An Experimental Study of Influences of Performance-Related Payments on Timing of Delegated Stock Purchases

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Highlights

• Performance-related payments (bonuses) are important tools for investment organizations to incentivize their employed traders

• Traders may generally prefer short-term to long-term bonuses

• Results show that short-term bonuses increase and long-term bonuses decrease too early timing of stock purchases leading to worse performance
Abstract

Performance-related bonuses are important tools for investment organizations to incentivize stock traders. Yet, two experiments indicate that bonuses rewarding short-term performance may lead to worse timing of purchases. We propose that hyperbolic time discounting make participants set lower aspired purchase prices for short-term (decreasing percentage) bonuses than long-term (increasing percentage) bonuses. For this reason purchases are made earlier for decreasing than increasing percentage bonuses, earlier for decreasing than random prices, and earlier for high than low price volatility. Neither purchases at lowest price or highest bonus are attained. Hyperbolic time discounting may account for bubbles observed in experimental double-auction markets.

Key words: stock purchase; bonus; bounded rationality; heuristic judgement; hyperbolic time discounting
INTRODUCTION

Performance-related payments or bonuses are considered by investment organizations to be tools to incentivize traders to whom they delegate portfolio management (Golec, 1988). An example is that bonuses are awarded conditionally on portfolios producing superior returns relative to an index. Surveys show that such bonuses frequently are based on annual portfolio performance. Quarterly evaluations are however not uncommon (Hedesström, 2010). An expressed concern is that bonuses based on short time intervals push traders towards short-term goals even though their organizations (e.g. pension funds) have long-term investment horizons (e.g. Guyatt, 2008; O’Barr et al., 1992; Marginson & McAulay, 2008). This may be counteracted if bonuses are instead based on long-term performance. It is therefore important to investigate whether bonuses based on long-term performance are equally motivating as bonuses based on short-term performance and that they have positive effects on performance.

In two experiments conducted by Hedesström et al. (2012) participants chose between the same bonus paid out either frequently (four bonuses based on short-term performance or short-term bonuses for short) or infrequently (one bonus based on long-term performance or long-term bonus for short). The results suggested that traders in stock markets would prefer short-term bonuses. In order to be equally attractive the deferred or long-term bonus needed to be between 20% and 40% higher than the four added short-term bonuses.

A preference for immediate over deferred benefits frequently demonstrated in research on time discounting (for reviews, see Frederick et al., 2002; Soman et al., 2006) may thus also apply to stock traders’ preferences for bonuses. It does however not follow that short-term bonuses improve performance. Experiments conducted by Andersson et al. (2012) in fact suggested that traders’ evaluations of stock prices are more accurate when based on longer price series than on shorter. Therefore, we decided to conduct additional experiments aimed at
demonstrating that preferences for short-term bonuses may lead to worse performance due to negative consequences for the timing of stock purchases.

Next we first selectively review previous research on incentives to traders in asset markets, then we review research on temporal discounting. This is followed by a derivation of the hypotheses tested in the experiments. Thereafter, the experiments are presented. In the last section we discuss the results and their implications.

Incentives

Allen and Gorton (1993) showed theoretically that assets traded in financial markets may be mispriced if investors delegate their investment portfolios to traders who receive bonus payments proportional to profits but incur no penalties for losses (referred to as convex incentives). Rajan (2006) argues that such incentives are potential threats to market stability. A few asset market experiments have been conducted to empirically investigate these hypothesized adverse effects.

In double-auction experimental markets with decreasing fundamental asset values, James and Isaac (2000) observed mispricing due to convex tournament incentives determined by performance relative to others. In a follow-up experiment (Isaac & James, 2003) mispricing remained despite the fact that not all participants received incentives and that underperformance was penalized.

Holmen et al. (2014) compared convex to linear incentives for similarly endowed participants in double-auction experimental markets with one traded asset. In the condition with linear incentives, payment was a linear function of final experimental wealth. This resembles incentives to traders investing their own money. In the condition with convex incentives, payment consisted of a small fixed amount plus a bonus if final wealth exceeded a pre-specified wealth. The bonus increased proportional to how much final wealth exceeded
the pre-specified amount. Convex incentives were found to result in higher risk taking and asset overpricing. In agent-based model simulations, Fabretti et al. (2014) showed that convex incentives may also decrease market stability.

Kleinlercher et al. (2014) extended the design of Holmen et al. (2014) to linear incentives, convex incentives, convex incentives with an upper limit, and penalties for losses but no bonuses for profits. In double auction experimental markets one high-risk and one low-risk asset were traded. The results showed differences between prices in the different treatments. In the convex treatment, prices were substantially above expected terminal dividends, while in the concave treatment prices were substantially below. Convex incentives also resulted in more investments in the risky asset.

In the studies reviewed above, effects of time discounting have not been an explicit focus. An exception is Cheung and Coleman (2014) who investigated convex tournament incentives in experimental markets with both decreasing and constant fundamental asset values. They found that mispricing is particularly detrimental when incentives create a conflict between maximizing short-term market value or long-term fundamental value. A market experiment with similar findings was reported by Smith et al. (2000) who found that the prevalence of price bubbles increased when dividends were paid out after each trading period than at the end of all trading periods.

**Time Discounting**

In laboratory experiments of time discounting, participants are asked to make a choice between a smaller monetary outcome sooner and a larger monetary outcome later. A general conclusion from a vast body of such experiments is that people generally exhibit positive time discounting (Frederick et al., 2002; Soman et al., 2006), that is, that the smaller outcome sooner (often immediate) is preferred to the larger outcome later. Yet, the review by Frederick
et al. (2002) also shows that the rate at which future outcomes is discounted varies to an extraordinary extent across experiments. A pure time preference or impatience may thus not be an adequate account of positive time discounting.

A frequent observation is also that rate of discounting declines over time, referred to as hyperbolic time discounting (Strotz, 1955). This deviation from a constant discount rate violates the fundamental principle of preference invariance in standard economic theory, since preferences for two inter-temporal alternatives will reverse if deferred equally much. Proposed accounts of hyperbolic discounting include influences of visceral factors that reduce self-control (Loewenstein, 1996), a concave function relating perceived time to calendar time resulting in a decreasing weight (Kim & Zauberman, 2009), or that uncertainty increases with time (Walther, 2010).

In another account proposed by Read et al. (2013) (see Alonso, 2013, for a similar conceptual analysis), time is only one of several attributes of inter-temporal choice alternatives. In making choices people place weights larger than or equal to zero on these attributes. When time is not discounted its weight is zero. Hyperbolic time discounting should therefore not be always expected. For instance, Read et al. (2012) found no change in rate of time discounting the closer in time the deferred larger alternative was. This refutation of hyperbolic time discounting and several others (e.g. van Boven & Lowenstein, 2003) may have different explanations but demonstrates the influence of contextual factors.

In this vein Read et al. (2013) showed that outcome framing affects the weight placed on time in inter-temporal choice. Specifically, rate of time discounting may differ if the choice alternatives are described differently than solely referring to the different monetary amounts received at different points in time. As an example, time discounting was less positive for a future outcome framed as an investment.
HYPOTHESES

Studies of the role of bonus payments in double-auction experimental markets (Holmen et al., 2014; Kleinlercher et al., 2014) have not addressed whether influences of bonuses based on short-term performance differ from influences of bonuses based on long-term performance. We conjecture that the timing of decisions would likely be influenced, and we devise an experimental task that enables us to study this. The task differs from double-auction experimental markets in that the prices are generated by the experimenter such that a single trader’s purchase decisions can be systematically investigated. We assume that the purchase decisions made by the single trader in our experimental paradigm would not differ from decisions made by traders in double auction experimental markets if the same prices are encountered.

In the experimental task participants role-play working as a trader for an investment organization mandated by a client to purchase stock lots at the lowest price within a given time frame. In each of several trading days participants either decide to purchase or defer purchase until the next trading day. They receive a bonus which is a constant percentage or a changing percentage of the positive difference between the maximum price set by the client and the purchase price. In Experiment 1 the percentage bonus decreases over trading days. It thus mimics a short-term bonus in that for random changes in the stock price, the bonus payout will decrease over time and hence reward short-term performance. Conversely, in Experiment 2 the percentage bonus is increasing over trading days, thus mimicking a long-term bonus by rewarding long-term performance.

We now derive a set of hypotheses about the timing of purchases. First, we propose that participants susceptible to hyperbolic time-discounting would fail to within the time frame purchase the stock lots at the lowest price. This follows since on each trading day the immediate bonus payout appears more attractive than a deferred bonus payout. Yet, a lower
purchase price would yield a larger bonus payout. It may therefore still be attractive to defer purchase if this information would be known. However, in the experiments the lowest price is not known to participants. We next propose that participants resolve this uncertainty by determining on each trading day whether the price bid is sufficiently lower than the maximum price to satisfy or exceed an aspiration level. For a decreasing percentage bonus in Experiment 1 rewarding short-term performance, participants would then be likely to frame the choice as being between a sure gain (the immediate bonus payout) and an uncertain lower gain (the decreasing percentage bonus given uncertainty about the price change). Consistent with previous research on how uncertainty reduces positive time discounting (Walther, 2010), participants would be expected to set a lower aspiration level (a smaller difference to the maximum price) when the percentage decreases than when it is constant and thus purchase the stock lot earlier. For an increasing percentage bonus in Experiment 2 rewarding long-term performance, participants would instead be likely to frame the choice as being between a sure gain and an uncertain larger gain due to the increasing percentage bonus. As a result, they would be likely to set a higher aspiration level (a larger difference to the maximum price) than for a constant percentage bonus and thus purchase the stock lot later. This reasoning leads to Hypothesis 1 that in both experiments participants will fail within the time frame to purchase the stock lots at the lowest price, and Hypothesis 2 that in Experiment 1 purchases will be made earlier for the decreasing percentage bonus than for the constant percentage bonus, whereas in Experiment 2 purchases will be made later for the decreasing percentage bonus than for the constant percentage bonus.

In both experiments the stock price either decreases or changes randomly. If the price decreases, deferring purchase longer should on average lead to a lower purchase price than when the price varies randomly such that the lowest price may appear at any time. It would then be in the clients’ interest to defer purchase to increase the likelihood of purchasing the
stock lot at the lowest price. However, our Hypothesis 3 states the reverse since the aspiration level should on average be reached or exceeded earlier when the price decreases than when it changes randomly. In Experiment 1 price volatility is also varied. By the same reasoning we propose Hypothesis 4 that purchases are made earlier when the price volatility is high than when it is low because a price equal to or lower than the aspiration level will on average be encountered earlier.

EXPERIMENT 1

Method

Participants

Participants were 64 undergraduates (44 women) enrolled in different study programs in other departments than the business school at University of Gothenburg, Göteborg, Sweden. Their mean age was 29.5 years (SD = 12.0 years). They were guaranteed SEK 50 (1 SEK or Swedish Crown was approximately equal to 0.125 US$ at the time of the study) but could receive an additional performance-related payment from 0 to SEK 200. The payment was rounded off upwards and sent by regular mail as vouchers worth SEK 50.

Experimental Design

In order to decrease response load, a mixed factorial experimental design was employed with a between-groups factor (price volatility: high vs. low) crossed with two [2 (percentage bonus: decreasing vs. constant) by 2 (price: decreasing vs. random)] replicated within-groups factors. Thirty-two participants were randomly assigned to the high price-volatility condition and another 32 participants to the low price-volatility condition.

Procedure
Participants were contacted by electronic mail and asked to answer a web questionnaire. They were instructed to answer the questionnaire without a break in an environment where they could work undisturbed. The questionnaire took approximately 30 minutes to answer.

The instructions informed participants that the aim of the study was to investigate trading in stock markets. They were asked to imagine being employed as a trader mandated by a client to simultaneously purchase a lot of 100 fictitious stocks at the lowest price in one of 15 trading days. The client set a maximum price per stock at which the lot could be purchased. In the condition with a constant percentage bonus, participants would obtain a bonus of 10% of how much lower the purchase price was compared to the client’s maximum price. In the decreasing percentage bonus condition, they would obtain a bonus of 10% if the stock lot was purchased on the first day, then decreasing by 0.5% per day to 9.5% if the stock lot was purchased on the second day, 9% if purchased on the third day, and so forth to 3% if purchased on the last day. The 15-day trading session was repeated eight times with four sequences consisting of random price sequences and four sequences consisting of decreasing prices. In half of the sessions with random and decreasing prices, respectively, the percentage bonus was constant; in the other half the percentage bonus was decreasing. The order in which the eight sessions were presented was counterbalanced. The additional payment was determined for a randomly chosen session. No additional payment was earned if the stock was purchased to the maximum price or higher. If purchased at a lower price, additional payment was proportional to the earned bonus with SEK 200 for obtaining the maximum bonus.

An opening and closing price of the stock were presented for each of the 15 trading days. Participants’ task was to decide each day whether to purchase the stock lots or to postpone purchase to any of the following days. They were informed that the closing price would be the purchase price. In order to facilitate for participants to judge the price change, the prices of the stock for the preceding days on which they decided not to purchase the stock lot remained
displayed on the computer screen. When they decided to purchase the stock lot, the prices for the days remaining of the 15-day trading period were also displayed. Participants were then asked to rate how satisfied they were with their purchase on a scale from -3 (very dissatisfied) to 3 (very satisfied).

The 16 numbers (opening prices were equal to the closing price the day before) representing the prices of the stocks were generated for each lot. In trading sessions with a random price and high price volatility, a random number sampled from a normal distribution ($M = \text{SEK } 0, SD = \text{SEK } 10$) was added to a constant. In the low price-volatility condition another eight sets of 16 numbers representing the stock prices were generated in the same way as in the high price-volatility condition, except that the random numbers were sampled from a normal distribution with a smaller standard deviation ($M = \text{SEK } 0, SD = \text{SEK } 2$). In the conditions with a decreasing price an additional number was added decreasing from the second day with SEK 2 per day. Different sets of prices with different constants (SEK 430, 450, 470, 490, 510, 530, 550, 570) were generated and presented to each participant in the eight trading sessions. Across participants the different sets were presented an equal number of times in each of the sessions. The clients’ maximum prices were equal to the constants. In the constant bonus conditions the average bonus payout increased when the price decreased and varied randomly when the price varied randomly. In the decreasing percentage bonus condition the average bonus payout increased to reach a maximum on the 10th day (for a 7.5% bonus) when the price was decreasing and decreased when the price varied randomly.

Results

Table 1 displays the average trading day on which the stock lots were purchased (referred to as purchase day, ranging from 1 to 15) and the mean ratings of satisfaction with the outcome of the purchase decision (ranging from -3 to 3).
A 2 (price volatility: high vs. low) by 2 (percentage bonus: decreasing vs. constant) by 2 (price: decreasing vs. random) analysis of variance (ANOVA) with repeated measures on the last two factors was conducted on purchase day. A significant main effect of the percentage bonus was obtained, substantiating that consistent with Hypothesis 2 purchases were made earlier for the decreasing percentage bonus than for the constant percentage bonus ($M_{decreasing percentage bonus} = 5.3$ vs. $M_{constant percentage bonus} = 6.9$), $F(1, 62) = 11.17, p = .001$, $\omega^2_{partial} = .04$.

Although in accordance with Hypothesis 3 purchases were made earlier when price decreased than when price varied randomly, the main effect of price only marginally reached significance ($M_{decreasing price} = 5.7$ vs. $M_{random price} = 6.5$), $F(1, 62) = 3.75, p = .057$, $\omega^2_{partial} = .01$.

In support of Hypothesis 4 purchases were made significantly earlier in the high price-volatility condition than in the low price-volatility condition ($M_{low price volatility} = 7.2$ vs. $M_{high price volatility} = 5.0$), $F(1, 62) = 8.98, p = .004$, $\omega^2_{partial} = .03$.

The satisfaction ratings were significantly higher for a random price than for a decreasing price ($M_{decreasing price} = 1.2$ vs. $M_{random price} = 0.2$), $F(1, 62) = 38.28, p < .001$, $\omega^2_{partial} = .13$. This may reflect that participants were able to determine that their purchases did not result in the highest bonus when the price decreased.

**EXPERIMENT 2**

**Method**

**Participants**

Participants were another 32 undergraduates (22 women) enrolled in different study programs in other departments than the business school at University of Gothenburg. Their mean age was 27.0 years ($SD = 9.3$). They were guaranteed SEK 50 but could receive an additional performance-related payment from 0 to SEK 200. The additional payment was
calculated for a randomly determined trading session. The payment was rounded off upwards and sent by regular mail as vouchers worth SEK 50.

**Experimental Design**

A 2 (percentage bonus: increasing vs. constant) by 2 (price: decreasing vs. random) within-groups design was employed with replicates on each factor.

**Procedure**

Only the percentage bonuses differed compared to the high price-volatility condition in Experiment 1. In the constant bonus condition participants were offered a bonus of 3% of how much the purchase price was lower than the client’s set maximum price. In the condition with an increasing percentage bonus participants were offered a larger bonus the later they purchased the stock lot. When purchasing the stock lot on the first day, they would receive 3% of the positive difference between the maximum price and the purchase price (as in the constant bonus condition). The bonus was then increased by 0.5% per trading day to 3.5% if the stock lot was purchased on the second day, 4% if purchased on the third day, and so forth to 10% if purchased on the last day. For a decreasing price the average bonus payout increased with trading day both when the percentage bonus was constant and when it was increasing. When price was random the average bonus payout likewise increased with trading day in the increasing percentage bonus condition, but varied with the random variation of the price in the constant percentage bonus condition.

**Results**

Table 2 displays mean purchase day and mean satisfaction ratings.

The results for purchase day were consistent with Hypothesis 2 in that the direction of the effect of a decreasing percentage bonus compared to a constant percentage bonus observed in Experiment 1 was reversed in Experiment 2 for an increasing percentage bonus compared to constant percentage bonus \(M_{\text{increasing percentage bonus}} = 7.8 \text{ vs. } M_{\text{constant percentage bonus}} = 7.1\). In a 2
(percentage bonus: increasing vs. constant) by 2 (price: decreasing vs. random) repeated-measures ANOVA the difference failed however to reach significance, $F(1, 31) = 2.42, p = .130, \omega^2_{\text{partial}} = .01$. In an additional 2 (experiment) by 2 (percentage bonus: changing vs. constant) mixed factorial ANOVA with repeated measures on the last factor, for a decreasing price the results of Experiment 2 ($M_{\text{increasing percentage bonus}} = 5.6$ vs. $M_{\text{constant percentage bonus}} = 4.8$) were directly compared to the results in the high price-volatility condition of Experiment 1 ($M_{\text{decreasing percentage bonus}} = 4.0$ vs. $M_{\text{constant percentage bonus}} = 4.9$). The interaction between experiment and percentage bonus was marginally significant, $F(1, 62) = 3.76, p = .057, \omega^2_{\text{partial}} = .02$.

In support of Hypothesis 3 purchases were in Experiment 2 made significantly earlier for a decreasing price than for a random price ($M_{\text{decreasing price}} = 6.0$ vs. $M_{\text{random price}} = 8.8$), $F(1, 31) = 34.01, p < .001, \omega^2_{\text{partial}} = .21$.

Table 3 shows in support of Hypothesis 1 that performance did not lead to the lowest price or to the highest bonus payout in neither of the experiments. For a decreasing percentage bonus in Experiment 1 the purchase price was higher than for the constant percentage bonus and higher than in Experiment 2 for a constant percentage bonus, which in turn was higher than for an increasing percentage bonus. It may also be noted that the absolute bonus payout varied, whereas expressed in percentage of the highest bonus payout, only the decreasing percentage bonus differed from the other conditions.

As in Experiment 1 a parallel ANOVA on the satisfaction ratings yielded a significant main effect of price due to higher ratings for a random price than for a decreasing price ($M_{\text{random price}} = 1.6$ vs. $M_{\text{decreasing price}} = 0.3$), $F(1, 31) = 33.59, p < .001, \omega^2_{\text{partial}} = .20$.

**GENERAL DISCUSSION**

We demonstrate that performance-related bonuses have detrimental effects on timing of stock purchases. The purchase decisions were in both experiments made too early such that the client’s
interest in purchasing at the lowest purchase price is not honoured and the trader is not granted the
highest bonus payout. In Experiment 1 a decreasing (short-term) percentage bonus reinforced too early
timing of purchases, whereas in Experiment 2 an increasing (long-term) percentage bonus reduced too
eye timing of purchases although performance was still not optimal. A constant percentage bonus
resulted in performance between these extremes.

The present results are qualitatively consistent with that the timing of purchases depends on an
aspiration level determining how much lower the price would need to be than the maximum price. In
both experiments the purchases were as expected made earlier when the price was decreasing than
when it was random. In Experiment 1 purchases were also as expected made earlier for high price
volatility compared to low price volatility.

We proposed that hyperbolic time-discounting moderated by framing (Read et al., 2012)
made participants set a lower aspiration level, that is a smaller difference between the
maximal price and the price bid, for a decreasing percentage (short-term) bonus in
Experiment 1 than for an increasing percentage (long-term) bonus in Experiment 2. This led
as expected to purchases at a higher price in Experiment 1 than in Experiment 2. A smaller
bonus payout was also received earlier in Experiment 1 than the larger bonus payout received
later in Experiment 2.

Our proposal of an aspiration level is conditional on that participants did not have full
knowledge of how the stock price decreased. In another study (Andersson et al., 2012)
participants were accurate in their directional predictions of a price change, although they
made systematic errors in trend predictions similar to those observed in previous research
(Bolger & Harvey, 1993; Webby & O’Connor, 1996). The conditions in this study were very
similar to the conditions of the present experiments. We may therefore be justified in
believing that also in the present experiments participants were unable to accurately infer how
much the price decreased. This reinforces our conjecture that participants were unable to infer
the lowest price. It is also likely that the results otherwise would have been different than
observed when the prices decreased. Another possibility speaking to the same point is that participants may have expected a mean reversal (DeBondt & Thaler, 1985, 1987; Lawrence & Makridakis, 1989).

In conclusion, in the experiments we found that short-term bonuses may negatively affect the timing of purchases in a stock market. We do not claim that this finding directly generalizes to actual stock markets since the participants were undergraduate students with little knowledge of stock trading. Their performance was both boundedly rational and dependent on judgmental heuristics. Yet, evidence suggests that professional traders are not always different from lay people in these respects (e.g. Törngren & Montgomery, 2004). Neither there are any compelling reasons to believe that professional traders (or other traders) importantly differ from lay people in being less susceptible to hyperbolic time-discounting (Livanas, 2011). The interaction between heterogeneous traders in actual asset markets, including arbitrageurs, still needs to be investigated. Time discounting’s role in influencing timing of buy and sell decisions has scarcely been investigated in experimental asset markets. We argue that doing so should be rewarding. It is conceivable that hyperbolic time discounting accounts for the finding that a declining fundamental asset value in such experimental markets leads to market prices exhibiting bubble and crash patterns (Stöckl et al., 2014).

Footnotes

1In double-auction asset markets, traders submit buy or sell orders that determine asset prices. With the aim of investigating the efficiency of such markets, Smith et al. (1988) used asset market experiments in which participants buy or sell quantities of a single asset whose fundamental value (the expected stream of dividends) declines deterministically over time. A common finding is that market prices exhibit strong bubble and crash patterns. The decline of the fundamental value has been suggested to be one moderating factor (Kirchler et al., 2012;
Nossair et al., 2001; Smith et al., 2000). Supporting results were obtained by Stöckl et al. (2014) showing that a non-changing fundamental value led to more efficient pricing than either a raising or declining fundamental value.

Such a scenario method is not uncommon in behavioral finance research. It differs from research on experimental markets (see footnote 1), but we know of no compelling reason why observations obtained with the scenario method would not in principle apply to experimental markets.

The proposition of an aspiration level is consistent with that people in making decisions are boundedly rational, that is satisficing instead of optimizing (e.g. Kahneman, 2003; Payne et al., 1993; Selten, 2001; Simon, 1982). Others (Hoffman et al., 2012; Kontek, 2011; Koop & Johnson, 2012) have recently proposed similar roles of an aspiration level in risky decision making. An application in behavioral finance is the constructs security, potential and aspiration level introduced by Lopes (1987) to understand both individual differences in and situational influences on risky choice that Shefrin and Statman (2000) later implemented in their behavioral portfolio theory.

A common feature of heuristic judgments is that an easily accessible attribute is substituted for a less accessible target attribute (Kahneman & Frederick, 2005). In the experiments the price difference is an easily accessible attribute that participants may substitute for the less accessible bonus payout. Due to different framing of the purchase choice, the disclosed changes in the percentage bonus are still expected to influence the aspiration level.

References


Table 1
Mean Purchase Day (M) and Mean Satisfaction Ratings (M) with Associated Standard Deviations (SD) Related to Random Versus Decreasing Price, Constant Versus Decreasing Percentage Bonus, and Low Versus High Price Volatility (Experiment 1)

<table>
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<th>Random price</th>
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<td>Percentage bonus</td>
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<td>Percentage bonus</td>
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<tr>
<td></td>
<td>Constant   M (SD)</td>
<td>Decreasing</td>
<td>M (SD)</td>
<td>Constant   M (SD)</td>
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<td>Low price volatility</td>
<td>Purchase day (1-15)</td>
<td>9.0 (4.9)</td>
<td>6.0 (4.3)</td>
<td>7.6 (4.9)</td>
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<tr>
<td></td>
<td>Satisfaction ratings (-3 – 3)</td>
<td>1.3 (1.0)</td>
<td>1.2 (1.1)</td>
<td>0.2 (1.7)</td>
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<tr>
<td>High price volatility</td>
<td>Purchase day (1-15)</td>
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<td>5.1 (4.0)</td>
<td>4.9 (3.3)</td>
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<td></td>
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<td>0.5 (1.3)</td>
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Table 2
Mean Purchase Day (M) and Mean Satisfaction Ratings (M) with Associated Standard Deviations (SD) Related to Random Versus Decreasing Price and Constant Versus Increasing Percentage Bonus (Experiment 2)

<table>
<thead>
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<th></th>
<th>Random price</th>
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<tr>
<td>Percentage bonus</td>
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<tr>
<td>Constant M (SD)</td>
<td></td>
<td>Increasing M (SD)</td>
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<td></td>
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<tr>
<td>Purchase day (1-15)</td>
<td>8.5 (4.3)</td>
<td>9.2 (4.2)</td>
<td>5.7 (3.2)</td>
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<tr>
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<td>1.7 (1.4)</td>
<td>1.6 (1.4)</td>
<td>0.3 (1.5)</td>
<td>0.3 (1.8)</td>
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Table 3
Mean Purchase Price and Bonus Payout in SEK for Decreasing Price in Experiments 1 and 2. (Percentage of lowest purchase price and highest bonus payout are given within parentheses.)

<table>
<thead>
<tr>
<th></th>
<th>Experiment 1</th>
<th></th>
<th>Experiment 2</th>
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<td></td>
<td>Percentage bonus</td>
<td></td>
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<tr>
<td></td>
<td>Constant</td>
<td>Decreasing</td>
<td>Constant</td>
<td>Increasing</td>
</tr>
<tr>
<td>Purchase price</td>
<td>49220 (104.3%)</td>
<td>49400 (104.7%)</td>
<td>49060 (103.9%)</td>
<td>48940 (103.7%)</td>
</tr>
<tr>
<td>Bonus payout</td>
<td>80 (28.6%)</td>
<td>51 (51.0%)</td>
<td>27 (32.1%)</td>
<td>62 (22.2%)</td>
</tr>
</tbody>
</table>

*Note.* Purchase price for 100 stocks is for an average maximal price of SEK 50000 (see Method in Experiment 1) calculated by the formula

\[
Purchase\ Price = 100(500 - 2(Purchase\ Day - 1)).
\]

When the percentage bonus is constant at 10% in Experiment 1 or 3% in Experiment 2, the mean bonus payout in SEK for 100 stocks is calculated as

\[
(Percentage\ Bonus/100) \times (50000 - Purchase\ Price),
\]

and when the percentage bonus decreases by 0.5% from 10% to 3% in Experiment 1, the mean bonus payout in SEK for 100 stocks is calculated as

\[
((10 - 0.5(Purchase\ Day - 1))/100) \times (50000 - Purchase\ Price),
\]

and when the percentage bonus increases by 0.5% from 3% to 10% in Experiment 2,

\[
((3 + 0.5(Purchase\ Day - 1))/100) \times (50000 - Purchase\ Price).
\]