



The disposition effect and loss aversion: Do gender differences matter?

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HIGHLIGHTS

- Analysis of Gender Differences in the Disposition effects in a controlled experiment.
- Male and female investors both sell more capital gains than capital losses.
- Women have higher disposition effects than men and behave more loss averse.
- The disposition effect is exclusively driven by women's reluctance to sell capital losses.

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ABSTRACT

This paper analyzes gender differences in the disposition effect in an experiment based on Weber and Camerer (1998). The results emphasize that female investors realize less capital losses, have significantly higher disposition effects and are more loss averse than men.

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1. Introduction

The financial-services industry is one of the most male-dominated branches, e.g., in 2009 the Wall Street involved 73% male traders (Alba and Pereira, 2011). A debate has started whether more women should work as traders because they are supposed to behave more risk-averse, follow less aggressive investments and thus may stabilize markets (e.g., Ziegler, 2012).

The Economic literature only partially gives answer to this recommendation because gender differences are rarely studied in Behavioral-Finance Experiments.¹ Eckel and Füllbrunn (2013) is an

exception. Here, female traders cause weaker price bubbles than men. The literature on individual decision making finds some well-established findings suggesting a positive impact of women, i.e., they behave more risk averse (Holt and Laury, 2002; Sutter and Rützler, 2010; Booth and Nolen, 2012) and trade less frequently (Barber and Odean, 2001). However, women are also found to be more loss averse than men (Schmidt and Traub, 2002; Gächter et al., 2007; Rieger et al., 2011).

This paper builds on the latter finding which may lead to a negative impact on the disposition effect. If women are more loss averse it can be hypothesized that they may be prone to higher disposition effects because loss aversion may hinder subjects to realize capital losses. The disposition effect is a phenomenon where investors tend to sell capital gains and are reluctant to realize capital losses (Shefrin and Statman, 1985). There is evidence on the collective level for private investors (Ferris et al., 1988) and for professionals (Garvey and Murphy, 2004).

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¹ For a summary on gender differences in individual decision making see Croson and Gneezy (2009).

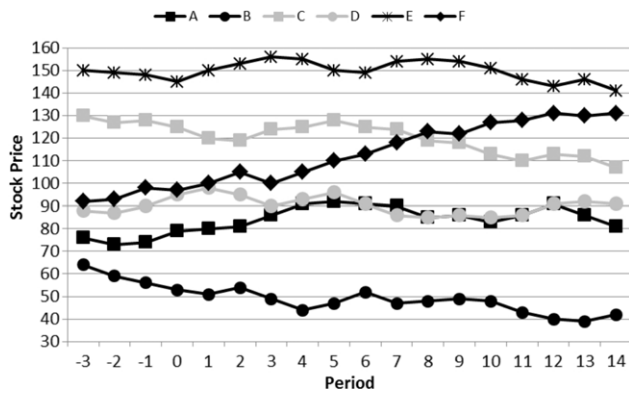


Fig. 1. Price movements of stocks A–F in periods –3–14.

The paper studies gender differences in disposition effects and loss aversion in an experiment based on Weber and Camerer (1998). Similar is Da Costa et al. (2008) who find that men sell more frequently after stock price increases.² The data of the current paper shows that women realize less capital losses which leads to significantly higher disposition effects than men. The finding can be explained by differences in loss aversion.

2. Experimental design

The experiment applies Weber and Camerer's (1998) framework where subjects can decide on portfolio choices between six risky assets (A, B, C, D, E and F).³ All asset prices of each period were predetermined in two stages before the experiment started.⁴

Stage 1: determination of the price movement.

A random process with fixed probabilities determined whether the price of each asset would increase (decrease). Subjects were told that exactly one asset followed one of the types: “++”, “+”, “--”, “-”. The chances of an increase were: 65%, 55%, 45%, 35%. The two remaining assets of the “0”-type increased by a chance of 50%.⁵ The probability of a price decrease was always one minus the chance of an increase.

Stage 2: determination of the price magnitude.

In each period this stage randomly determined the magnitude of the stock price change. With a probability of one third it was either: 1, 3 or 5. To get familiar with the stock types subjects were informed about prior stock prices in periods: –3, –2, –1, and 0. Fig. 1 illustrates stocks' price movements.⁶

Experimental procedures.

Subjects were endowed with 10,000 Talers⁷ which could be used for trading actions in periods 1–13. In period 14 subjects' portfolio was liquidated and they received its value. To control whether subjects correctly assessed the stock types they were asked to

guess the stock types after periods 7 and 14.⁸ Finally, they had to complete a short survey.⁹

The experiment was programmed in z-Tree (Fischbacher, 2007). Three sessions were conducted with a total of 55 students in May 2011 at the University of Duesseldorf.¹⁰ Subjects were recruited with ORSEE (Greiner, 2004) and earned on average 15.89 Euros.

3. Results

This section reports disposition effects determined with the methods of Odean (1998) and Weber and Camerer (1998). Subsequently, subjects' loss aversion is analyzed. All statistical tests involve two-sided *p*-values if not otherwise stated.

On average women buy significantly less stocks (120) than men (187) (Mann–Whitney test, *p* = 0.001) which confirms Charness and Gneezy (2011) and indicates that women invest more risk averse.

Men sell a higher fraction of capital gains (57%) than capital losses (43%) (Wilcoxon matched-pairs test, *p*-value = 0.097). The effect is more pronounced for women who sell 67% capital gains and 33% capital losses (Wilcoxon matched-pairs test, *p*-value = 0.002).¹¹

Result 1. Men and women sell a higher fraction of gain stocks than loss stocks. The effect is more pronounced for female investors.

Following Odean (1998) disposition effects are calculated based on the “Proportion of Gains Realized” (*PGR*) and “Proportion of Losses Realized” (*PLR*). The study focuses on individual disposition effects which is in contrast to Odean who analyzes aggregate disposition effects. For each subject the total number of realized gains (losses) is counted and divided by the total number of “Paper Gains” (“Paper Losses”). A stock is a Paper Gain (Paper Loss) whenever the selling price was at least as high (below) the purchase price. A sell is a gain when the price was at least as high as the purchase price. Stocks which were sold below their purchase price are defined as losses.¹² It can be defined as:

Proportion of Gains Realized (*PGR*)

$$= \frac{\text{Realized Gains}}{\text{Realized Gains} + \text{Paper Gains}} \quad (1)$$

Proportion of Losses Realized (*PLR*)

$$= \frac{\text{Realized Losses}}{\text{Realized Losses} + \text{Paper Losses}} \quad (2)$$

where “Realized Gains” (“Realized Losses”) are the aggregate number of stocks in the portfolio sold as gains (losses). The disposition effect (*DE*) is defined as: $DE = PGR - PLR$.¹³ It can attain values

⁸ The guess score is calculated as a measure of fit between the best estimate and a subject's guess. I used the same coding as Weber and Camerer (1998) where: ++ = 2, + = 1, 0 = 0, – = –1, – = –2. The guess score is the sum of all absolute differences where 0 (12) is the best (worst) estimate.

⁹ Before the experiment started, subjects' degree of loss aversion was elicited with the method of Gächter et al. (2007).

¹⁰ The data of these sessions also serve as control treatment in an experiment on the disposition effect of teams in Rau (2013).

¹¹ When not conditioned on gender subjects sell 62% capital gains and 38% capital losses. This confirms Weber and Camerer (1998) who find that 64% capital gains and 36% capital losses are sold.

¹² To account whether sells were capital gains/losses the Last-In-First-Out (LIFO) principle was used.

¹³ The study follows Weber and Welfens (2007) who calculate individual disposition effects for each investor separately.

² In contrast to this paper, the authors do not determine the disposition effects based on the proportion of gains/losses and do not relate it to the individual loss aversion. The paper is discussed in the conclusion.

³ The assets were labeled with the neutral German word “Anteile” meaning “shares”.

⁴ Subjects could not influence the stock prices with their trading actions.

⁵ Subjects were not told the exact type of an asset.

⁶ The stocks followed these types: A = ++; B = –; C = ––; D = 0; E = 0; F = ++.

⁷ The profits were converted at an exchange rate of 0.001€/Taler(s).

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