Testing The Order And Framing Effect In Budgetary Decision-Making: Experimental Study

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Abstract: One of the important roles of management accountants, nowadays, is to provide input for managers in decision-making. The presentation order of the input and response modes used, either sequentially or simultaneously, can lead to order effects (either primacy or recency) that result in biased decision-making. Order effects in this study were analyzed using the Belief-Adjustment Model (Hogarth and Einhorn, 1992). Belief adjustment theory is applied as the main framework of this research and framing effects were added to get an explanation of the interactions and effect. This study aims to empirically examine the moderating effect of information framing on the belief revision process in the budget preparation. A laboratory experimental method was used in this study with a 2x2 between-subjects design and participants consisted of 108 accounts managers from a newspaper's business group. The hypotheses were tested using Two-Way ANOVA and found the existence of the recency effect. The finding indicates that in the step-by-step (sequential) response mode, the occurrence of recency effects can be mitigated by information framing.

1 INTRODUCTION

A perspective shift about the management accountant's role in a company is clear in this modern era. The traditional perspective about the management accounting system is not enough to describe the profession of management accountant. Brewer (2008) proposed a new framework regarding the management accountant's role in increasing the value of controlling interest, which is poured into four pillars, namely: leadership, strategic management, operational alignment, and continuous improvement and learning.

The strategic management accountant's role is to facilitate discussion among various functions in the firm. The report created by the management accountant is expected to help as a strategic decision-making tool to align all strategies in the firm. The management accountant is responsible for the availability of input in management decision-making. Information generated by the management accountant is accumulated in sequence, starting from varian analysis, through capital budgeting, until employee performance evaluations.

Sequential patterns of information presented can affect managers in decision-making due to bounded rationality (an individual condition in which they have limitations in processing information systemically and rationally because of limited information, time, memory capacity, etc.); hence, creating biased and non-optimal decisions. Biased decision-making is caused by the usage of heuristic strategy, which is a simplification in the decision-making process. One of the biases that can happen due to sequential information gathering is order effect, which means that managers are making judgments not based on the available information, being are more affected by the sequence of the consecutively obtained information. Order effect consists of primary effect, which means that one tends to give more weight to the information that was obtained first, so the last decision made is affected by this first-obtained information, and recency effect, which means that one tends to give more weight to the last-obtained information, so the last decision made is affected by this last-obtained information.

This order effect is very likely to happen in management accounting; one of the examples is in annual budget prepartion, which requires a few

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months to process the related information. This research is referring to the belief-adjustment model by Hogarth and Einhom (1992) with the assumption that managers are familiar with budgeting, and using a few short serial pieces of information for the sake of simplifiying the experimental cases.

2 LITERATURE REVIEW AND HYPOTHESES

Tversky and Kahneman (1981) explain the framing effect phenomena through prospect theory, which states that framing adopted by managers may affect the decision taken. Managers process the information obtained into solutions or decisions for a problem based on the adopted framing. Framing effect is an effect on the judgment made because of the information delivery method. The same information delivered with a different method will cause a different perspective. Framing effect can happen because of an information selection process that emphasizes only certain parts.

2.1. Order Effect

Research regarding the order effect that is analyzed using the belief-adjustment model (Hogarth & Einhorn, 1992) is related to the differences of information type, including information complexity, information length, and the response method to various information. This research uses a simple information type that involves only one item for every part of information that needs to be processed by the subject and is a familiar job for the subject. Short information (2-12 items) consists of four items – as mentioned in Ashton and Ashton's (1988) experiment. The response modes are either Step-by-Step (SbS), in which the subject is asked to revise their belief level sequentially every time information is obtained, or End-of-Sequence (EoS), in which the subject is asked to revise their initial belief level simultaneously at the time the last information is obtained.

The Belief-Adjustment Model that was developed by Hogarth and Einhorn (1992) assumes that one will finish the belief revision assignment generally using a gradual process of anchoring and adjustment in which the first opinion (anchor) is adjusted to a few information pieces that are obtained next. This research uses an experimental method in which the subject is asked to revise their belief about causal hypothesis in a management accounting context that is classified as an evaluation assignment, so the encoding of new information obtained can be either positive or negative.

2.2. Framing Effect

Framing refers to the possibility that a hypothesis can be evaluated by various alternatives (Tversky & Kahneman, 1981). Psychology research that tests the framing effect shows that a small difference in word arrangement or assignment presentation can change one's tendency, so it also affects the alternatives of the decision taken (Guiral & Esteo, 2006).

Decision-making can be affected by how the information is framed, either negative frame or positive frame. Belief level will decrease if positive information is obtained first and negative information next. The recency effect can be moderated using Information Framing (Fischhoff, 1983). The management accountant acts as an information provider to support management decision-making in which the information can be positively or negatively framed. It is possible that non-optimal decision-making can be avoided by framing the information relevant to the decision that is under consideration. Specifically, it can be said that positive framing can be used to reduce the unnecessary influence of negative information, and negative framing can be used to neutralize the unnecessary influence of positive information (Rutledge, 1995).

2.3. Belief-Adjustment Model and Order Effect

Hogarth and Einhorn (1992) imply that the manager evaluation may be influenced by the order of information acquisition, which may result in bias; hence, decision-making becomes less than optimal.

This may be related to how the management information system is designed to generate information and how the information is used by the management accountant (Dillard et al., 1991). The result of the study conducted by Hogarth and Einhorn (1992) will be re-examined in this research (especially in the management accountant context) to see whether the recency effect is proven to happen in a simple assignment with short and diverse information in SbS response mode, and also whether the primacy effect is proven to happen in a simple assignment with short and diverse information in EoS response mode. What is meant by diverse information is when the information obtained has different/opposite coding/type, such as positive

information, and then followed by negative information, or vice versa.

Based on the Belief-Adjustment Prediction Model (Hogarth & Einhorn, 1992) and the result of previous researches related to short, simple and diverse information presentation that resulted in the recency effect in SbS response mode, two hypotheses can be formulated as follows:

H1: A subject that receives information with the order of ++-- (positive-negative) will improve their belief to raise the budget higher than the subject that receives information with the order of --++ (negative-positive).

2.4. Framing

The thinking logic for the second hypothesis refers to Rutledge (1995), who states that if the order of information received is "positive-negative", then the primacy effect should be decreasing when the information is framed negatively. When the order of information received is "negative-positive", the primacy effect should be decreasing when the information is framed positively.

With an analogous approach, we believed that the same logic also applies in the recency effect bias that happens in EoS mode response, when the framing in the opposite model states that when the order of information received is in the order of "positive, negative", the recency effect should be decreasing, when the information is framed positively, so the second hypothesis is formulated as follows:

H2: A subject that receives information with the inappropriate frame (information with positive-negative order framed positively, and vice versa) will improve their belief level of a budget raised higher than a subject that receives information with the appropriate frame (information with positive-negative order framed negatively, and vice versa)

3 METHOD AND ANALYSIS

3.1. Experiment Design

This study used indoor experiments in which the independent variables are manipulated by the researcher. All participants were randomly assigned to each group in order to increase the probability of homogeneity between groups in the experiment (Nahartyo, 2012). The experiment began with the pilot test and then continued to the core experiment. The experimental study used in this study is a full 2x2 between-subject factorial pattern with information presentation order (two levels: positive-negative, negative-positive), and information framing (positive, negative). Between-subject design will compare the effect of different treatments on different subjects.

This study uses an experimental 110 accountants and managers involved in the budgeting process in several companies in one group that engaged with the daily national print media. Due to the nature of the newspaper business, they are very sensitive to the dollar rate (related to print pricing), basic electricity tariffs, fuel tariffs, minimum wages of workers and prevailing tax rates in Indonesia. This is due to an experimental instrument in the form of a budgeting case, so that participants are at least expected to understand the terms and objectives of the questions in the given case.

Before going into the core experiment, a pilot test is conducted. The purpose of the pilot test is to know the subject's understanding of the given case. The pilot test was conducted on 20 people on the 2013 Accounting Master's Program. They are grouped in fives. The pilot test results stated that the F is significant so the experimental questionnaire can be conducted.

The experimental subjects were randomly divided into four groups, with each group getting a different treatment.

Table 1: 2 x 2 ANOVA Experiment Design

2 x 2 ANOVA Experiment Design		
Information Presentation Order	Information Framing	
	+	-
++--	Sel 1	Sel 3
--++	Sel 2	Sel 4

Prior to the experiment, subjects were asked to fill in demographic data, and then they were given several types of treatment. Overall, researchers gave four different treatments in which each case gives different types of manipulation to the participants.

All participants were instructed to remain in the role of a subject who was estimating an increase in production budget and answering some questions related to production cost cases. Subjects are given

background information as well as some information related to the company's production costs in the current year. Then, the subject is requested to set an initial conviction level regarding the possibility of budget increase as the initial anchor.

Next, additional information is given in stages according to the group. Each group received different treatment. Each time they receive additional information, as mentioned above, the subject is asked to provide a revision of their conviction level related to a budget increase within a 100-point scale (0-100). After the experiment is completed, the subjects are asked to fill in a manipulation check question and then they were debriefed.

3.2. Operational Definition and Variable Measurement

The independent variable in this research is the sequence of information given, in the form of two positive information items and two negative information items, and framing information in the form of positive framing and negative framing.

The dependent variable in this research is the conviction level revision from participants that may cause Order Effect. Order Effect is obtained from the initial conviction level assessment to the last conviction level assessment.

3.3. Data Analysis and Hypothesis Testing Technique

A homogeneity test is performed to test ANOVA's assumption that each group (category) has the same variance. The homogeneity test used in this research is the Levene test. The Levene test criteria is whether the significance is < 0.05, so the group variance is not homogenous, but if the significance is > 0.05 then the data group variance is homogenous (Ghozali, 2011).

The analysis technique used in this research is Two-Way ANOV. Analysis of variance is a method for testing the relationship between one dependent variable (metric scale) with one or more independent variables (nonmetric or categorical scales). Two-Way ANOVA is used to test the relationship between one metric dependent variable and two or more categorical independent variables.

4 RESULTS AND DISCUSSIONS

Overall, subjects participating in this experiment were 110 people who were randomly assigned to four treatment groups (group 1 = 28 people; group 2 = 27 people; group 3 = 28 people; group 4 = 27 people). Of the 110 data subjects who participated, there were two people who did not pass the manipulation check, so only 108 subjects' data were to be processed and analyzed.

An individual characteristic difference test is conducted to know the even-ness distribution of each of the experimental subjects. For that reason, a randomization test is performed. Table 4.1 shows the randomization test result.

Table 2: Tests of Between-Subjects Effects

Dependent Variable: group

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	2,447[a]	4	.612	.475	.754
Intercept	171,361	1	171,361	133,156	.000
Gender	.317	1	.317	.246	.621
Education Level	2,218	1	2,218	1,724	.192
Age	.081	1	.081	.071	.905
Working Period	.302	1	.302	.234	.629
Error	132,553	103	1,287		
Total	810,000	108			
Corrected Total	135,000	107			

a. R Squared = .018 (Adjusted R Squared = -.020)

Based on Table 4.1, it is known that equivalence test results show that the F-test score from the gender of the participant = 0.246 (p = 0.621); the F-test score of the participant's educational level = 1,724 (p = 0.192; age of participant has an F-test score = 0.071 (p = 0.905), and the working period of participant has an F-test score of 0.234 (p = 0.629). Thus, it can be concluded that there is no significant difference between treatment groups or, in other words, all treatment groups are equivalent. Based on this condition, it is expected that the response of each group is not contaminated by differences in characteristics between individuals.

A homogeneity test is performed to test ANOVA's assumption that each group (category) has the same variance. Levene's test of homogeneity of variance is one of the tools to test the homogeneity of groups (categories). Levene testing's criteria is if significance > 0.05 then variance of the data group is homogeneous (Ghozali, 2011).

Table 3: Test of Homogeneity of Variances

Conviction Level Revision

Levene Statistic	df1	df2	Sig.
.465	7	99	.858

This research is using Analysis of Variance (ANOVA). Two-Way ANOVA is used to test the relationship between one metric dependent variable with two or more categorical independent variables.

Hypothesis 1: A subject that receives information with the order of ++-- (positive-negative) will raise their conviction level higher than a subject that receives information with the order of --++ (negative-positive). Theoretically, group 1 and group 3 responses (which are the subjects that received additional information with the order of ++-- in doing conviction level revision regarding the budget raise) will be higher than group 3 and group 4 responses (the subjects that receive additional information with --++ order).

Table 4.3 panel A presents the results of one-way variance analysis and it appears that the F-test value is 3.822 (p = 0.001). These results reflect significant differences in response between the treatments relating to the revision of conviction level in budget increase. Panel B shows the average response of participants to conviction level revision dependent variable. Participant responses in group 2 have a mean of 44.0741 and group 4 have a mean of 47.7778; this shows that their mean is lower than the participant responses in group 1, which have a mean of 55.9259, and group 3, which have a mean of 54.8148. This indicates that participants in group 2 and group 4 assess the conviction level revision regarding the budget increase lower than participants in group 1 and group 3. This difference is statistically significant, below 1 per cent (p = 0.001).

Table 4: ANOVA Test Result for Dependent Variable-Conviction Level Revision

Panel A: Table ANOVA

	Squared Amount	**df**	**Average Squares**	**F**	**Sig**
Between Group	9,552.775	8	1194.097	3.822	0.001
Intra Group	30,932.411	99	312.449		
Total	40,485.185	107			

Panel B: Average Treatment

	Group treatment	**Mean**	**Standard Deviation**	**Percentage**
Conviction Level Revision	Group1	55.9259	19.66239	27
	Group2	44.0741	16.23369	27
	Group3	54.8148	19.48774	27
	Group4	47.7778	15.27525	27
Total		50.6481	18.45799	108

Panel C: Contrast Mean

Contrast	**Significance**
Group1 vs Group2	0.039
Group2 vs Group3	0.028
Group1 vs Group3	0.036
Group2 vs Group4	0.039
Group1 vs Group4	0.017

Based on Table 4.3, it is known that hypothesis 1 is supported because the test results generate a p-value of 0.001 (≤ 0.05). The average subject that receives information with ++-- order experiences an increase in conviction level regarding the budget raise higher than the subjects receiving --++ information order. That result shows that the recency effect is happening because the last conviction level is more affected by the last information received. Therefore, H1 proposed in this research is supported by data.

Hypothesis 2: A subject that receives information with the inappropriate frame (information with positive-negative order is framed positively, and information with positive-negative order is framed negatively) will improve their belief level of budget raised higher than the subject that receives information with the appropriate frame (information with positive-negative order is framed negatively, and information with negative-positive order is framed positively). Theoretically, group 1 and group 4 responses (the subjects that received information with an inappropriate frame) in doing belief level revision regarding the budget raised will be higher than group 2 and group 3 responses (the subjects that received information with an appropriate frame).

Based on Table 4.3, it is known that hypothesis 2 is accepted because the mean response of group 1 was 55.9259, significantly higher than group 3, whose mean response was 54.8148 (p = 0.036). It is known that group 1 comprises subjects that received ++-- information with positive framing, while group 3 comprises subjects that received ++-- with negative framing. This means that the subject that receives information with an inappropriate frame (positive negative information order is framed positively) will increase their belief level regarding budget raised higher than subjects that receive information with an appropriate frame (positive negative information order is framed negatively).

The mean response of group 2 was 44.0741, significantly higher than group 4, whose mean response was 47.7778 (p = 0.039). It is known that group 2 comprises subjects that received --++ information order with positive framing, while group 4 comprised subjects that received --++ an information order with negative framing. This means that subjects that receive information with an inappropriate frame (negative positive information is framed negatively) will increase their belief level regarding budget raised higher than the subjects receiving information with an appropriate frame (negative-positive information order is framed positively). This shows that information framing can affect the recency effect that may show up due to obtaining diverse information. (The subject's last belief level is more affected by the last information obtained.) Hence, the proposed H2 in this research is supported by data.

5 CONCLUSIONS

Based on the result and analysis, we conclude that the existence of the recency effect is real. The attention of the subject when the information is provided in Step-by-Step mode is more weighed on the last information than the first information. The recency effect causes bias in budget decisions. However, this bias can be mitigated by framing the information with an inappropriate manner. If the order of information is ++--, then the framing of information should be positive (appropriate frame). If the order of information is --++, then the framing of information should be negative (inappropriate frame).

The next research can use group participants, not only individuals, because in reality the budgeting process in a firm is a participative process that combines several related opinions. The next research may also include variables in the form of anchor strength to further validate the use of framing in mitigating the recency effects, both in low or high anchor condition.

REFERENCES

Alvia, L., & Sulistiawan, D. (2012). The Impact of Cognitive Style to Recency Effect in Stock Investment: An Experimental Study. Available at SSRN 2201544.

Asare, S. K., & Messier Jr, W. F. (1991). A review of audit research using the belief-adjustment model Auditing (pp. 75-92): Springer.

Ashton, A. H., & Ashton, R. H. (1988). Sequential belief revision in auditing. Accounting Review, 623-641.

Bamber, E. M., Ramsay, R. J., & Tubbs, R. M. (1997). An examination of the descriptive validity of the belief-adjustment model and alternative attitudes to evidence in auditing. Accounting, Organizations and Society, 22(3), 249-268.

Biyanto, F. (2001). Hubungan pembingkaian informasi anggaran, tanggung jawab, dan pengalaman terhadap pilihan keputusan pada investasi berisiko. Universitas Gadjah Mada.

Brewer, P. C. (2008). Redefining management accounting: Promoting the four pillars of our profession. Strategic finance, 27-35.

Dillard, J. F., Kauffman, N. L., & Spires, E. E. (1991). Evidence order and belief revision in management accounting decisions. Accounting, Organizations and Society, 16(7), 619-633.

Fischhoff, B. (1983). Predicting frames. Journal of Experimental Psychology: Learning, Memory, and Cognition, 9(1), 103.

Ghozali, I. (2011). Aplikasi Multivariate dengan Program IBM SPSS 19. Semarang: Badan Penerbit Universitas Diponegoro.

Guiral, A., & Esteo, F. (2006). Are Spanish auditors skeptical in going concern evaluations? Managerial Auditing Journal, 21(6), 598-620.

Gunawan, B., & Yusuf, M. H. (2012). PENGARUH ORDER EFFECT DAN POLA PENGUNGKAPAN DALAM PENGAMBILAN KEPUTUSAN INVESTASI. InFestasi, 8(2), 123-136.

Hogarth, R. M., & Einhorn, H. J. (1992). Order effects in belief updating: The belief-adjustment model. Cognitive psychology, 24(1), 1-55.

Krishnamoorthy, G., Mock, T. J., & Washington, M. T. (1999). A comparative evaluation of belief revision models in auditing. Auditing: A Journal of Practice & Theory, 18(2), 105-127.

Nahartyo, E. (2012). Desain dan Implementasi Riset Eksperimen. Yogyakarta: UPP STIM YKPN.

Nasution, D. (2007). Pengaruh urutan bukti, gaya kognitif, dan personalitas terhadap proses revisi keyakinan. Universitas Gadjah Mada.

Pei, B. K., Reed, S. A., & Koch, B. S. (1992). Auditor belief revisions in a performance auditing setting: An application of the belief-adjustment model. Accounting, Organizations and Society, 17(2), 169-183.

Pinsker, R. (2011). Primacy or recency? A study of order effects when nonprofessional investors are provided a long series of disclosures. Behavioral Research in Accounting, 23(1), 161-183.

Rutledge, R. W. (1995). The ability to moderate recency effects through framing of management accounting information. Journal of Managerial Issues, 27-40.

Sugiyono. (2008). Metode Penelitian Pendidikan. Bandung: Alfabeta.

Sukardi. (2011). Metodologi Penelitian Pendidikan. Jakarta: Bumi Aksara.

Susanto, B., & Nahartyo, E. (2008). Pengaruh Tanggungjawab, Motivasi Intrinsik, dan Pembingkaian Informasi Anggaran Dalam Pengambilan Keputusan Investasi Dengan Group-Shifts Sebagai Variabel Pemoderasi. Tesis tidak dipublkasikan.

Tubbs, R. M., Messier Jr, W. F., & Knechel, W. R. (1990). Recency effects in the auditor's belief-revision process. Accounting Review, 452-460.

Twersky, A., & Kahneman, D. (1981). The framing of decisions and the psychology of choice. Science, 211, 453-458.