Outcome Effects and Capacity Cost Reporting

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1.0 Introduction

Underutilized capacity resources are a major concern in many organizations (Consortium for Advanced Manufacturing - International (CAM-I) 1996). When companies are unaware that underutilized capacity resources exist, lost profit opportunities or unnecessary investment can result (see Brausch and Taylor (1997, 44) and Ansari et. al (1997,1) for specific industry examples). In an effort to manage capacity resources in a cost-effective manner, academic (e.g. Ostrenga 1988; Cooper and Kaplan 1992; Hansen and Mowen 1994; DeBruine and Sopariwala 1994) and industry (e.g. CAM-I 1996) groups are promoting an easy way to manage capacity resource costs: explicitly reporting capacity usage information to decision makers. One consistent message provided by the preceding literature is that organizations are frequently unaware of underutilized capacity resources. By measuring and explicitly reporting unused capacity resources, "awareness" of underutilized resources is purportedly improved and decision makers can more effectively manage capacity resources.

While implementing an explicit capacity reporting system obviously offers potential benefits, it is important to also consider potential risks associated with an explicit capacity reporting system. In this paper, we consider whether explicit capacity reporting systems lead to biased performance evaluations or "evaluator outcome effects." Although explicit capacity reporting may improve ex-ante capacity decisions, explicitly identifying unused capacity resources can also bias ex-post evaluations. We provide experimental evidence that, whenever ex-post unused capacity exists, evaluator outcome effects (i.e. biased evaluations) also exist if an explicit capacity reporting system is used. However, evaluator outcome effects do not exist when a traditional reporting system is used. We discuss this finding in light of recent academic guidance regarding how accountants can mitigate biased evaluations associated with ex-post outcomes (Frederickson et. al 1999).

The remainder of the paper is organized as follows. The next section briefly contrasts explicit capacity reporting and traditional reporting. Section 3 discusses the outcome effect and presents our hypothesis. Section 4 describes our experimental method and results. The final section discusses implications and limitations of this study.

2.0 Traditional Reporting vs. Capacity Reporting

Although industry groups and some individual companies (e.g., Catepillar, General Motors, and IBM) promote a comprehensive and detailed capacity measurement and reporting system (CAM-I 1996, 13), management accountants have largely focused on measuring and reporting unused capacity cost information (Ostrenga 1988; Cooper and Kaplan, 1992; Hansen and Mowen 1994). While traditional capacity costing methods (e.g. budgeted, normal, and actual costing) attempt to report *all* capacity costs as a product cost[1], proponents of capacity cost reporting argue that total capacity costs should *not* be assigned to current output as a product cost. Instead, capacity costs should be separated into the portion that is used to make current output and the portion that is unused.

The portion that is unused explicitly brings an opportunity cost to management's attention.

Figure 1 demonstrates the difference between traditional reporting and explicit capacity cost reporting using a simple example. Although the reporting systems in Figure 1 are simple format variations, the capacity costing system purportedly sends a useful signal to decision makers (Hansen and Mowen 1994, 83; Cooper and Kaplan 1992, 6)[2]. If decision makers do not fully consider the opportunity cost of unused capacity, then explicitly presenting such information (via the capacity cost report) increases the chance that opportunity costs will be considered (Sanbonmatsu et. al 1997).

Figure 1

COMPARISON 1: (Unused Capacity Exists)	
TRADITIONAL REPORTING	
Revenue	1,545
Total Expenses	- 1,536
Profit	9
CAPACITY COST REPORTING	
Revenue	1,545
Productive Expenses	- 1,236
Cost of unused capacity	- 300
Profit	9
COMPARISON 2: (Unused Capacity Does Not Exist)	
Traditional Reporting	
Revenue	1,920
Total Expenses	- 1,536
Profit	384
CAPACITY COST REPORTING	
Revenue	1,920
Productive Expenses	- 1,536
Cost of unused capacity	0
Profit	384

3.0 Motivation and Hypotheses

Capacity decision making occurs under conditions of uncertainty; however, decision *evaluation* typically occurs after outcome information has been at least partially realized. This creates an opportunity for outcome information to bias the performance evaluations of capacity decision makers (who make ex-ante decisions). The accountability literature (c.f., Tetlock 1983) has demonstrated that many decision makers anticipate and modify their decisions to receive favorable evaluations from their decision evaluators. Thus, it is important to understand capacity reporting's implications on *decision evaluators.*

Brown and Solomon (1987, 1993) label performance evaluation bias caused by outcome information as an "outcome effect," a phenomenon closely related to the hindsight bias (Fischhoff 1975) and the curse of knowledge (Camerer et. al 1989)[3]. Generally speaking, the outcome effect refers to the tendency to judge events as being more predictable *after* outcome information is known[4]. In an uncertain environment, unused capacity reporting can direct managerial attention toward how well capacity resource supply accommodates capacity resource demand. While directing managerial attention is one stated benefit of unused capacity reporting (Cooper and Kaplan 1992; McNair and Vangermeersch 1996) one possible detriment is that explicit capacity reporting increases evaluator outcome effects.

Specifically, the capacity cost reporting format may cause evaluators to associate explicitly reported ex-post unused capacity costs with ex-ante decision quality. In the words of Creyer and Ross (1993, 61) the evaluator incorrectly believes that the capacity decision maker "should have known it all along." Conversely, without separately reporting unused capacity costs (i.e. using traditional reporting systems), any non-normative association between ex-post unused capacity costs and ex-ante decision quality is mitigated.

Under the condition of unused capacity costs, explicit capacity reporting precisely displays an apparent mismatch between capacity resource supply and capacity resource demand, thus creating an opportunity for evaluator outcomes. Formally stated:

H1: When ex-post unused capacity costs exist, larger evaluator outcome effects will occur when unused capacity is explicitly reported relative to when unused capacity is not explicitly reported, *ceteris paribus.*

By contrast, zero unused capacity costs (i.e. fully employed capacity resources) do not precisely display how well supply matches demand. Zero unused capacity could mean capacity resource supply perfectly matches demand or it could mean that capacity resource demand exceeds supply. As such, when unused capacity costs do not exist, capacity reporting and traditional reporting provide equivalent information. Comparison 2 in Figure 1 demonstrates the equivalency of the two types of reporting when unused capacity does not exist. Given that traditional reporting and capacity reporting provide equivalent information when unused capacity does not exist, we focus our investigation on situations where unused capacity *does* exist in order to identify potentially dysfunctional behavior (i.e., biased performance evaluations).

4.0 Experiment

4.1 Participants and Experimental Instrument

A total of eighty-two participants were recruited from undergraduate finance and accounting classes at a large public university. The Camerer et. al (1989) two-stage method of providing performance-contingent incentives in an outcome effect environment was employed. As such, participants were either part of the (first stage) pre-test group (n = 18) or the (second stage) test group (n = 64). The Appendix reproduces the experimental instrument.[5]

In the first stage, the pre-test group completed the experiment in order to form a benchmark for the test group. The pre-test group read background information and re-

viewed two hypothetical capacity decisions. Afterward, the pre-test group was asked to evaluate each capacity decision on a 15-point rating scale.[6] For each decision, the pre-test group's average performance evaluation was computed. The average evaluations served as a target for test subjects in the second stage.

In the second stage, sixty-four participants (i.e. the "test group") read the same case information and reviewed the same hypothetical capacity decisions as did the pre-test group. Test subjects were offered additional compensation (up to an additional $15) based on how closely they could match the average evaluations made by the pre-test group.[7] Test subjects were repeatedly and explicitly told that pre-test subjects did not have access to any outcome information; therefore, any outcome information received by test subjects should have been considered irrelevant. That is, we intentionally biased subjects against finding outcome effects. If subjects were not explicitly told that pretest subjects did not have access to outcome information, then subjects could have interpreted the inclusion of outcome information as an implicit instruction to use outcome information. Consequently, repeatedly reminding subjects that outcome effects *should* be ignored (and providing monetary incentive to ignore outcome information) allows us to distinguish between (1) true outcome effects and (2) subjects simply following implied directions.

4.2 Experimental Design

A split-plot design was employed using three between-subjects groups and one within-subjects treatment. Each test group participant was randomly placed in one of three outcome groups: (1) no outcome information, (2) capacity cost reporting outcome information, or (3) traditional cost reporting outcome information.[8] While these between-subject groups test for outcome effects in a straightforward manner, the single within-subjects treatment (described below) is relatively subtle.

By design, one capacity decision was intended to be "appropriate" (henceforth, the "ex-ante good" decision) while the second capacity decision was intended to be "insufficient" (henceforth, the "ex-ante bad" decision). All test-group subjects received one ex-ante good and one ex-ante bad decision.[9] Also by design, all subjects who received outcome information (i.e., "capacity" or "traditional" outcomes) received unfavorable outcomes (i.e., ex-post unused capacity costs always occurred.)

The following illustrates the within-subjects treatment in conjunction with the experimental hypothesis. In the ex-ante good decision case, the hypothetical decision maker selects 128 units of capacity (similar to the stated "average" required capacity). Although this decision appears to be a good decision ex-ante, if the decision evaluator is biased by outcome information (i.e. ex-post unused capacity information), then ex-post evaluations will suffer. That is, the supply of capacity resources was much greater than realized demand (more than 20% unused resources). In contrast, the second hypothetical decision maker selects 107 units of capacity - too few units of capacity considering the "average" requirement. However, if the outcome information (i.e. unused capacity information) influences the decision evaluator, then the decision appears relatively appropriate. That is, the supply and demand of capacity resources are approximately equal (less than 2% unused resources).[10] In summary, unfavorable outcomes resulted in ex-ante good decisions becoming ex-post bad decisions and *vice versa.* The experimental cells and complete model are summarized in Figure 2.

Figure 2

Hypothesized Outcome Effects

		Within-Subjects Manipulation: *The hypothetical decision was...*	
		Ex-ante Good (ex-post bad)	*Ex-ante Bad (ex-post good)*
Between Subjects Manipulation	*No Outcome (Control Group)*	**Baseline: Relatively Good Evaluation**	**Baseline: Relatively Bad Evaluation**
	Traditional Cost Reporting Outcome Group	**Prediction: Slightly worse than Baseline**	**Prediction: Slightly better than Baseline**
	Capacity Cost Reporting Outcome Group	**Prediction: Much worse than Baseline**	**Prediction: Much better than Baseline**

4.3 Experimental Results

Test subjects were instructed to match performance evaluations with pre-test subjects *who had no outcome information;* consequently, participants with outcome information maximized their performance incentive by *ignoring* outcome information. Although the financial incentive provided to participants is biased against supporting our hypothesis, performance evaluation ratings were nevertheless consistent with outcome effects (Figure 2 summarizes how outcome effects would occur in our research design).[11] The average performance evaluation ratings provided by all participants are presented in Figure 3.

In both the relatively good and relatively poor ex-ante decision conditions, outcome information caused evaluator outcome effects. Within the ex-ante good decision condition, the control group's average evaluation rating ($\underline{M}$ = 1.7) was closer to an "appropriate" evaluation (i.e. 0) relative to both the traditional reporting group ($\underline{M}$ = 2.0) and the capacity reporting group ($\underline{M}$ = 2.5). Thus, unfavorable outcome information caused participants to evaluate the capacity decisions as being relatively excessive. Conversely, within the ex-ante bad decision condition, the control group's average evaluation rating ($\underline{M}$ = -3.8) was closer to an "insufficient" evaluation relative to both the traditional reporting group ($\underline{M}$ = -3.2) and the capacity reporting group ($\underline{M}$ = -2.7). Thus, unfavorable outcome information caused participants to evaluate the capacity decisions as being relatively appropriate. Again, participants with outcome information explicitly knew that pre-test subjects did not have outcome information; regardless, outcome information appears to have impacted evaluation ratings.

Repeated-measures analysis of variance was performed in order to assess the significance of these rating differences. When all test-subject groups are analyzed, the between-subjects manipulation is not a significant source of performance rating variation (F = 1.52, p = .22). Further analysis revealed that the statistically insignificant results of the complete model are due to the inclusion of the traditional reporting outcome group. When each outcome method is compared to the no outcome group (as outlined in Figure 2), significant outcome effects are observed in the capacity reporting condition, but not in

Figure 3

Actual Results

Note: The experimental rating scale is centered on zero. As such, ratings closer to zero reflect "more appropriate" ratings relative to ratings further from zero.

		Within-Subjects Manipulation *The hypothetical decision was...*	
		Ex-ante Good (ex-post bad)	*Ex-ante Bad (ex-post good)*
Between Subjects Manipulation	*No Outcome (Control Group (n = 18)*	**Baseline: Average Evaluation 1.7**	**Baseline: Average Evaluation -3.8**
	Traditional Cost Reporting Outcome Group (n = 32)	**Average Evaluation 2.0**	**Average Evaluation - 3.2**
	Capacity Cost Reporting Outcome Group (n = 31)	**Average Evaluation 2.5***	**Average Evaluation - 2.7***

*Repeated-measures ANOVA comparing the no outcome group to the capacity reporting outcome group reveals a significant difference at the p = .06 level.

the traditional reporting condition. Specifically, a repeated-measures ANOVA comparing the no outcome group to the capacity reporting outcome group reveals that outcome information is a significant source of performance rating variation ($F = 3.64$, $p = .06$). However, when the no outcome group is compared to the traditional reporting group, outcome information is not a significant source of performance rating variation ($F<1$).[12]

5.0 Implications and Limitations

In an effort to improve capacity resource management, recent managerial accounting literature promotes the explicit measurement and reporting of unused capacity costs. While this practice offers purported benefits such as improved organizational communication (CAM-I 1996) and improved recognition of capacity resource inefficiencies (Cooper and Kaplan 1992; McNair and Vangermeersch 1996), explicitly reporting unused capacity cost information is not yet a widespread practice (Brausch and Taylor 1997). Assuming organizations become increasingly cognizant of the potential benefits offered by capacity reporting systems (and therefore increasingly adopt such systems), it is important to understand the potential detriments from a capacity reporting system. Although capacity reporting systems lead to greater awareness of underutilized resources, that awareness may, at times, prove to be detrimental. This study investigates one potentially detrimental situation; namely, explicitly reporting unused capacity costs can lead to biased performance evaluations whenever unused capacity exists. Using an experimental methodology, we find evidence that capacity reporting leads to evaluator outcome effects not present in traditional reporting systems.

The asymmetric nature of capacity reporting leads to such outcome effects because capacity reporting provides inconsistent feedback relative to traditional reporting. For example, when a traditional reporting system is used demand realization (favorable or unfavorable) does not systematically bias performance evaluations. However, when a capacity reporting system is used, unfavorable demand realizations that yield explicitly reported unused capacity costs lead to relatively negative performance evaluations. Given that the accountability literature (c.f., Tetlock 1983) has demonstrated that decisions are modified in order to receive favorable performance evaluations, our findings suggest that capacity decision makers have an incentive to systematically reduce excess capacity in order to guard against the possibility of unfavorable demand realizations. While such capacity decisions can be economically sub-optimal from an organizational perspective, these decisions bias individual performance evaluations.[13] Furthermore, the incentive for individuals to reduce excess capacity could result in choices that inappropriately increase production. The potentially excessive inventory from those choices would (1) run counter to the objectives of Just-In-Time inventory systems and (2) be subject to a higher risk of obsolescence.

Fortunately, recent experimental research finds that the magnitude of outcome effect bias is systematically impacted by organizational factors that management accountants can likely influence. Specifically, Frederickson et. al (1999) find that (1) prior experience working under an outcome-based reporting system and (2) more frequent outcome reports increase the magnitude of outcome effect bias. To the extent that management accountants can (1) design decision based evaluation schemes and (2) limit the capacity reporting frequency observed by decision evaluators, the biased outcome effects observed in this study are likely to be mitigated.

In order to avoid overstating the inferences that can be drawn from this study, several limitations should be acknowledged. First, this experiment was designed to isolate potential detrimental effects of capacity reporting. As such, we focused on situations where excess capacity does exist, but we did not investigate how our findings might interact with various causes of that excess capacity. We also did not examine potential benefits from capacity reporting nor the methods of mitigating evaluation bias described by Frederickson et. al (1999). Further, we did not consider whether similar outcome effects would result in response to standard variance feedback. Finally, individual decision makers using basic capacity costing reports were investigated in this study. However, capacity decisions in practice are made in an interactive, interpersonal environments where group dynamics likely affect capacity decisions.[14] These offer interesting avenues for future research.

Nevertheless, we demonstrate that the capacity reporting format affects performance evaluations *even when evaluators have an explicit incentive to ignore outcome information.* As such, we provide one reason why a capacity reporting format can lead to incongruent goals between an organization and a capacity decision maker within that organization. Although capacity reporting systems offer many potential benefits, it is important to consider the risks of capacity reporting before implementing such systems.

Appendix

Experimental Instrument

Introduction (***Pre-test Participants begin with the section titled "case overview"***)

This is a study of performance evaluation that should take about 15 minutes. You will earn $5 for your participation. You can earn up to $20 based upon your performance.

Task Enclosed is a brief case patterned after the university's Executive MBA Seminar. This Seminar is a non-mandatory luncheon in which a guest speaker discusses a business topic. Because lunches must be ordered before learning how many Executive MBA students will attend Seminar, lunch-ordering decisions are difficult. Approximately one month ago, 18 undergraduate business students completed this study. These students were asked to (1) read the same case information that you will read, (2) review the lunch-ordering decisions made by two hypothetical meal coordinators, and (3) evaluate these lunch-ordering decisions. In exchange for their effort, each student was paid a $5 participation fee. In this part of the study, you are asked to evaluate the same lunch-ordering decisions. In addition to the case information that the previous 18 students read, you will also receive financial information describing how many Executive MBA students attended each luncheon. This information was not available to the eighteen students who previously completed this study.

Compensation You can earn additional compensation if your evaluations are similar to the average evaluations obtained from the 18 previous student participants. You will try to match the evaluations of the 18 previous student participants using the same 15-point scale used by the previous participants. Students who best match the 18 previous student participants will receive additional compensation as follows:

The 1st and 2nd best matches:	$15 each
The 3rd and 4th best matches:	$10 each
The 5th and 6th best matches:	$ 5 each

You will be paid in cash at the end of this session.

Case Overview Time is essential to Executive MBA students. These students work full-time jobs during the week and attend intensive classes during the weekend. In order to optimize time, the Seminar is offered during the break between Saturday's required Executive MBA classes. The Seminar consists of a lunch and a presentation made by a guest business speaker. Attendance is voluntary.

Lunch Decisions Executive MBA students pay $15 to attend each Seminar. These students expect a quality meal. The Alumni Center's catering service has consistently offered high quality lunches at a reasonable cost. The Alumni Center sets up for the Seminar, prepares and serves all lunches, and cleans up after the Seminar. The standard Alumni Center lunch costs $16 per plate; however, the Executive MBA program has obtained a discounted price of $12 per plate. The $4 discount is due to the fact that (1) the Executive MBA program pre-purchases meals and (2) the Executive MBA program errs on the side of purchasing too many meals rather than too few meals. In short, a good relationship exists between the Executive MBA program and the Alumni Center. On average, 120 out of the total 140 Executive MBA students attend each Seminar. While 120 is the average number of students who attend Seminar, attendance has ranged from 85 stu-

dents to 137 students. Because liberal meal orders are made (too many meals rather than too few), an average of 125 meals are purchased for each Seminar. On the rare occasions when the number of students attending Seminar exceeds the number of pre-purchased meals, the Alumni Center has added additional place-settings at the $12 discount price. Both the frequency and the magnitude of inadequate meal purchases strains the Executive MBA program's relationship with the Alumni Center. In short, pre-purchasing too few meals costs the Executive MBA program goodwill, and jeopardizes the long-term contract with the Alumni Center.

Below are the most important factors that affect Seminar attendance:

Impending Exams and Group Projects When exams or projects are scheduled during the Saturday afternoon classes, many students forego the Seminar in order to study or complete a project.
Weather Students must walk from the business school to the Alumni Center in order to attend the Seminar. Poor weather reduces the number of students who attend.
The Seminar Speaker's Reputation If the guest business speaker is well known, more students attend the Seminar.
Advertising the Speaker Executive MBA students promote certain guest speakers. For example, if the speaker is from Motorola, an Executive MBA student from Motorola might e-mail all Executive MBAs to encourage Seminar attendance. A compelling e-mail message typically increases Seminar attendance.

Saturday Seminar meals must be ordered by Friday afternoon.

Performance Evaluation 1

A hypothetical meal coordinator faced the following conditions.
On a particular Friday, the Seminar meal coordinator knew:

- Five of the 140 Executive MBA students could not attend weekend classes due to work conflicts.
- No exams or projects were scheduled for Saturday afternoon classes.
- The guest speaker was not extremely well known. However, her topic was of interest to many students.
- The weather forecast stated a 10% chance of rain the next day.
- No Executive MBA students promoted the guest speaker via e-mail.

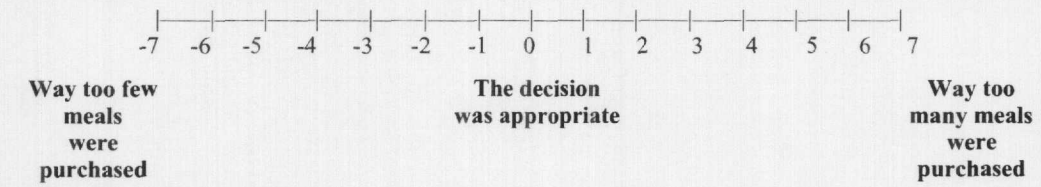
The meal coordinator pre-purchased 128 meals. Assume the following outcome resulted:

Displayed performance report depended upon the experimental manipulation. The "no outcome" group did not receive outcome information. The "outcome" groups received either the traditional report or capacity cost report shown in Figure 1, Comparison 1.

The 18 previous student participants evaluated the meal coordinator by answering the preceding question using the 15-point scale provided. The financial information you have seen was not available to these students. **Your task is to estimate as closely as possible the average evaluation that the previous student participants provided.** Those of you

who best match the average evaluation score will receive additional compensation as described on page 1.

Performance Evaluation:
How strongly do you believe the meal coordinator's pre-purchasing decision of 128 meals was the best possible decision? Indicate your evaluation by **precisely** placing an "X" at the appropriate position.



Performance Evaluation 2

A hypothetical meal coordinator faced the following conditions.
On a particular Friday, the Seminar meal coordinator knew:

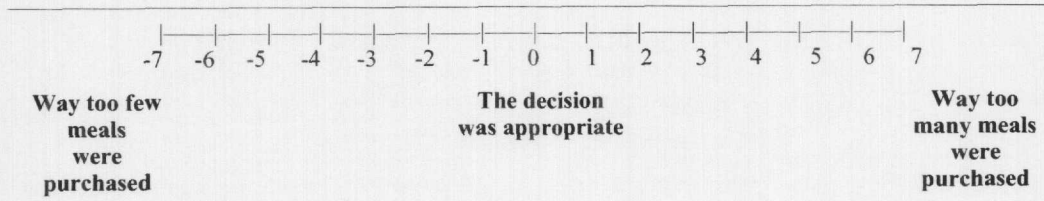
- Two of the 140 Executive MBA students could not attend weekend classes due to work conflicts.
- No exams or projects were scheduled, however, one group of MBA students (six total students) was presenting a report during Saturday afternoon classes.
- The guest speaker was fairly well known. His topic had been discussed at length in a previous class discussion.
- The weather forecast stated a 5% chance of rain the next day.
- No Executive MBA students promoted the guest speaker via e-mail.

The meal coordinator pre-purchased 107 meals. Assume the following outcome resulted:

Performance Reports Similar to Figure 1 Comparison 1 were shown (Performance Report depends upon the experimental manipulation).

The 18 previous student participants evaluated the meal coordinator by answering the preceding question using the 15-point scale provided. The financial information you have seen was not available to these students. **Your task is to estimate as closely as possible the average evaluation that the previous student participants provided.** Those of you who best match the average evaluation score will receive additional compensation as described on page 1.

Performance Evaluation:
How strongly do you believe the meal coordinator's pre-purchasing decision of 128 meals was the best possible decision? Indicate your evaluation by **precisely** placing an "X" at the appropriate position.



Ackowledgements

We appreciate the helpful comments made by Steve Kachelmeier and two anonymous reviewers.

Endnotes

1. Typically, estimation error is shown through variances. For example, when actual sales are less than budgeted sales in a traditional system an under applied volume variance results (i.e. although the *intent* is to apply all capacity costs to output units, over-budgeting sales leads to the variance). By definition, under applied volume variances ≤ unused capacity costs (equivalence occurs when budgeted sales are at full capacity). In contrast, over applied volume variances have no corresponding signal in a capacity costing environment. The measurement and theoretical differences between volume variances and explicit capacity reporting are discussed in detail by Cooper and Kaplan (1992; 3).

2. While Cooper and Kaplan (1992) also discuss product-costing benefits associated with isolating unused capacity costs, investigating product-costing benefits (which are based on product cost determination that is independent of output volume) is beyond the scope of this study because the current paper investigates evaluation effects associated with report format.

3. Following the precedent of Baron and Hershey (1988) and Brown and Solomon (1987; 1993). we use the terminology "outcome effect" rather than "hindsight bias" because this study's dependent variable is decision appraisal, not probability judgment.

4. See Kennedy (1995) for a related study in an audit setting.

5. We selected an experimental task with a perishable good (food service) in order to avoid complications caused by inventory. Specifically, changing inventory levels can cause income differences between capacity costing and traditional costing methods due to the timing of inventory cost assignment and inventory sales. Our perishable goods task allows us to clearly focus on the reporting format differences between capacity costing and traditional costing.

6 As shown in the appendix, the scale was centered on an "appropriate" capacity decision. Scale-end-points represented "insufficient" (i.e., -7) and "excessive" (i.e., +7) capacity choices.

7. Pre-test subjects received a $5 participation wage. Test subjects received both a participation and a possible performance-based wage. On average, test subjects received a total of $10.63 for their participation in the 20-minute experimental session.

8. The no outcome group was necessary for valid comparisons to be made with the outcome groups. Although pre-test subjects had no outcome information, the pre-test and test groups had different incentive structures; therefore, a test group with no outcome information was necessary.

9. The order of within-subject treatment (i.e., ex ante good and ex ante bad) was counterbalanced to control for potential order effects. In addition, we cosmetically varied the two sets of subjective information in order to avoid possible demand effects (Swinyard 1993, 274). For both the pre-test subjects and the test subjects, no significant differences be-

tween the two sets of subjective information were found ($F < 1$), indicating that participants were not influenced by this cosmetic change.

10. Maintaining some (small) amount of unused capacity costs rules out the possibility that negative evaluations occurred for *any* unused capacity signal (relatively big or relatively small).

11. One test subject (out of sixty-four) responded that too little capacity was chosen in ex-ante good decision case while an appropriate amount of capacity was chosen in the ex-ante bad decision case. In addition, this subject proposed that the optimal amount of capacity was 141 units when the instructions specifically stated that 140 units of capacity was the maximum amount of possibly required capacity. This subject was excluded from all analyses, leaving a total test sample of sixty-three subjects. Including this subject does not affect reported results.

12. No interaction between outcome information and ex-ante capacity decision (good or bad) was observed in any analysis ($F<1$ for all analyses).

13. Even if reported unused capacity is not explicitly tied to performance evaluation, implicit incentives to minimize reported unused capacity may exist. Luft (1994) discusses decision maker incentives caused by implicit contracts.

14. For example, most CAM-I capacity models assign responsibility for unused capacity to various decision makers within an organization. As such, if an operations manager adopts JIT, production personnel would not be responsible for this unused capacity.

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