An Examination of the Impact of Alternative Accounting Procedures on Risk-Taking Behavior: A Test of Prospect Theory

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AN EXAMINATION OF THE IMPACT OF ALTERNATIVE ACCOUNTING PROCEDURES ON RISK-TAKING BEHAVIOR: A TEST OF PROSPECT THEORY

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ABSTRACT

Many business decisions which use accounting information are made under conditions of uncertainty and are biased, in part, on relative gains and losses. Therefore, accounting settings appear to be a particularly appropriate setting to test the predictions of prospect theory. To date, little accounting research has been conducted which has used prospect theory as its theoretical foundation. Using a discount period decision under risk, practicing accountants were asked to indicate the likelihood of making an inventory payment. The results of the study provide limited support for prospect theory propositions. It also is interesting that the perceptions of an ethical conflict by subjects significantly impact the likelihood assessments made by the subjects.

Introduction

Accounting practice is guided by a comprehensive set of generally accepted accounting principles (GAAP). In many instances, there exist several acceptable alternatives from which to choose in accounting for a particular business transaction. In theory, these alternatives are equally representative and equally informative to users of financial statements. Since each of these alternatives is intended to maintain the same degree of representational faithfulness, a choice of one accounting alternative over another should not lead to a difference in subsequent behavior. Business decisions which are made based on the accounting data generated through the use of one acceptable alternative should not differ from decisions made based on another alternative.

Considerable accounting research has been conducted in an effort to determine whether investment and credit decisions differ as a result of the choice of an accounting alternative. In particular, a great deal of research has been conducted which investigates the reaction of the stock market to changes between inventory valuation techniques (FIFO vs. LIFO). In general, this research has been conducted at a macro-level and has yielded mixed results. (For a review of this literature, see Lindahl, Emby, and Ashton, 1988.) An interesting alternative to this type of research is to investigate investment and credit decisions in an experimental setting. One particular accounting situation which warrants empirical investigation is the area of accounting for purchase discounts in recording inventory cost. GAAP allows for two alternative treatments in the costing of inventory when cash discounts are available. The purpose of this research is to investigate the impact of these two accounting alternatives on decision making.

Theoretical Background and Hypothesis Development

As an alternative to expected utility theory, Kahneman and Tversky (1979) introduced a descriptive model of decision making under risk, called prospect theory. Through a series of experiments, Kahneman and Tversky demonstrated that an
individual’s decision making behavior may vary based on how an individual perceives the possible outcomes. Specifically, the theory suggests that a decision maker is likely to choose a riskier alternative when he perceives that outcomes are potential losses than when the outcomes are potential gains.

For example, Kahneman and Tversky asked decision makers to choose between two “positive prospects.” Individuals were asked if they would prefer (a) $3,000 or (b) an 80% probability of receiving $4,000. The expected utility of the second choice is $3,200 ($4,000 x 0.80) and is greater than the expected utility of the first alternative ($3,000). However, when the two alternatives were prospective gains, the subjects overwhelmingly chose the sure chance of $3,000 rather than the 80% chance of receiving $4,000. Kahneman and Tversky suggest that when decision makers must choose between positive prospects, they tend to be risk averse.

The authors also asked subjects to choose between two negative prospects. Decision makers were asked to indicate whether they would prefer (a) a sure loss of $3,000, or (b) an 80% probability of losing $4,000. The expected loss of utility of the second choice is -$3,200 (-$4,000 x 0.80) and more negative than losing $3,000. Thus, expected utility theory predicts that a sure loss of $3,000 is preferable to an 80% chance of a $4,000 loss. However, 92% of the subjects chose the second alternative instead of the first. Kahneman and Tversky suggest that when decision makers must choose between positive prospects, they exhibit risk seeking behavior when prospects are negative.

Cash flow is critical to most vendors and suppliers. Therefore, these suppliers of inventory to merchandising and manufacturing firms frequently provide for special credit discounts if a purchaser is willing to pay for an invoice within a relatively short period of time. For example, credit terms are often stated 2/10; n/30, which means that the purchaser has the choice of a 2% discount if payment is made with 10 days of the invoice; otherwise, payment in full is required within 30 days.

GAAP has allowed for two accounting alternatives for the purchaser. The first alternative, the gross method, requires that the purchaser record the purchase at the invoice or gross amount. If the purchaser chooses to pay within the discount period, he pays the discounted amount and the discount serves to reduce the cost of the purchase. The second method, the net method, assumes that the purchaser takes advantage of all discounts. Accordingly, all purchases are recorded at the discounted or net amount. If the purchaser chooses not to pay within the discount period, he must record a loss for the amount of the discount. The effect on net income is the same for both methods, and both are used in practice.
for purchases, is an appropriate application to test the robustness of prospect theory. Good cash management suggests that all cash discounts should be taken. However, it is conceivable that, due to cash flow constraints, a management accountant might be faced with a situation in which a discount period was expiring, and cash was not readily available to make payment and take advantage of the discount. Suppose that two management accountants are faced with the decision described above. Accountant A recorded his original purchase using the gross method. If he chooses to make payment within the discount period, he records a purchase discount and reduces the cost of his purchase. Accountant B recorded his original purchase using the net method. If he elects to make payment within the discount period, no additional entry is necessary, since he originally recorded the purchase at the net (invoice less discount) amount. The net effect both methods is to reduce the cost of the purchase. Both of these prospects appear to be positive.

Alternatively, assume that both accountants choose not to make payment within the discount period. Accountant A simply waits until the due date of the invoice and makes payment. No additional entry is necessary in this case since the original invoice was recorded at the gross amount. Accountant B recorded the original purchase and the associated liability at the net amount. If he chooses to pay after the discount period, his liability is now greater than the amount originally recorded. GAAP requires that Accountant B record a loss for this difference. It appears that Accountant B is faced with a negative prospect.

It is at this point that prospect theory applies. When an accountant chooses not to make payment within a discount period, the decision results in a reduction in net income. This is true, whether the accountant has adopted the gross or the net method of accounting for purchases. Expected utility theory suggests that, since the final wealth state is the same, payment behavior will not differ between the gross and the net methods. However, prospect theory suggests that decision makers who have loss prospects (the net method) are more risk seeking. Therefore, prospect theory would suggest that accountants who face a loss will be more likely to take a risk and make payment during a discount period (even though cash may not be available) than accountants who do not face a loss. Accordingly the following research hypothesis is proposed:

H1: Accountants who adopt the net method of accounting for inventory purchases will be more risk-seeking than accountants who adopt the gross method.

Mowen and Mowen (1986) demonstrated that the size of a discount in relation to the purchase price affects the likelihood that a decision maker will attempt to claim a discount. Accordingly, a second hypothesis, designed to examine the impact of materiality, is proposed.

H2: The materiality of a discount in relation to net income will affect the risk preferences of accountants.

Research Methodology

In order to examine the research hypotheses, a decision-making experiment, using practicing accountants was conducted. A between-subjects 2 x 2 factorial design was used. (See Table 1.) The decision task required subjects to indicate the likelihood that he or she would make payment within a discount period under uncertain (and risky) conditions. The subjects were randomly assigned to one of the four treatment cells. (See Table 1.)

Subjects also were asked to provide general demographic information to determine whether the random assignment to treatments was successful. Appropriate statistical tests were conducted to determine whether any of these demographic characteristics were predictors of the dependent variable. The results of these tests indicate that the probability assessment required in the experimental task was not affected by any of the demographic characteristics.
Subjects

Participants in the experiment were accountants who are experienced in similar decisions. A total of 119 subjects participated in the task. The subjects were Certified Public Accountants (CPAs) and Certified Management Accountants (CMAs) attending a Continuing Professional Education (CPE) seminar. Participation in this project was voluntary. In order to encourage the subjects to respond accurately and honestly, their anonymity was assured.

A summary of the demographic characteristics of the sample is provided in Table 2. The subjects reported an average work experience of 15.6 years. Almost all of the subjects (92.4%) were CPAs. Slightly more than one-half (56.3%) of the subjects were employed as accountants in private industry. The remainder (43.7%) were in public practice. These demographic statistics suggest that the sample was well-qualified for the experimental task.

Research Instrument

Appendices 1 and 2 provide examples of two of the four cells of the research design. The first independent variable manipulated in the instrument was the choice of the accounting alternatives used for recording purchases. Subjects were informed as to company policy regarding either the gross or net methods. This accounting policy decision is generally made by the managing accountant and, for the sake of consistency, generally does not vary between vendors. The second experimental manipulation was the materiality of the discount. This variable was manipulated in relation to net income.

Appendix 1 provides an example of the gross method/high materiality manipulation (Cell 1 of Table 1). Subjects were informed that the adopted accounting policy requires that all purchases be accounted for using the gross method and that monthly net income has averaged $50,000. Accordingly, the discount of $4,000 is considered material ($4,000/$50,000 = 8% of income). Appendix 2 is an example of the net method/low materiality manipulation (Cell 4 of Table 1). In this treatment, subjects were informed that company accounting policy requires that all purchases be accounted for using the net method and that monthly net income has averaged $200,000. Accordingly, the discount is considered immaterial ($4,000/$200,000 = 2% of income). Note that in Appendix 2, the subject must decide whether to make payment under risky conditions or recognize a loss. In Appendix 2.
an examination of the impact of alternative accounting procedures on risk-taking behavior

results

the following linear model was used in the analysis of the experimental results:

\[ Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + \varepsilon \]

where:

- \( Y \) = the likelihood that payment will be made,
- \( X_1 \) = treatment 1 - Accounting alternative (Gross or Net method),
- \( X_2 \) = treatment 2 - Materiality of discount (High or Low),
- \( X_3 \) = the perceived ethical conflict presented in the case, and
- \( \varepsilon \) = error term.

While \( X_1 \) and \( X_2 \) were categorical variables representing the two levels of the two experimental manipulations, \( X_3 \) was a continuous variable and was included in the model as a covariate (Tabichnick & Fidell, 1989).

Tables 1 and 3 provide a summary of the results of the analysis. Hypothesis 1 predicted that accountants who adopt the net method of accounting for purchases would be more likely to exhibit risk-seeking behavior. In the present study, risk-seeking behavior was defined as an increased probability that payment for an invoice would be made during the discount period even when the availability of sufficient cash was uncertain. Table 1 indicates that the mean probability reported by subjects assigned to the Net treatments was 34.87 (on a scale of 0 to 100). For subjects assigned to the Gross treatments, the mean probability was 27.24. While this is directionally consistent with the prediction of H1, Table 3 indicates that this difference is, at best, only marginally significant (F = 2.71; Prob > F = .1025). Accordingly, weak support is provided for H1.

The second hypothesis predicted that the larger the purchase discount in relation to total monthly sales and net income, the greater the likelihood the subjects would exhibit risk-seeking behavior. Table 1 reports a mean likelihood of payment of 25.77 (on a scale of 0 to 100) for subjects in the Low Materiality treatment. Subjects in the High Materiality treatment reported a mean of 36.63. Table 3 indicates that the mean response of subjects in the High Materiality treatments differ significantly from subjects in the Low Materiality.
ity treatments ($F = 5.56; \text{Prob } F = .0201$). Accordingly, these results provide support for H2.

Table 3 also reports the covariate results. To control for any variance in the dependent variable that could result from the ethical nature of the likelihood assessment required in the case, the perceived ethical conflict, a continuous variable, was included in the model. As seen in Table 3, the degree to which the decision presented an ethical conflict was closely related to the likelihood of payment ($F = 39.36; \text{Prob } F = .0001$). Specifically, subjects were less likely to make payment within the discount period when they perceived that the payment presented an ethical conflict.

In summary, the experiment was designed to determine whether the choice of the net method of accounting for purchases discounts would increase the probability of risky decision behavior. The results of the experiment provide weak support for this proposition. In addition, the experiment examined the impact of the materiality of a purchases discount on decision behavior. The results indicate that the larger the discount in relation to income, the greater the likelihood of payment. Finally, when the case presented an ethical dilemma to subjects, they were less likely to make payment.

**Conclusions**

Prospect theory proposes that decision making behavior will vary according to the framing of potential outcomes. Specifically, the theory predicts that when an outcome is viewed as a potential gain, a decision maker will tend to be risk averse. Alternatively, when an outcome is viewed as a potential loss, a decision maker will be more prone to risk-seeking behavior. This study examined the tenets of prospect theory in an accounting setting.

The results of the study provide limited support these propositions. Subjects who faced a potential loss appeared to be more likely to make payment for an invoice under risky conditions than subjects who did not face such a loss (a likelihood assessment of 34.87 compared to a likelihood of 27.24). While this difference is only marginally significant, the differences are in the predicted direction. In addition, the results indicate that subjects were more willing to make payment under risky conditions when the materiality of the discounts was greater. Between-cell contrasts indicate that the likelihood assessment of subjects in the Net/High Materiality treatment differed significantly from the mean response of subjects in the remaining three treatments ($F = 5.20; \text{Prob } F = .0245$). This suggests that the risk-

| TABLE 3 | Tests of Hypotheses 1 and 2
| Analysis of Variance Results |
| Dependent Variable: Probability of making payment within discount period |
| Source | DF | Sum of Squares | F-Value | Pr > F | R-Square |
| Model | 3 | 30404.285 | 15.88 | 0.0001 | 0.292875 |
| Error | 115 | 73408.993 | | | |
| Corrected Total | 118 | 103813.277 | | | |

| Source | DF | Sum of Squares | F-Value | Pr > F |
| Main effects: | | | | |
| GROSS/NET | 1 | 1729.706 | 2.71 | 0.1025 |
| MATERIAL | 1 | 3549.477 | 5.56 | 0.0201 |

| Covariate: | | | |
| ETHICAL | 1 | 25125.102 | 39.36 | 0.0001 |
seeking behavior was most pronounced when the possibility of a material loss existed.

In addition to the findings related to the two experimental treatments, the study suggests that the perception of an ethical conflict by subjects significantly impacts the likelihood assessment made by subjects. When subjects viewed the decision to “ride the float” as unethical, they were significantly less likely to exhibit risk-taking behavior. This finding suggests that ethical considerations may have some impact on the robustness of prospect theory. Additional research is warranted to investigate this possibility.

References


APPENDIX 1

Gross Method / High Materiality

Assume that you are the controller for a mid-sized merchandising firm. For the past year, monthly sales for your firm have averaged $500,000 and monthly net income has averaged $50,000. As controller, your responsibilities include the approval of cash disbursements.

At present, a large portion of the merchandise that you sell is purchased from one manufacturer. Accordingly, payments to this manufacturer are a significant portion of your monthly disbursements. Based on the volume of your merchandise purchases and the credit history you have established with your supplier, you have been granted excellent credit terms. At present, your credit terms with your supplier are 4/10, n/30. Specifically, you are granted a 4% discount on purchases when payment is made within 10 days of delivery. Otherwise, the total amount (gross) of the invoice is due within thirty days. For your benefit, your supplier has set up an account at a local bank for you to deposit your invoice payments. This convenience allows you to wait until the afternoon of the 10th day after delivery to make payment and still receive credit within the discount period.

Realizing the significance of this discount and the generous credit terms, you have always paid within the discount period. Ten days ago, you receive delivery of Invoice #201, an unusually large order. The gross amount of this invoice was $100,000.

In order to pay Invoice #201 within the discount period and claim the discount of $4,000, payment must be deposited in your supplier’s account this afternoon. Upon analysis, you determine that you do not have sufficient cash available to make payment today. In addition, you have no other immediate means to obtain cash.

In the past, your supplier has allowed you to take the 4% discount as long as you deposit your payment into the supplier’s account during normal business hours on the 10th day after delivery. You have found, however, that if you wait until late afternoon to make payment, the check is not deducted from your firm’s checking account until the following evening. Upon consideration, you determine that you could make payment today, and cover the payment with tomorrow’s cash receipts, assuming the anticipated cash receipts are equal to those of a typical business day.

However, if you make payment today and the anticipated cash receipts do not materialize, your bank will not cover the check and will return it to your supplier unpaid. Your supplier has specified, in your credit agreement, that if any payment is returned by the bank for insufficient funds, your credit terms (and discount) will be cancelled and all future purchases will be shipped C.O.D.

In accordance with your company’s accounting policies, all merchandise purchases are recorded and posted at the gross amount. Therefore, if you make payment today (within the discount period), you would record the following entry:

\[
\begin{align*}
\text{Accounts Payable} & \quad 100,000 \\
\text{Purchases Discount} & \quad 4,000 \\
\text{Cash} & \quad 96,000
\end{align*}
\]

If you wait until the end of the month to make payment, you would record the following entry:

\[
\begin{align*}
\text{Accounts Payable} & \quad 100,000 \\
\text{Cash} & \quad 100,000
\end{align*}
\]

Given the circumstances described above, what is the likelihood that you would make payment today?

\[
\begin{array}{ccccccccccl}
\text{VERY} & \text{VERY} & \text{VERY} & \text{VERY} & \text{VERY} & \text{VERY} & \text{VERY} & \text{VERY} & \text{VERY} & \text{VERY} & \text{VERY} \\
0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 & 8 & 9 & 10
\end{array}
\]

PLEASE INDICATE ANSWER BY PLACING A SLASH (/) ON THE LINE ABOVE.
APPENDIX 2

Net Method / Low Materiality

Assume that you are the controller for a mid-sized merchandising firm. For the past year, monthly sales for your firm have averaged $2,000,000 and monthly net income has averaged $200,000. As controller, your responsibilities include the approval of cash disbursements.

At present, a large portion of the merchandise that you sell is purchased from one manufacturer. Accordingly, payments to this manufacturer are a significant portion of your monthly disbursements. Based on the volume of your merchandise purchases and the credit history you have established with your supplier, you have been granted excellent credit terms. At present, your credit terms with your supplier are 4/10, n/30. Specifically, you are granted a 4% discount on purchases when payment is made within 10 days of delivery. Otherwise, the total amount (gross) of the invoice is due within thirty days. For your benefit, your supplier has set up an account at a local bank for you to deposit your invoice payments. This convenience allows you to wait until the afternoon of the 10th day after delivery to make payment and still receive credit within the discount period. Realizing the significance of this discount and the generous credit terms, you have always paid within the discount period. Ten days ago, you receive delivery of Invoice #201, an unusually large order. The gross amount of this invoice was $100,000.

In order to pay Invoice #201 within the discount period and claim the discount of $4,000, payment must be deposited in your supplier’s account this afternoon. Upon analysis, you determine that you do not have sufficient cash available to make payment today. In addition, you have no other immediate means to obtain cash.

However, if you make payment today and the anticipated cash receipts do not materialize, your bank will not cover the check and will return it to your supplier unpaid. Your supplier has specified, in your credit agreement, that if any payment is returned by the bank for insufficient funds, your credit terms (and discount) will be cancelled and all future purchases will be shipped C.O.D.

In accordance with your company’s accounting policies, all merchandise purchases are recorded and posted at the net amount. Therefore, if you make payment today (within the discount period), you would record the following entry:

\[
\begin{align*}
\text{Accounts Payable} & \quad 96,000 \\
\text{Cash} & \quad 96,000
\end{align*}
\]

If you wait until the end of the month to make payment, you would record the following entry:

\[
\begin{align*}
\text{Accounts Payable} & \quad 96,000 \\
\text{Loss on Forfeited Discounts} & \quad 4,000 \\
\text{Cash} & \quad 100,000
\end{align*}
\]

Given the circumstances described above, what is the likelihood that you would make payment today?

VERY UNLIKELY

0------1------2------3------4------5------6------7------8------9------10

PLEASE INDICATE ANSWER BY PLACING A SLASH (/) ON THE LINE ABOVE.

PLEASE INDICATE ANSWER BY PLACING A SLASH (/) ON THE LINE ABOVE.
<table>
<thead>
<tr>
<th>Appendix 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Please circle the number corresponding to the extent to which you believe you are presented with an ethical conflict in the above case.</td>
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</tbody>
</table>

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<th>No Conflict</th>
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<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>A Great Deal of Conflict</th>
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<tr>
<td>Suppose you decide to pay the invoice today. Please evaluate this action.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<th>2</th>
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<th>Ethical</th>
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<td>3</td>
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<td>7</td>
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<td>9</td>
<td>Unacceptable to My Employer</td>
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<tr>
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<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td>7</td>
<td>8</td>
<td>9</td>
<td>Does Not Violates an Unwritten Contract</td>
</tr>
<tr>
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<td>3</td>
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<td>7</td>
<td>8</td>
<td>9</td>
<td>Does Not Violate an Unspoken Promise</td>
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