameters under gains and losses while the second stage simulates the stock market. Our objectives are to evaluate the correlation between the disposition effect, and belief in mean reversion and asymmetric risk attitudes, and to determine the influence of gender identities on the disposition effect.

2. LITERATURE REVIEW

Shefrin and Statman (1985) were the first to formally analyze the disposition effect, a term they themselves coined. Their theoretical framework uses a model with four major elements that provide distinct contributions to their analysis: namely, mental accounting, prospect theory, self control, and regret aversion.

Soon after, using real-life data from U.S. stock trading, Lakonishok and Smidt (1986) discovered that not only is abnormal turnover positively correlated with past price changes (consistent with the disposition effect), it also exhibits a seasonality. In fact, December seemed to hold a correlation that is practically nonexistent which the authors attributed to tax-related trading at the end of the year.

Weber and Camerer (1998) later offered another explanation for the disposition effect (as supported by Shu et al. (2005)). It states that the effect can be driven by an irrational belief of mean-reverting stock prices. Whether stock prices mean-revert or not, people believe they do and thus, after a price increase, an investor will irrationally believe that the price will eventually drop or at least, that the probability of it happening is much higher, and vice versa.

Building up on the work of Kroll et al. (1988), Weber and Camerer (1998) had used an experimental design where participants make portfolio decisions. They were allowed to either buy or sell six risky assets before each period. There were 14 periods whose prices were based on a probability distribution, and not on the participants' actions so that they may isolate the disposition effect. The six shares had different

probabilities (i.e., 65%, 50%, 45% and 35% for one asset each, and 55% for two assets). The participants knew the probabilities, but did not know where each probability was assigned to.

A share that had risen the most frequently was most likely assigned the 65% probability which makes it a share that a Bayesian agent would want to hold onto. Likewise, a share that has fallen the most times is most likely the share with the 35% probability, making it a share that a Bayesian agent would want to sell as quickly as possible. Therefore, the disposition effect is a clear mistake, and participants who exhibit it are behaving irrationally.

Many studies have extended, replicated or mimicked Weber and Camerer's (1998) experimental design (e.g. Da Costa et al. (2013); Jiao (2015); Goulart et al. (2013)). From these studies, they found that disposition effects were exhibited mostly by participants who felt responsible for their failures (Chui, 2007), participants who bought the shares themselves (Summers & Duxbury, 2012), male participants (Da Costa et al., 2013), and two-participant teams (Rau, 2015).

Research in other parts of the world also offer their own insights. In Israel, Shapira and Venezia (2001) found that professional investors showcase a lower degree of disposition effect as compared to amateur investors, indicating that counsel from professionals with training and experience could lessen their bias. In Finland, Grinblatt & Keloharju (2001) conclude that an individual's life cycle also accounts for disposition effect in trading. In the Australia, Brown et al. (2003) argue that there are three important characteristics of the disposition effect exhibited in their stock market: (a) the degree of disposition effect slowly decreases throughout time, (b) individuals with bigger investments showcase less disposition effect, and (c) experience with the same stock also acts as a basis for the level of disposition effect exhibited. In addition, the Karachi stock exchange showed disposition effect is evident because of transaction costs while regret avoidance was shown to be insignificant (Ashraf et al., 2014).

3. FRAMEWORK

3.1 Bayes' Theorem

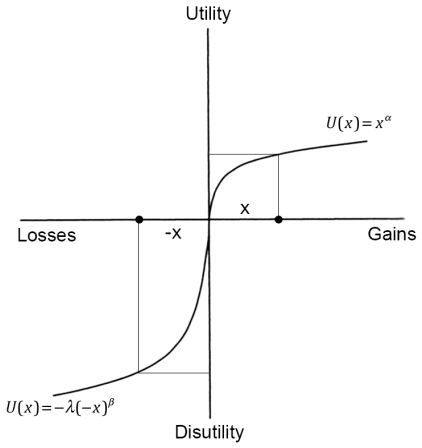
Traditional economics assume that individuals think rationally when making decisions. With this principle, we can predict the choices of decision-makers since they are inclined to make logical decisions given any circumstance. In investment decisions, a rational investor would assign probabilities to the value of each risky asset where he chooses the one with the highest expected returns. Likewise, individuals can predict the movement of stock prices and describe a probability of an event occurring based on situations that might be associated with it.

3.2 Prospect Theory

Kahneman and Tversky (1979) developed the prospect theory wherein they showed that individuals observe different valuations on gains and losses. In contrast to the expected utility theory, the prospect theory utility function is not defined on an individual's wealth level but is derived from gains and losses relative to a reference point. An individual's utility function follows an S-shaped curve (see Figure 1) where it is concave in the gain domain while convex in the loss domain. This implies that an individual is risk averse when he is gaining while risk seeking when he is losing. Because of this, they put more valuation and weight to a loss rather than a gain of the same amount.

Since individuals have asymmetric risk attitudes, realizing gains and losses can become disproportionate. Looking at the graph in Figure 1, when an investor encounters an X amount of paper loss in his stocks, the disutility he could derive from realizing that loss is greater than the utility he can derive from a gain of the same amount. Because of this disproportionately large disutility from the loss, the investor will risk the paper loss by holding onto losing stocks in an attempt to realize a smaller loss. Conversely, when he faces a paper gain, his risk aversion prompts him to sell the stock immediately in order to secure the gain. This theoretical mechanism is consistent with the disposition effect and hence, affirming the possible correlation of the dual risk attitudes of prospect theory towards the existence of the disposition effect.

Figure 1. Prospect Theory Utility Function



Source: *Tversky et al. (1979)*

3.3 Belief in Mean Reversion

Other than the preference-based approach of prospect theory, belief-based theories such as belief in mean reversion are also seen as potential determinants of the disposition

effect. Poterba and Summers (1987) show that stock returns are positively correlated in the short run but are negatively correlated over long horizons. This implies that asset prices fluctuate around its mean, but may eventually divert towards its average price in the long run. However, recent studies found no strong evidence of mean reversion and whether it will continue in the future (Blythe, 2012; Mayost, 2012). Whether mean reverting asset prices truly holds or not, the belief in mean reversion influences investment behavior and decision-making.

3.4 Gender and Investment Behavior

Pandey (2014) and Deo and Sundar (2015) showed that there indeed exists a significant difference between the behavior of males and females. Males take on riskier activities while females have less tolerance for uncertainty, making them more risk averse. Similarly, Bogan et al. (2013) observed in a group investing experiment that dominantly male teams exhibit more loss aversion, which is coupled with more risk seeking when losing, as compared to all female or mixed groups.

Bem (1983) proposed a related theory indicating gender differences in behavior and decision-making. Gender schema theory suggests that individuals as they grow adapt to their respective gender roles in their culture and environment and eventually behave according to what constitutes being "male" or "female". The mental schemas they have developed influence their response to new information and behavior. Since gender has a potential role in affecting investing behavior, gender identities can be elicited and magnified through priming (Thaler & Sunstein, 2008). This technique is used in social psychology to increase the ease of processing information associated with the stimulus that nudges a person to exhibit a certain behavior.

4. METHODOLOGY

We facilitated our experiment through individual computer interfaces, and explained the proceedings with an instructional video. To test the significance of masculinity and femininity with regards to its effect on the degree of the disposition effect, we administered the priming method by Banaji et al. (2005) wherein a picture is attached on the participant's desk and kept there for the entire duration in order to draw out their masculinity or femininity. Pictures were selected from books and magazines, half of which are associated with each gender. After this, participants were asked to state their thoughts on the pictures.

We divided them into six treatment groups based on whether they were grouped with the same gender or a mixture of the two, and on whether they were primed or not. This amounts to six treatment groups, namely a group of all female primed participants, all male primed participants, female and male (mixed) primed participants, all female non-primed participants, all male non-primed participants, and female and male (mixed) non-primed participants.

Our experiment is composed of two stages where each stage is done in the domain of gains and losses. We followed Jiao's (2015) experimental design where the first stage is similar to the experiment of Abdellaoui et al. (2008) and the second stage is based on Weber and Camerer (1998). For the first stage, our goal is to assess the risk attitudes of the participants so we asked them to choose between a risky outcome (lottery) and a risk-free outcome (certainty amount). Although the elicitation procedure is not directly estimated, it was arranged so that we can implement nonlinear probability weighting by keeping the probabilities fixed. The experiment used Experimental Currency (EC) as the monetary unit, wherein 1000EC = 50 PHP. The first question asked the participant which option he or she prefers. If the participant picks the risk-free option, the succeeding question offered an equivalent lottery but with less certainty amount. Thus, the payoffs are changed depending on his or her previous answer.

Through this, we are able to draw out their certainty equivalent. For both domains, six lotteries are presented along with five risk-free values of changing certainty equivalents. An example is given below:

Which do you prefer?
A. Getting 2000 EC with a probability of 2/3 or 0 EC with a probability of 1/3.
B. Getting 1330 for sure.

In the second stage, the participants are randomly assigned to three conditions: PREDICT, SELL, and BOTH. In the condition PREDICT, they were shown 10 periods of stock price fluctuations. They monitored the price sequence and predicted the probability that the price will increase or decrease in the 11th period. They are rewarded based on the quadratic scoring rule (QSR), an incentive compatible mechanism to elicit beliefs, which takes the accuracy of their prediction into account. Given that the participant's prediction of the probability of the price movement is b, the reward would be:

$$Q(b)=\begin{cases} m+2n(b)-n[b^2+(1-b)^2], & \text{if price increases in the 11th period} \\ m+2n(1-b)-n[b^2+(1-b)^2], & \text{if price decreases in the 11th period} \end{cases} \quad (1)$$

where m and n are both 2000 so the maximum reward is 4000 EC and the minimum is 0 EC. They were provided a table, named Prediction Reward Determination to help them understand QSR. In the condition SELL, each participant was endowed with 10 shares per asset. They indicated a number of shares to sell after 10 periods. The remaining unsold shares will be automatically sold at the 11th period given its predetermined price. The condition BOTH has the condition PREDICT and SELL, where the sequence of these two activities is random.

The initial prices of the assets are normalized to 10,000 EC where the price movements in each period depend on two occurring states: GREEN and RED. For these two states, the probabilities of the price going up are 67% and 33% respectively. There are 25 price sequences with their orders generated randomly. Each sequence is presented on a chart, which has 10 periods of independently predetermined prices.

The price change magnitude (1000 EC) was constant across all periods. This will eliminate the probability of the price exceeding the initial price in a certain time frame. Therefore, asymmetric risk attitude is the only factor that could cause disposition effect, making loss aversion irrelevant in this paper.

The experiment was conducted in three sessions where one-third of the participants are in the condition PREDICT, one-third in the condition SELL, and one-third in the condition BOTH. However, in the condition BOTH, the two decisions might have some cross-effects when asked simultaneously that make the results uncertain. When the participants hold the asset, there would be biased beliefs in the more desirable direction (Mayraz, 2011). To avoid this, the order of the decisions is randomized. Comparing the conditions PREDICT and BOTH can help us determine whether gambling with their given experimental currency would lead to less belief bias, while comparing conditions SELL and BOTH can help us determine if explicitly reporting their predictions would lead to less disposition effect.

We did not let the participants make buying decisions to simplify the reference point, which is the initial price. This also simplifies the activity to selling and holding, which eliminates self-justification. The initial position is not selected so this is independent from the participant's skill in winning and/or losing.

After the experiment, the participants are given an exit survey on their demographic information and experience in the experiment, and another survey called Bem Sex-Role Inventory for us to elicit the degree of the participants' masculinity/femininity.

Their reward was determined by both their responses and luck. For the first stage, one of the 30 questions for each domain of gains and losses was randomly chosen and the participants were rewarded according to their answers in the selected questions. If in a particular question, a participant had chosen the certain outcome B, he will be rewarded with the same amount, accordingly. However, if he chose the risky option A, he will roll a die to determine his payoff. For instance, in the sample question, if the die lands on a 1 or 2 (approximately 33%), he will receive 2000 EC; if the die lands otherwise, he will get nothing. His losses in the second part will be deducted to his gains. For stage two, one of the price sequences is randomly selected (through draw lots from a bowl of papers) to determine the reward in predicting or selling the asset, which the participant had decided on. Once a participant finishes a session, he will be given the sum of the rewards earned in stage 1 and 2 where the accumulated experimental currency can be converted to its equivalent in pesos. The maximum reward for this experiment is P194 and the minimum is P-100. Each participant was also be given a show up fee of P50 aside from the reward they have received.

We gathered 120 De La Salle University students taking economics, finance and/or business undergraduate courses by randomly asking students around the campus if they are willing to participate in our experiment. There were two sessions per experimental group with 10 persons each. Each session lasted for approximately 45 minutes and was held in Henry Sy Sr. Hall Library.

5. RESULTS AND DISCUSSION

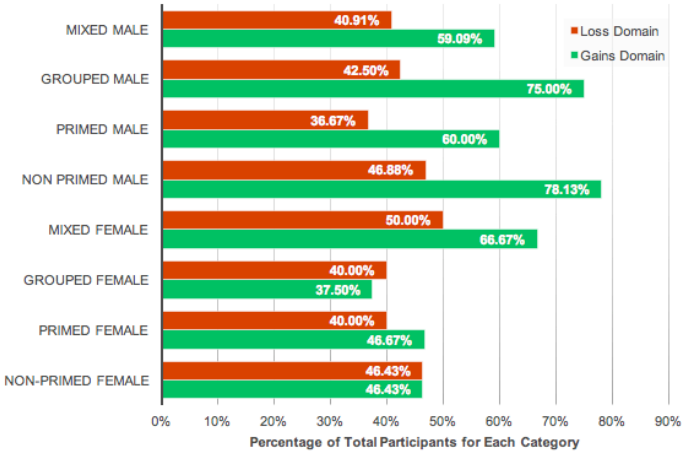
5.1 Descriptive Analysis

Through our experiment, we were able to identify risk-seeking and optimistic behavior across the different treatment groups, domains and conditions. We found that there is an overall larger proportion of men, unprimed participants, and participants who were grouped with both genders exhibiting risk-seeking behavior compared to to their treatment counterparts. However, if we dissect their aggregate behavior based on domains, we are presented with a few contrasting but insignificant differences: a greater proportion of females, and primed individuals were risk-seeking in the domain of losses.

Notably, a significantly greater proportion of men were risk-seeking in the domain of gains. And, in this domain, their proportion far outweighed female participants. More men were willing to take in risks for higher rewards while more women were more willing to take in risks for smaller losses. This may mean that men place greater importance on profits while women are more focused on reducing losses.

When we analyze the treatment groups by their gender and domain, we found that the proportion of risk-seeking women were almost on-level for the two domains while the proportion for men were unsurprisingly more risk-seeking in the gains domain (see Figure 2). The obvious exception were the females who were grouped alongside men. In fact, these women exhibited behavior similar to their male counterpart. This begs the questions, "Does the mere presence of men cause more women to take in risk?" Looking at how the male participants fared when grouped alongside females, men were still more risk-seeking in gains. However, a greater proportion of men were risk-seeking in gains when surrounded by only men. Their appetite in the losses domain remained relatively constant. One possible explanation would be that men become more competitive around each other and thus, try to obtain higher profits by taking in more risk.

Figure 2. Risk-Seeking Behavior Across Gender and Domains



Source: *Authors' Calculations.* Note: A risk-seeing participant is one that has chosen a greater number of risky options compared to risk-free options.

When it came to priming, while it had little effect on women (reducing their risk appetite for losses by a small margin), it had a large effect on men in an unexpected manner. Fewer male participants exhibited risk-seeking behavior in both domains when primed for masculinity. We speculated whether the priming had an opposite effect on men and indeed, primed males had an average BEM score of 2.3667 which is more feminine compared to the -0.0313 score of their unprimed counterpart. Primed for femininity, more men were less inclined to take in risks for either domain.

Table 1. Optimistic Behavior Across Conditions

	Category	Predict Only Condition			Both Condition⁺		
		Mean	Percentage	Number	Mean	Percentage	Number
Treatment 1	Female	0.51	63.00%	10/16	0.53	67.00%	16/24
	Male	0.49	52.00%	11/21	0.54	67.00%⁺	16/24
Treatment 2	Non-primed	0.49	61.00%	11/18	0.53	54.00%	13/24
	Primed	0.50	47.00%	9/19	0.55	75.00%⁻	18/24
Treatment 3	Group	0.49	56.00%	5/27	0.55	57.00%	17/30
	Mix	0.52	60.00%	6/10	0.53	78.00%⁺	14/18
	Category	Sell Only Condition			Both Condition		
		Mean	Percentage	Number	Mean	Percentage	Number
Treatment 1	Female	4.6	44.00%	8/18	5.25	58.00%⁻	14/24
	Male	4.97	53.00%	9/17	5.02	50.00%	12/24
Treatment 2	Non-primed	5.13	55.56%*	10/18	5.18	58.00%	14/24
	Primed	4.41	41.00%	7/17	5.08	46.00%⁻	11/24
Treatment 3	Group	4.86	52.00%	12/23	5.17	53.00%	16/30
	Mix	4.63	42.00%	5/12	5.08	56.00%⁻	10/18

Source: *Authors' Calculations.* Note: An average optimistic participant is one whose average prediction is over 0.50, and/or average selling decision is over five shares. Number corresponds to the number of average optimistic participants to total participants for each category. An asterisk (cross) or dash means that it is significantly greaten than its categorical (condition) counterpart.

As summarized in Table 1, we found that participants under the both condition gave higher predictions and sold more shares on average across all treatment groups. This may mean that when asked to simultaneously predict the chance of a price increase and sell a number of shares, participants became more optimistic. Similarly, proportions of optimistic individuals were greater in the both condition for most of the treatment groups. The difference is significant for individuals grouped with both genders. For men, it is significant only when predicting while for women and primed participants, it is only significant when selling shares. In the sell and predict only conditions, we found that while females gave more optimistic predictions than men, they sold fewer shares.

5.2 Complex Analysis

Table 2 presents the series of regressions employed in the decision level analysis. We use negative binomial regression in estimating the coefficients since our dependent variable *selling* is a count variable taking integer values from 0 to 10. Regressions (1) and (3) report the results in the domain of gains while regressions (2) and (4) are in the domain of losses.

Table 2. Negative Binomial Regression Results at the Decision Level

Independent Variable	(1)	(2)	(3)	(4)
GainSize	-0.0166 (0.0252)			
LossSize		0.0155 (0.0204)		
SRM	0.2142 (0.2416)	-0.1159 (0.2068)		
Alpha			-0.9631 (1.2287)	
Beta				0.1866** (0.1065)
Constant	1.7404*** (0.1445)	1.5227*** (0.1179)	2.5505** (1.1982)	1.4611*** (0.0858)
Dispersion Coefficient	0.1680	0.3048	0.3166	0.3186

Source: *Authors' Calculations.* Note: The independent variable is *selling,* which pertains to the number of shares a participant has sold at the 10th period price after observing the price sequence. Clustered standard errors (in parenthesis) are reported in the table along with the coefficients and their respective significance level (***p-value<0.01, **p-value<0.05, and *p-value<0.10).

Our first hypothesis linking the belief in mean reversion and the disposition effect can be explained in regressions (1) and (2) in Table 3. Based on the regression results, belief in mean reversion does not explain the prevalence of the disposition effect since SRM is reported to be insignificant, at least in this sample. Moreover, this is almost expected since SRM is significantly positive (p-value<0.05) indicating significant absence of belief in mean reversion. With its absence, it is evident that its explanatory power cannot be tested nor dismissed, although the disposition effect existed in the sample.

Regressions (3) and (4) show the results for our second hypothesis. In the domains of gains, the risk parameter alpha, although reported as insignificant, reveals a negative sign that is consistent with our theoretical predictions indicating that more risk-averse individuals sell more shares when facing gains in order to secure real profits. On the other hand, the risk parameter beta is also consistent with our theoretical predictions with a significant positive coefficient suggesting that more risk averse individuals tend to sell more shares when facing losses or similarly, more risk seeking individuals sell less or hold losing shares in order to avoid realizing paper losses.

With these results, we can interpret that individuals tend to exhibit the disposition effect, as they become more risk seeking when facing paper losses. As for the insignificance of the risk parameter alpha, it could be the case that the participants have high tolerance for securing gains than avoiding losses.

Table 3. OLS Regression Results on Treatment Groups

Independent Variable	(1)	(2)
Male	-0.1065	-0.1045
	(0.0765)	(0.1099)
Prime	0.0028	0.0187
	(0.0754)	(0.0996)
Group	-0.0629	-0.0553
	(0.0810)	(0.0785)
MalexPrime		0.0019
		(0.1550)
MalexBEM		-0.0078*
		(0.0042)
Constant	0.1588*	0.1456
	(0.0923)	(0.1010)
R-squared	0.0317	0.0680

Source: *Authors' Calculations.* Note: The independent variable is *PGR-PLR,* which is computed by the percentage of paper gains realized minus the percentage of paper losses realized. Robust standard errors (in parenthesis) are reported in the table along with the coefficients and their respective significance level (***p-value<0.01, **p-value<0.05, and *p-value<0.10)

To examine how our treatment variables affect the disposition effect, we run an ordinary least squares regression with PGR-PLR as our independent variable to account for individual-level disposition effect. While the the demographic and treatment variables remain insignificant in explaining disposition effect as shown in regression (1), the interaction variable of gender and gender identity came out significant at 10 percent level of significance. The signs indicate that males that are more masculine (lower BEM score) tend to exhibit a higher degree of the disposition effect.

Our results show that being male or gender in itself cannot determine biasness towards this irrational behavior, but being male with higher masculine identity creates a significant impact on exhibiting the disposition effect.

6. CONCLUSION AND RECOMMENDATION

The primary goal of this experiment is to determine whether asymmetric risk attitude and belief in mean reversion are correlated with the exhibition of the disposition effect while considering the influence that gender identities have on choice behavior.

Results of the experiment suggests that different levels of masculinity and femininity bring different types of trading behaviors. Given that masculine males exhibit a significantly greater degree of disposition effects and are more risk-seeking, it is recommended that different financial entities such as broker-dealers hire more females for better financial resiliency. In addition, it is important that they take note of the male presence as it instigates riskier behavior in both genders. Companies may opt to prime their traders for femininity if they wish to lessen excessive risk taking. They may do so through the use of pictures.

We recognize that our paper is quite limited, and thus recommend further research that obtains a more realistic sample data of practicing trading professionals. In doing so, our findings may be affirmed or discredited with further evidence. Through this, more grounded and sound recommendations for firms may be generated. Moreover, we suggest that future studies consider the effects of the aggregate belief in market direction (or *market sentiment*) on the disposition effect. Similar studies parallel to this study may also consider whether or not investors' expectation on the uncertainty of the market contribute to irrational trading behavior (or *implied market volatility*). Lastly, we suggest that future experiments look at interaction amongst participants to assess herding behavior. This may also lead to a greater influence on participants' trading behavior with respect to the impact gender and gender identities in each treatment group.

Given the goal of our study, it is still uncertain the belief in mean reversion and/or asymmetric risk attitudes can explain the disposition effect, although risk attitudes in losses

is statistically significant. Our findings on gender identities, on the other hand, tells us that masculinity in males induces greater exhibition of the disposition effect, and their presence affects the decision-making of surrounding traders. We can confirm that differences in trading go beyond the simple duality as men can exhibit feminine traits, and vice versa. We hope that our study may pave the way for further research on gender identities, trading behavior and the disposition effect.

7. REFERENCES

Abdellaoui, M., Bleichrodt, H., & L'haridon, O. (2008). A Tractable Method to Measure Utility and Loss Aversion under Prospect Theory. *PsycEXTRA Dataset*. doi:10.1037/e722852011-018

Ashraf, M., Walis, F., & Saheed, S. (2014). Disposition Effect: evidence from the Karachi stock exchange. *European Journal of Business and Management, 6*(11), 19-24.

Banaji, M. R., Lemm, K. M., & Carpenter, S. J. (2001). The social unconscious. In M. Hewstone & M. Brewer (Series Eds.) & A. Tesser & N. Schwartz (Vol. Eds.), Blackwell handbook of social psychology: Vol. 1. Intraindividual processes (pp. 134–158). Oxford, UK: Blackwell.

Banaji, M. R., Lemm, K. M., & Dabady, M. (2005). Gender Picture Priming: It Works With Denotative and Connotative Primes. Social Cognition, 23(3), 218-241.

Barber B, M. Lee, Y.T., Liu, Y J, Odean T (2009) Just how much do individual investors lose by trading? Rev. Financ. Stud 22(2): 609–632. doi:10.1093/rfs/ hhn046.

Barber, B. M., & Odean, T. (2001). Boys will be Boys: Gender, Overconfidence, and Common Stock Investment. The Quarterly Journal of Economics, 116(1), 261-292. doi:10.1162/003355301556400

Barberis, N., & Xiong, W. (2006). What Drives the Disposition Effect? An Analysis of a Long-Standing Preference-Based Explanation. Retrieved February 29, 2016, from https://www.princeton.edu/~wxiong/papers/disposition.pdf.

Brown, P. R., Chappel, N., Rosa, R. D., & Walter, T. S. (2003). The Reach of the Disposition Effect: Large Sample Evidence Across Investor Classes. SSRN Electronic Journal SSRN Journal, 1-32. Retrieved March 2, 2016, from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=302655

Chui, P. (2001). An Experimental Study of the Disposition Effect: Evidence from Macau. Journal of Psychology and Financial Markets, 2(4), 216-222.

Coates, J. M., & Herbert, J. (2008). Endogenous steroids and financial risk taking on a London trading floor. Proceedings of the National Academy of Sciences, 105(16), 6167-6172. doi:10.1073/pnas.0704025105

Cooper, R. (2013). Banking Commission: Trading floors 'need more women'. Retrieved from The Telegraph website: http://www.telegraph.co.uk/women/womens-business/10129368/Banking-Commission-Trading-floors-need-more-women.html

Da Costa Jr, N., M. Goulart, C. Cupertino, J. Macedo, and S. Da Silva (2013). The disposition effect and investor experience. Journal of Banking and Finance 37, 1669–1675.

D'Acunto, F. (2015). Identity, Overconfidence, and Investment Decisions. SSRN Electronic Journal. doi:10.2139/ssrn.2641182

Frazzini, A. (2006). The Disposition Effect and Underreaction to News. The Journal of Finance, 61(4), 2017-2046. Retrieved March 4, 2016, from http://www.econ.yale.edu/~af227/pdf/The Disposition Effect and Underreaction to news - Frazzini.pdf

Goulart, M., N. Da Costa Jr, A. Santos, E. Takase, and S. Da Silva (2013). Psychophysiological correlates of the disposition effect

Grinblatt, M., & Keloharju, M. (2001). What Makes Investors Trade? Journal of Finance, 56, 589-616.

Jiao, P. (2015). Belief in Mean Reversion and the Disposition Effect: An Experimental Test. Retrieved February 28, 2016, from http://www.cgu.edu/PDFFiles/SPE/Behavior Econ Seminars/2013/Belief in Mean Reversion_Oct28.pdf

Tversky, A., & Kahneman, D. (1974). Judgment under Uncertainty: Heuristics and Biases. Science, 185(4157), 1124-1131. doi:10.1126/science.185.4157.1124

Kahneman, D., & Tversky, A. (1979). Prospect Theory: An Analysis of Decision under Risk. Econometrica, 47(2), 263. Retrieved from March 2, 2016 http://pages.uoregon.edu/harbaugh/Readings/GBE/Risk/Kahneman 1979 E, Prospect Theory.pdf

Kaustia, M. (2011). Disposition Effect. Investors, Corporations, and Markets Behavioral Finance, 169-189. Retrieved March 4, 2016, from finance.aalto.fi/en/people/kaustia/disposition_effect.pdf.

Kroll, Y., Levy, H., & Rapoport, A. (1988). Experimental tests of the mean-variance model for portfolio selection. *Organizational Behavior and Human Decision Processes, 42*(3), 388-410. doi:10.1016/0749-5978(88)90007-6

Lakonishok, J., & Smidt, S. (1986). Volume for Winners and Losers: Taxation and Other Motives for Stock Trading. *The Journal of Finance, 41*(4), 951-974. doi:10.1111/j.1540-6261.1986.tb04559.

Lewellen, W.G., Lease, R.C., Schlarbaum, G.G. (1977) Patterns of investment strategy and behavior among individual investors. The Journal of Business 50(3): 296–333. Available: http://www.jstor.org/stable/2352539

Mayraz, G. (2011). Wishful Thinking. *SSRN Electronic Journal SSRN Journal*. doi:10.2139/ssrn.1955644

Nelson, J. A. (n.d.). Would Women Leaders Have Prevented the Global Financial Crisis? Implications for Teaching About Gender and Economics. SSRN Electronic Journal. doi:10.2139/ssrn.1961722

Niederle, M., & Vesterlund, L. (2007). Do Women Shy Away From Competition? Do Men Compete Too Much? *The Quarterly Journal of Economics, 122*(3), 1067-1101. doi:10.1162/qjec.122.3.1067

Odean, T. (1998). Are Investors Reluctant to Realize Their Losses? SSRN Electronic Journal SSRN Journal. Retrieved March 4, 2016, from https://faculty.haas.berkeley.edu/odean/Papers current versions/AreInvestorsReluctant.pdf.

Rau, H. A. (2014). The disposition effect and loss aversion: Do gender differences matter? Economics Letters 123.

Shapira, Z., & Venezia, I. (2001). Patterns of Behavior of Professionally Managed and Independent Investors. Journal of Banking and Finance, 25(8), 1573-1587.

Shefrin, H., & Statman, M. (1985). The Disposition to Sell Winners Too Early and Ride Losers Too Long: Theory and Evidence. The Journal of Finance, 40(3), 777-790. doi:10.1111/j.1540-6261.1985.tb05002.x

Shu, P. G., Yeh, Y., Chiu, S., & Chen, H. (2005). Are Taiwanese individual investors reluctant to realize their losses? Pacific Basin Finance Journal, 25(2), 201-223.

Summers, B. and D. Duxbury (2012). Decision-dependent emotions and behavioral anomalies. Organizational Behavior and Human Decision Processes 118, 226–238.

Talsepp, T., Vlcek, M., & Wang, M. (2014). Speculating in gains, waiting in losses: A closer look at the disposition effect. Journal of Behavioral and Experimental Finance, 2, 31-43. Retrieved March 4, 2016, from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1101627

Unite, A., Sullivan, M., & Shi, A. (2015). Women on Top: Diversity in Gender and Education Profiles of Top Management and Board of Directors of Philippine Publicly Traded Firms*. 1-102. Retrieved April 6, 2016.

Weber, M., & Camerer, C. F. (1998). The disposition effect in securities trading: an experimental analysis. Journal of Economic Behavior & Organization, 33(2), 167-184. doi:10.1016/s0167-2681(97)00089-9

Zhang, J., Wang, H., Wang, L., & Liu, S. (2014). Is There Any Overtrading in Stock Markets? The Moderating Role of Big Five Personality Traits and Gender in a Unilateral Trend Stock Market. PLoS ONE, 9(1). Retrieved March 24, 2016, from http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0087111