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TABLE OF CONTENTS

Using Different Probability Distributions for Managerial Accounting Technique: The Cost-Volume-Profit Analysis Hassan A. Said	3
Sarbanes-Oxley and the Fishing Expedition Mark Aquilio.....	25
Effectiveness of Auditing Curricula Revisited Blouch, Michenzi and Ulrich.....	37
Investigation of Determinants of Operational Efficiency of CPA Firms In The UK Elsayed A. Kandiel and Mohamed Djerdjouri.....	57
An Analysis of Transfer Pricing Policy and Notable Transfer Pricing Court Rulings Mitchell Franklin and Joan K. Myers.....	73
Radar Charts and The Paradigm of Cognitive Fit: Implications for Accounting Research and Practice Phillip D. Harsha and Christopher S. Hines.....	86
Impact of Expenses, Turnover And Manager Tenure on Blend Fund Performance Richard Kjetsaa and Maureen Kieff.....	99
Changes in Student Moral Reasoning Levels from Exposure to Ethics Interventions In A Business School Curriculum Lisa Flynn and Howard Buchan.....	116
A Teaching Case on the Benefits and Costs of Restaurants Using <i>Opentable</i> Online Restaurant Reservations Thomas L. Barton and John B. Macarthur.....	126
Going Concern: Decision Usefulness or Harbinger of Doom? Fischer, Marsh and Brown.....	136
CY 2016 Home Health Prospective Payment System Rate Update for Medicare Programs Gonzalo Rivera Jr., and Paul Holt.....	147
Able Accounts: A New Tax Provision for Disabled Americans Mccarthy, Pilato and Silliman.....	156
The Impact of Dodd-Frank on The Economy and Financial Institutions Five Years Later Ronald A. Stunda.....	167

USING DIFFERENT PROBABILITY DISTRIBUTIONS FOR MANAGERIAL ACCOUNTING TECHNIQUE: THE COST-VOLUME-PROFIT ANALYSIS

Hassan A. Said

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ABSTRACT: The stochastic cost-volume-profit (CVP) analysis has received ample attention in the accounting, finance, and economics literature, not only because it is a pivotal technique, but also because methods developed in these areas are often transferable to stochastic applications of decision science problems. Because CVP analysis is based on statistical models, decisions can be broken down into probabilities that help with short-term decision-making objectives. This study explores, investigates, and applies the CVP model to four different statistical distributions. Rather than rendering an exact mathematical model, the analysis is based on specific input information and requires tremendous attention to details, the best that CVP can do is provide approximate answers to practical problems. The CVP's assumptions embodies sacrifices of the model's pragmatism and accuracy, however, advancements in software technologies have made cost, effort, and time inexpensive to estimate the variables making solutions stochastically more feasible. Undoubtedly, an "exact" solution to an unrealistic model has very little practical value. Ultimately, management's acumen has to be made after careful consideration of inputs and not just rely solely on the model statistical outcomes.

Keywords: CVP analysis; probability distribution; Beta-PERT; Skewness; Kurtosis; EasyFit

INTRUDUCTION

The use of cost-volume-profit (CVP) analysis has application not only in the manufacturing sector but also for financial services entities (Basu et al. 1994). Despite a considerable research literature progress on CVP analysis, that has accumulated since the seminal contribution of Jaedicke and Robichek (1964), this advancement has been almost entirely unheeded by textbooks authors of accounting and finance. Like all financial models, CVP, is based on a set of simplifying assumptions that reduce the complexity of input and output variables to make decision making more tractable. To understand a financial model and its usefulness, its assumptions and their role in a decision must be understood. According to Horngren and Foster (2010), the basic CVP model is subject to ten essential assumptions and limiting conditions: behavior of costs and revenues is linear, selling prices are constant, prices of production inputs are constant, all costs can be categorized into their fixed and variable elements, total fixed costs remain

Said

constant, total variable costs are proportional to volume, efficiency and productivity are constant, the model involves a constant sales mix or a single product, revenues and costs are being compared over a unit-volume base, and volume is the only driver of costs. Learning the basic deterministic CVP model is fortunate for students, but an understanding of the generalization of the model to uncertainty situations and relaxing some of its limiting conditions is an added improvement. A CVP model that incorporated uncertainty would hence provide a good entry point into the essential but challenging topic of decision-making under uncertainty. Virtually all real-world business decisions take place under conditions of uncertainty, and that at least some modest degree of familiarity with analytical approaches to decision-making under uncertainty could well benefit the future business leaders. The seminal application of uncertainty to the CVP model was first introduced by Jaedicke and Robichek using the basic CVP equation:

$$Z = Q (P - V) - F \quad (1)$$

Where Z = Profit, Q = Unit Sales, P = Price/Unit, V = Variable Cost/unit, F = Total Fixed Cost

Various statistical distributions has been investigated perilously such as normal (Jaedicke and Robichek, here after JR, (1964)), log normal (Hilliard and Leitch (1975)) and several distribution-free methods such as the Tchebycheff Inequality (Buzby (1974)), model sampling (Liao (1975), and Kottas and Lau (1978)), and additional improvements are examined to the CVP model such as multiproduct (Johnson and Simik (1971), and cost of capital and degree of operating leverage (Guidry, Horrigan and Craycraft (1998)), all have been employed by these and other authors (Shih (1979), and Yunker and Yunker (2003) and Banker, Dyzalov, and Plehn-Dujowich (2014)) to analyze the demand uncertainty, cost behavior and the random behavior of profits. The application of these works was largely confined to the assessment of probability distribution of profit and the calculations of their central tendency (mean) and spread (variance) to identify the "best" choice among alternative measures of profit.

Thus far, this extensive literature has been virtually ignored by managerial and cost accounting authors, e.g., Garrison, Noreen, and Brewer (2011), Zimmerman (2013), Warren, Reeve, and Duchac (2014), and their reluctance to undertake CVP models under uncertainty may be attributed to the diversity and complexity of the research literature, i.e., multi-product, multiple uncertainty sources, the assumption that demand exceeds, equals, or less than production sales, use of the basic accounting CVP model versus "economic" demand relating quantity sold to price and/or unit cost functions. The CVP analysis is expected to be complicated, connecting as it does to various concepts from economics and mathematical statistics. However, Bhimani, et al. (2008) cautioned that, in situations where revenue and cost are not adequately represented by the simplifying assumption of CVP analysis, managers should consider more sophisticated approaches to their analysis. Notwithstanding, it is the belief here that the CVP model provides an excellent context for introducing these analytical approaches. The extreme simplicity of the basic deterministic CVP model enables

a clearer perception of the elements added by generalizing the model to a stochastic one. While the full mathematical derivations and statistics shown herein are probably too complicated for most undergraduates, the results themselves are fairly straightforward, and they facilitate a precise focus on such fundamental concepts in decision-making under uncertainty as the tradeoff between expected profits and breakeven probability.

There is tradeoff between the comprehensiveness and accuracy of a model that tends to generate mathematical complexity and its applicability and ease-of-use to which it can readily provide convincing answers to particular questions. The purpose of this research is an attempt to strike an appropriate balance between these two competing criteria. Statistics is the branch of applied mathematics concerned with the collection and interpretation of quantitative data and the use of probability theory to estimate parameters that find use in science, engineering, business, computer science, and industry. Its importance is given to definitions of concepts, derivation of formulas and proofs of lemmas and theorems. In business, emphasis is placed on the concepts, use of formulas without their derivations and practical applications in all areas of business. Technology and its applications in accounting, finance, and statistics is trying to orient decisions about business and economic applications, functionality or, in the case of academic software, pedagogy. According to Nolan and Lang (2009) approaches to the teaching of statistics for business have changed dramatically. The advancement in use of computer technologies in the class room made it easy to use the formulas and computer software that give various kinds of probabilities, random samples estimations, confidence intervals, descriptive information that are able to test hypotheses make fitting distributions instantly (Madgett, 1998).

The American Institute of Certified Public Accountants (2005) states that “technology is pervasive in the accounting profession,” stressing that leveraging technology to develop and enhance functional competencies through appropriate use of electronic spreadsheets and other software to build models and simulations. Therefore, what the business students and future professionals should learn, with the help of computer technologies, is to understand statistical concepts and use them in analyzing practical data and make appropriate conclusions. This paper sets forth to analyze and apply CVP models intended specifically for pedagogical use in managerial and financial accounting progressions as a gateway to decision-making under uncertainty applying four different distributions: Normal, Lognormal, PERT, and Kumaraswamy. Section 2 will portray the basic concepts of CVP model under uncertainty and distribution fitting. In section 3 will detail the uncertainty in CVP and apply the four distributions above using the same numerical example, and finally, section 4 briefly summarizes and evaluates the contribution to business professionals and pedagogy.

Said

THE BASIC CONCEPTS OF STOCHASTIC CVP MODEL AND DISTRIBUTION FITTING

CVP analysis in the certainty case is its popularity as a decision tool used to determine the breakeven volume or sales, its usefulness is, however, limited by the deterministic nature of the relationship assumed (see (1) above). The breakdown point at which sales equal total costs and profit equals zero may be found as follows:

$P \times Q^* - (F + V \times Q^*) = Z = 0$, where Q^* is the breakeven volume (sales in units).

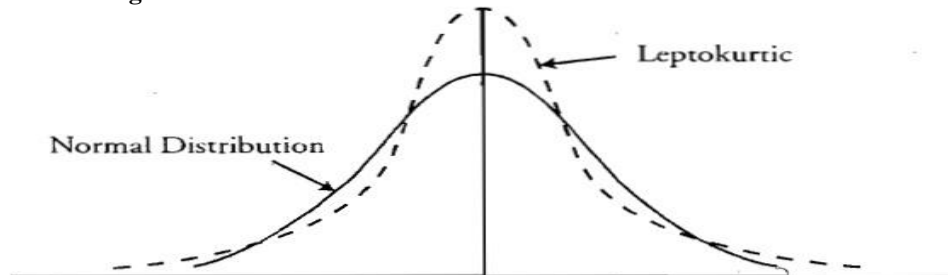
Consequently, Q^* can be written as: $Q^* = F / (P - V)$, where: $P - V$ = Contribution margin per unit = C , and Total Contribution margin is $TC = Q \times C$, thus at breakeven level $TC = F$. To convert Q^* to dollar sales, multiply both sides of the Q^* formula by P , yields breakeven in sales = S^* . $S^* = F / (1 - V/P)$, where the denominator is called the contribution margin ratio.

Consider a previous example used by JR (1964), which will be using throughout the paper, where $F = \$5.8 \times 10^6$, $V = \$1,750$, $Q = 5000$, $P = \$3000$, then $Q^* = 4,640$ units and $S^* = \$13.92 \times 10^6$, thus, the manager would make sure that the sales level needs to exceed these thresholds to generate any profit. JR surmised that the assumptions or simplifications implied in the deterministic model are justified if they are assumed to lead to the same or better decisions than might be provided by more intricate yet workable uncertainty models. A realistic approach model would be to examine the usefulness and the implementation of the model under uncertainty conditions. Thus, most of the input variables included in the breakdown formula are subject to a wide range of possible outcomes due to chance variations. These input variables are: P , Q , V , C , and F that yield the output variables Z . In a probabilistic CVP analysis, one or all of these input variables may be treated as a random variable. It is assumed that all input and output variables are having unimodal (one mode) distributions.

For each random variable it is possible to estimate (fit) the probability distribution indicating the likelihood that it will take on various possible values. Raw data is almost never as well behaved as we would like it to be. Consequently, fitting a statistical distribution to data is part art and part science, requiring compromises along the way. In a typical managerial accounting and finance textbook one finds two or three summary measures of the distribution that generally provide value to a decision maker: the mean (μ), the standard deviation (σ), and the coefficient variation ($CV = \sigma/\mu$). However, additional statistics that are shown to have importance in explaining the distribution's properties are: skewness (SKW- third central moment about the mean) is a measure of asymmetry about the mean) and kurtosis (KUR- the fourth central moment about the mean) is primarily peakedness (width of peak), tail thickness, and lack of shoulders, a higher peak (higher kurtosis) than the curvature found in a normal distribution. To provide a comparison of the shape of a given distribution to that of the normal one, the excess kurtosis measure is usually used instead; distributions with negative or positive excess kurtosis are called *platykurtic* or *leptokurtic* distributions respectively. A

leptokurtic distribution (e.g., student's) is having a fatter tail and higher peakedness than normal (see Figure 1).

Figure 1



Distribution fitting is the procedure of selecting a statistical distribution that best fits to a data set generated by some random process. Random factors affect all areas of business striving to succeed in today's highly competitive environment need a tool to deal with risk and uncertainty involved. Using probability distributions is a scientific way of dealing with uncertainty and making informed business decisions. In many industries, the use of incorrect models can have serious consequences such as inability to complete tasks or assess projects in time leading to substantial time and money loss. Distribution fitting allows the development of valid models of random processes.

When one is confronted with data that needs to be characterized by a distribution, it is best to start with the raw data and answer four basic questions about the data that can help in the characterization. The first relates to whether the data can take on only discrete or continuous values. Most CVP models have used continuous distributions and this paper follows that convention. The second looks at the symmetry of the data and if there is asymmetry, in other words, are positive and negative outliers equally likely or is one more likely than the other. The third question is whether there are upper or lower limits on the data; there are some variables like Q, S, V and F that cannot be lower than zero (non-negative distributions, i.e., one side bounded) whereas there are others like Z that can be any amount (unbounded, and if it is bounded its value is unknown). The final and related question relates to the likelihood of observing extreme values in the distribution; in some data, the extreme values occur very infrequently whereas in others, they occur more often. The Normal distribution is defined on the entire real axis ($-\infty, +\infty$), and if the nature of the data is such that it can only take on positive values, then this distribution is almost certainly not a good fit.

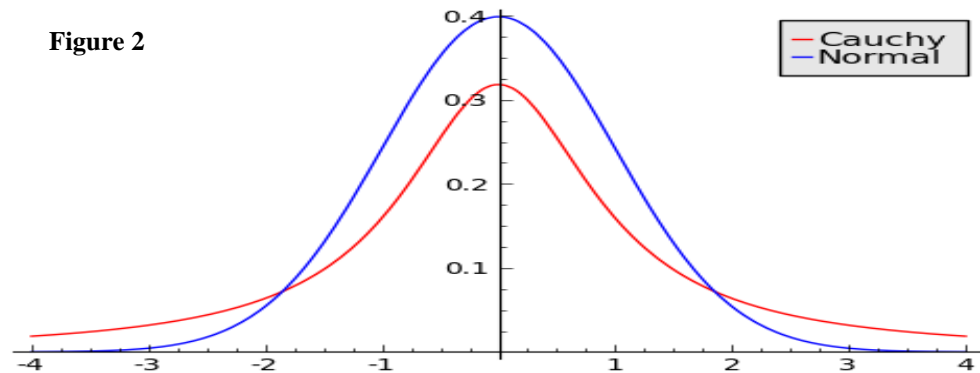
The shape of the Normal distribution does not depend on the distribution parameters (μ ; location and σ ; scale). Even if the data is symmetric by nature, it is possible that it is best described by one of the heavy-tailed models such as the Cauchy distribution (See Figure 2). Similarly, one cannot "just guess" and use any other particular distribution without testing several alternative models.

Said

The use of probability distributions involves complex calculations which are practically impossible or very hard and time consuming to do by hand. Distribution fitting software helps automate the data analysis and decision making process, and enables managers to focus on the core business goals rather than

technical issues. In particular, one may decide to settle for a distribution that less completely fits the data over one that more completely fits it, simply because estimating the parameters may be easier to do with the former. This may explain the overwhelming dependence on the normal distribution in practice,

Figure 2



notwithstanding the fact that most data do not meet the criteria needed for the distribution to fit. Nowadays, there are many low-priced software packages available in the market to estimate distributions and generate random numbers fitting these distributions (Excel, Stat::Fit, CumFreq, EasyFit, NetSuite, Vose Software, Risk Solver, @Risk MATLAB and R). All the results in this research are obtained using either Excel or EasyFit, employing 100,000 randomly generated variables to fit the four distributions used in the stochastic CVP model.

UNCERTAINTY AND THE CONVENTIONAL CVP MODEL

A. Normalcy of Profit Model

A probability density function of a Normal distribution is characterized by location and scale parameters. Location and scale parameters are typically used in modeling applications. For the normal distribution, the location and scale parameters correspond to the μ and σ , respectively, and its SKW and KUR are zeros. However, this is not necessarily true for other distributions. JR introduced uncertainty into the conventional CVP model by assuming first that only one independent variable, volume (Q) that is independent and normally distributed while all other inputs are given, known values with certainty (deterministic), thus, the profit equations may be written as $E(Z) = E(Q)(P - V) - F$, where E is the expectation operator. However, if all components are normally distributed and independent of each other and that the resulting profit is also normally distributed. They defined the expected value of profit as:

$$E(Z) = E(Q) [E(P) - E(V)] - E(F) \quad (2)$$

It is known that the subtraction of one normal variable from another yield a normal variable, therefore, the distribution of the resulting profits (Z) is close to normal because a normal variable (F) is subtracted from an approximately normal variable ($Q \times (P - V = C)$). Nevertheless, JR have assumed the multiplication of two normal variables (Q and C). The issue of (Z) being normally distributed random variable was then questioned by Ferrara, Hayya and Nachman (FHN thereafter, (1972)) arguing that the total contribution ($Q \times C$) cannot be distributed normally unless the sum of the coefficients of variation of the two variables (CV_Q and CV_C) is less than or equal to 12 percent at the 0.05 significance level. Since all input variables are mutually independent, there are no correlations between them, and the variance of profit (Z) is $\sigma^2(Z) = \mu_2(Z)$, $\mu_2(Z)$ is the second moment about the mean $\mu(Z) = E(Z)$. Throughout the paper the use of first (central) moment is to represent the mean and the second moment about the mean is to represent the variance of the random variable, and the third and fourth moments are representing its skewness and kurtosis respectively. Kottas and Lau (1978) have developed formulas for computing the second to fourth moments of two random variables, in the following example these formulas will be used to illustrate relationships and distribution properties that are govern by at least their four moments.

Consider the previous example that is used by JR (1964) with added information: $Q \sim N(5000, 400^2)$, $P \sim N(3000, 50^2)$, $V \sim N(1750, 75^2)$, $F \sim N(5800000, 100000^2)$

The coefficients of variations ($CV = \sigma / \mu$) are $CV_Q = 8\%$ and $CV_P = 1.67\%$, $CV_V = 4.29\%$, $CV_F = 1.72\%$. Given the uncertainty situation the expected profit is $E(Z) = 5000 [3000 - 1750] - 5800000 = \$450,000$ = the first central moment = $\mu(Z)$ = Median = Mode of Z.

Using central moments' notation, remember that all input variables are pairwise independent, thus contribution margin per unit is

$\mu(C) = \mu(P) - \mu(V) = 3000 - 1750 = \1250 , and $\mu(C) \times \mu(Q) = \mu(TC)$ = Total Contribution margin, $\mu(TC) = 5000 \times 1250 = \$6,250,000$, then expected profit is

$$\mu(Z) = \mu(TC) - \mu(F) = (1250)(5000) - (5800000) = \mathbf{\$450,000}.$$

The second moments about the mean for output variables are $\mu_2(C) = \mu_2(P) + \mu_2(V) = 50^2 + 75^2 = 8,125$, and

$$\mu_2(TC) = (\mu(Q))^2 \times (\mu_2(C)) + (\mu(C))^2 \times (\mu_2(Q) + \mu_2(Q) \times \mu_2(C))$$

$$\mu_2(TC) = (5000)^2 (8125) + (1250)^2 (400)^2 + (400)^2 (8125) = 4.54425 \times 10^{11}, \text{ and}$$

$$\mu_2(Z) = \mu_2(TC) + \mu_2(F) = 4.54425 \times 10^{11} + 100000^2 = 4.64425 \times 10^{11}$$

Since the input variables are statistically independent, therefore the profit standard deviation can be written as:

$$\begin{aligned} \sigma(Z) &= \{\sigma^2(Q) [\sigma^2(P) + \sigma^2(V)] + (E(Q))^2 [\sigma^2(P) + \sigma^2(V)] + [E(P) - E(V)]^2 \\ &\quad \sigma^2(Q) + \sigma^2(F)\}^{1/2} \\ &= \mu_2(Z) \end{aligned} \quad (3)$$

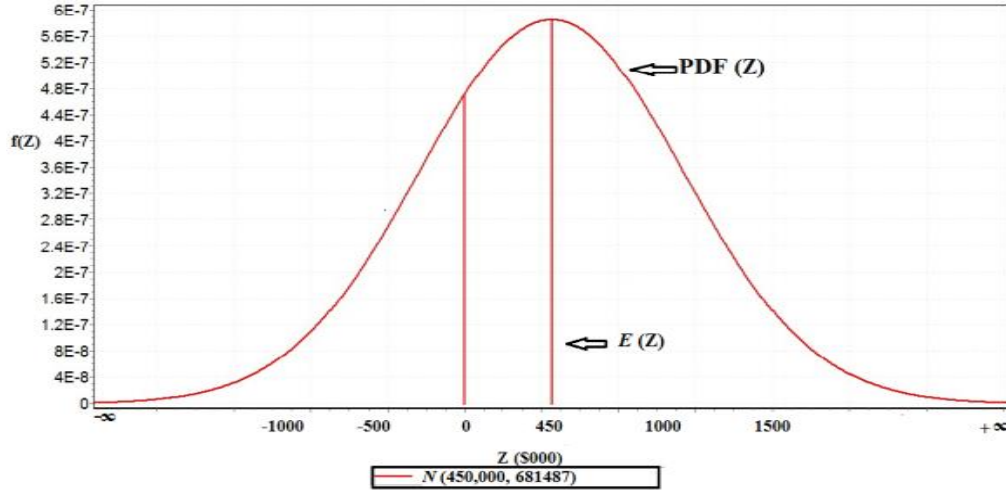
$$\sigma(Z) = \{400^2 (50^2 + 75^2) + 5000^2 (50^2 + 75^2) + [3000 - 1750]^2 (400)^2 + 100000^2\}^{1/2}$$

Said

$$\sigma(Z) = 681,487 = [\mu_2(Z)]^{1/2}$$

The $CV_Z = 151.44\%$, it is very high relative to the CV of input variables. The measure is useful because the standard deviation (spread) of data must always be understood in the context of its mean. That is, the actual value of the CV is independent of the unit in which the measurement has been taken, so it is a dimensionless number that allows comparison of risk versus expected profit. At the 95% confidence level the probability to generate a loss $P(Z < 0)$ is 25.45%, and the chance of breaking even is 74.55%, and the probability of generating profit more than \$450,000 and less than a million dollars is 29.02%. If the input means stayed the same but their spreads (σ) increased then the risk (probability of upside-profit and downside-loss) of Z is increased, but the breakeven of Z stays the same. The 95% of the area under a normal curve lies within $z (=1.96)$ standard deviations of the mean, i.e., $P(Z_1 < Z < Z_2) = 95\%$, thus $\mu(Z) \pm z \times \sigma(Z) = \$450,000 \pm (1.96) \$681,487$, representing the range of Z from $Z_1 = \$-885,714.52$ to $Z_2 = \$1,785,714$. (See figure 3)

Figure 3



The skewness of Z ($SKW(Z)$) resulting from the multiplication of C and Q is dependent on the coefficients of variation of C and Q , accordingly, the larger of the confidents the more skewed is the distribution of TC and consequently Z . Ware and Lad (2003) show that normalcy of the product of the two products function depend on the CVs of the two variables and their correlation, but since correlation = 0, since Q and C are statistically independent, it will only be necessary to determine how large are the two coefficients must be in order for the frequency distribution of Z to approach normal distribution. In the above example, the coefficients of variations are $CV_Q = 400 / 5000 = 8\%$ and $CV_C = [(8125)^{1/2}] / 1250 = 7.21\%$ and their sum is 15.21%, which is more that 12% stated by FHN above. It is still normal but slightly skewed to the right. The calculation of SKW and Kur

are done through computer program for ease of time and efforts. If Z is strictly normal we would have zeros for both measures, but we know this Z distribution is slightly skewed to the right.

$SKW(Z) = E[(Z - \mu(Z) / \sigma^3(Z))]$, this measure also written as $(\mu_3(Z) / \sigma(Z))^3 = 4.875 \times 10^{16} / (681487)^3$

$SKW(Z) = .154029$ that is positively skewed i.e., the right tail is longer and the mass of the distribution is more concentrated on the left. To see the fatness of the tail and whether the distribution has higher peak than normal distribution we look at the KUR measure.

$KUR(Z) = \{E[(Z - \mu(Z))^4] / \{[E(Z - \mu(Z))^2]^2\}$
 $= [\mu_4(Z) / \sigma^4(Z)]$

Excess Kurtosis (EKUR) however is more commonly defined as the fourth moment around the mean divided by the square of the variance of the distribution minus 3, thus, $EKUR = KUR(Z) - 3 = \{[6.5415 \times 10^{23}] / [(681487)^2]^2\} - 3 = 3.03282 - 3 = \mathbf{0.03282}$. Since EKUR for normal distribution is zero, the Z distribution is slightly having more tail or higher peak. Note that SKW and KUR are uneven measures of normalcy of unimodal distributions. A distribution could be perfectly symmetrical (zero skewness) yet may be very peaked (e.g., Cauchy Distribution). In such case the distribution being tested would not be normal, but use of skewness alone would shows opposite suggestion, thus, both tests yield better conclusion of departure from normalcy and ignoring both is misjudgment.

B. The Lognormal Distribution Application

The question of normally distributed and statistically independent input variables under conditions of certainty of the CVP model of JR has been criticized by FHN (1972), Hilliard and Leitch (1975), Lau and Lau (1976), and Kottas and Lau (1978) on the ground that, at 5% confidence level, Z is not likely to be normally distributed unless certain restrictive conditions are met, and there may be natural dependency between the input variables. The independency assumption of inputs severely restricts realism in application of the model since Q, P, and V are often correlated, and the normalcy assumption raises the possibility of negative S, P, V, and F since the lower bound of a normal distribution could have negative values. Hilliard and Leitch proposed that the input variables in the CVP model be assumed log normally distributed. There are two major advantages for using lognormal distribution: (1) Using it solves the problem associated with the multiplicative operation $Q \times C$. (2) The distribution is more appropriate for describing the behavior of the input variables. Hilliard and Leitch assumed that the inputs Q and C are bivariate log normally distributed and F is deterministic.

Similar to the normal the lognormal distribution is completely defined by its two parameters values: the first moment about zero and the second moment about the mean (location = μ , and scale = σ , parameters respectively), the log normal distribution's coefficient of variation ($CV = \{[\exp(\sigma^2)] - 1\}^{1/2}$) and it is independent of its arithmetic mean.

Said

The normal and lognormal distributions are closely related. Assuming that the input variables Q and C are log normally distributed that means the log of Q and the log of C are normally distributed. For example, if Q_L is distributed log normally with parameters μ_L and σ_L , then $\log(Q_L)$ is distributed normally with mean μ_N and standard deviation σ_N . Similarly, if Q_N has a normal distribution, then $Q_L = \exp(Q_N)$ has lognormal distribution. Note that in all calculations the natural log (ln) is used and exp term represents the natural exponential function. Olsson (2005) shows that if Q is log normally distributed, then the median of log (Q) is equal to the median of Q, but the mean of log (Q) does not equal the antilog (exp) of the log (Q). Since lognormal and normal are related, MATLAB® of MathWorks, Inc. has developed formulas (Lognstat) that can be used to convert the μ_L and σ_L of log normal distribution to μ_N and σ_N of normal distribution and vice versa. These are as follows:

$$\mu_L = \exp [\mu_N + (\sigma_N^2) / 2] \quad (4)$$

$$\sigma_L = \{ \exp [2 \mu_N + \sigma_N^2] \cdot \exp [\sigma_N^2] - 1 \}^{1/2} \quad (5)$$

and

$$\mu_N = \text{LN} \{[(\mu_L)^2 / (\sigma_L^2 + \mu_L^2)]^{1/2}\} \quad (6)$$

$$\sigma_N = \{ \text{LN} [\sigma_L^2 / (\mu_L^2 + 1)] \}^{1/2} \quad (7)$$

Using the same information of Q in RJ example before, but now Q is log normally distributed, that is $Q \sim \text{LOGN}(5000, 400^2)$, we can generate the normally distributed μ_N and σ_N using (6) and (7) above.

$$\mu_N(Q) = \text{LN} \{5000^2 / [400^2 + 5000^2]\}^{1/2} = 8.5140034, \text{ and } \sigma_N(Q) = \{ \text{LN} [400^2 / 5000^2] + 1 \}^{1/2} = 0.07987442$$

Similarly, the μ_L and σ_L can be converted (using (4) and (5) above) and the results above to generate the log normal Q parameters:

$$\mu_L(Q) = \exp [8.5140034 + (0.07987442)^2 / 2] = 5000, \text{ and}$$

$$\sigma_L(Q) = \{ \exp [2(8.5140034) + (0.07987442)^2] \cdot \exp [(0.07987442)^2] - 1 \}^{1/2} = 400$$

Similarly, attempt is made matching pervious result of $\sigma_L(Z) = \$681,487$ using (5) for calculated values of

$$\mu_N(Z) = 12.421034 \text{ and } \sigma_N(Z) = 1.091759$$

$$\sigma_L(Z) = \{ [\exp 2(12.421034) + (1.091759)^2] [\exp [(1.091759)^2] - 1] \}^{1/2} = \$681,487$$

If inputs Q and C are log normally distributed then Z is log normally distributed since the product of bivariate log normal is also log normal, hence, the expected values are

$$E[\text{LN}(Q)] = \mu_L(Q) \text{ and } E[\text{LN}(C)] = \mu_L(C), \text{ where } \mu_L(C) = \mu_L(P) - \mu_L(V) = \$1250$$

$$\sigma_L(C) = [\sigma_L^2(P) + \sigma_L^2(V) - 2 \cdot \text{COV}(P, V)]^{1/2}, \text{ where COV is the covariance between P and V. If the COV(P,V) is zero then } \sigma_L(C) = [\sigma_L^2(P) + \sigma_L^2(V)]^{1/2}, \text{ and then } \sigma_L^2(C) = [50^2 + 75^2] = 8125$$

Previously stated in the deterministic CVP model that $TC = Q \times C$, and $Z = TC - F$, then $TC = Z + F$, therefore

$E [LN (TC)] = E [LN (Q) + E [LN (C)]]$, and hence

$\sigma_L [LN (TC)] = \{\sigma_L^2 [LN (Q)] + \sigma_L^2 [LN (C)] + 2 \text{COV} [LN (Q), LN (C)]\}^{1/2}$, where COV is the covariance between the log of Q and the log of C, the last term is positive because the correlation between Q and C is expected to be positive, if it is assumed zero that means the input variables are independent (i.e., the correlations between Q and P and between Q and V are zeros), thus the expected profit is

$$E (Z) = \mu_L (Z) = \mu_L (Q) [\mu_L (P) - \mu_L (V)] - \mu_L (F) \quad (8)$$

This is similar to JR's expected profit of **\$450,000**.

If, however, the input variables are dependent then the expected value of Z is

$$E (Z) = \mu_L (Z) = \mu_L (Q) [\mu_L (P) - \mu_L (V)] - \mu_L (F) + \sigma_L (Q) [\rho_{QP} \cdot \sigma_L (P) - \rho_{QV} \cdot \sigma_L (V)] \quad (9)$$

Where ρ_{QP} is the correlation between Q and P and ρ_{QV} is the correlation between Q and V.

If $Q = 0$ (or $C \leq 0$; shutdown point) then $E (Z) = -\mu_L (F) = \$5,800,000$, which is the lower bound of Z, highly unlikely. If the correlations in (9) are zeros then equation (8) equals (9). However, if $\sigma_L (Q)$ differs considerably from zero then its effect is very pronounced. Economies of scale and laws of supply and demand rubrics would suggest that the above correlations are likely to be less than zero. Thus, expected profit is likely to be a decreasing function of $\sigma_L (V)$ and an increasing function of $\sigma_L (P)$. In the log normal CVP model with correlations of zeros (no dependency) the probability of generation less than zero profit (i.e., loss) is 26.1%, at 95% confidence level, slightly higher than the normal model result of 25.45%. Using (9), the model shows a lower expected profit of \$435,000 when $\rho_{QP} = -0.9$ and $\rho_{QV} = -0.1$ and $\rho_{PV} = 0$.

$E (Z) = 5000 [3000 - 1750] - 5800000 + 400 [(-0.9) (50) - (-0.1) (75)] = \$435,000$ with probability of 20.1%. Under normal model the expected profit at 95% level the range is between \$-885,690 and \$1,785,690 and for the log normal with zero correlation the range at the same confidence level the range is between -\$767,000 and 1,872,000 (see figure 4)

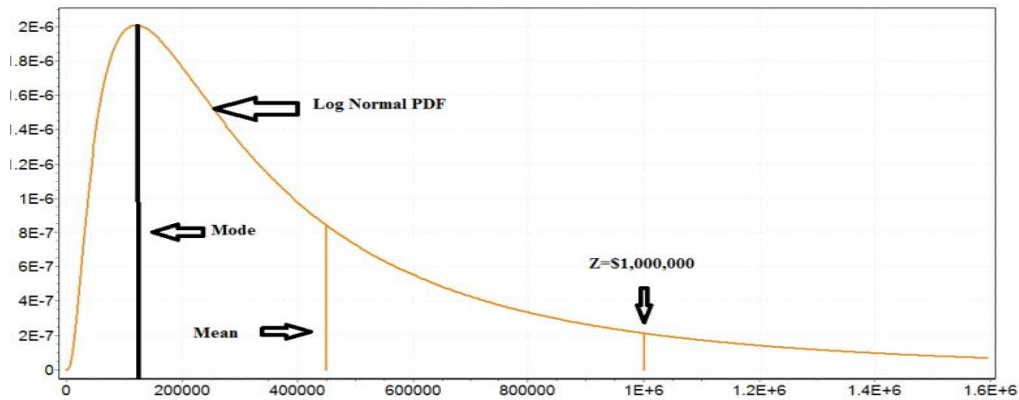
C. Beta-PERT Distribution Approach

Under uncertainty conditions, managers appreciate and prefer the information that has predictability within a range rather than a point estimate. Because it is highly effective, simple, cost efficient, and computationally convenient, the Beta-PERT technique utilizes predictive information that helps managers to incorporate the uncertainty element into the conventional CVP analysis. It integrates the manager's business acumen, and knowledge of statistics and accounting into a framework useful for practical applications. Many managers are familiar with PERT because it is used in Critical Path Method, first discovered by Malcolm et

Said

al. (1959) and used in the Program Evaluation Research Task (PERT). According to Greer (1970), it originally postulates the time estimates for completing a project that follows Beta distribution. In making decisions managers are not infallible, for them the technique provides a mechanism for developing three cost estimates with a range based on their (background) experience, insights, intuition, and forecast of economic conditions (Berger, 2006).

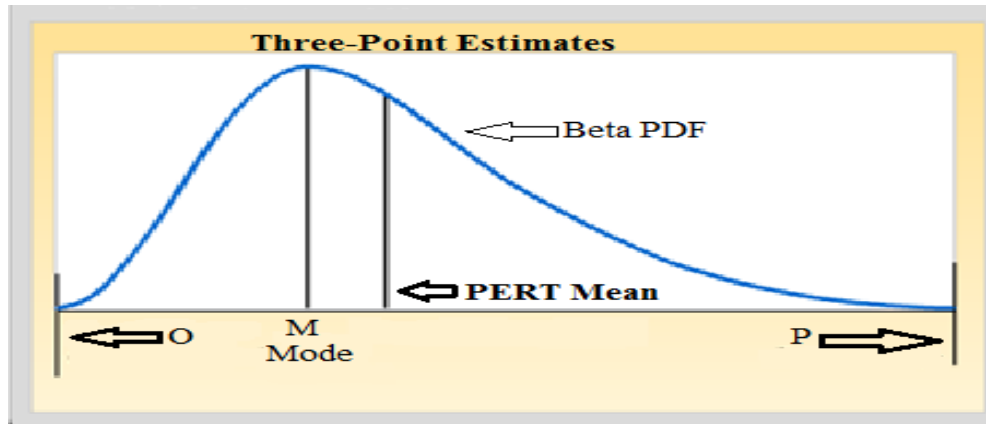
Figure 4



To simplify the process, the manager collects (estimates) information for three scenarios having three cost estimates: Optimistic (O), Most Likely (M), and Pessimistic (P). These estimates are derived subjectively and describe three measures required for the PERT application; the maximum (highest costs, P), the minimum (lowest costs, O), and the in between (most likely, M) that could prevail for either new or existing products or services (see Figure 5). Assuming that the variable in question is an economic 'good' like profit, so that it makes sense to set $O > P$, however, the technique can be applied equally well to variables like costs by reversing the roles of P and O. Using the PERT method introduces uncertainty into a CVP by treating each input or output (Q, P, V, C, F, or Z respectively) as random variables. The probability distribution of PERT random variable follows Generalized Beta Distribution. PERT Distribution is a particular case of Beta Distribution, encompassing a wide range of distributions with values within the defined range.

In the standard textbook PERT method (Hillier and Lieberman, 2009), the three estimates are called the PERT parameters and are fed into the mean and variance formulas for PERT. Letting $[a, m, b]$ be the three assumed PERT parameters as they are elicited from experts representing minimum, maximum, and mode of the input variable (e.g., variable cost), then the standard PERT expected value is $\mu = (a + 4 * m + b) / 6$.

Figure 5



The mean formula is giving weights to the mode (m) twice as much as the ends (a , b), and that the value of the mean is different from m in all unimodal-asymmetric PERT distributions. If the mode is closer to a , the tail is longer to the b direction, bringing mean for the b side and vice versa. The statistician David Vose, (of Vose Software) has proposed the Modified PERT (adopted by Mathematica from Wolfram|Alpha). This distribution is more versatile for applications, because the mean is calculated in a more flexible way.

$$\text{Mean} = \mu = (a + \lambda * m + b) / (\lambda + 2)$$

(10)

In this model, the higher lambda (λ) is the steeper the function in the mode neighbor (higher kurtosis), and the smaller is the distance between mean and mode. The model also makes the density near the ends (a , b) less important (having less mass). Obviously Modified PERT becomes standard PERT when lambda (λ) is equal 4, and that will be the worth with the calculations that follows. The second formula from the standard PERT is the variance:

$$\sigma^2 = (b - a)^2 / 36$$

(11)

Farnum and Stanton (1987) show that this combination of $\lambda = 4$ and the denominator of 36 in σ^2 is limited (i.e., having a constant σ that is $1/6$ of the range ($b - a$)), but indeed optimal for a wide range of m , Herrerías-Velasco, et al. (2011). When the mode is close to the middle between the two ends, the density is symmetrical, and moving to the sides there is an increasingly asymmetrical feature. This versatility, different than symmetrical Normal distribution, is what makes Beta-PERT Distribution so convenient distribution to model many metrics from business world. It is a very common situation in which one needs to assign a variable within a specified range, where the mode is approaching the two ends.

The Beta Distribution is defined by four parameters, two of them are (α and β , called the shape parameters) that defines the make of the Beta function, and the other two are (a =Min and b =Max), within which there is possibility of having

Said

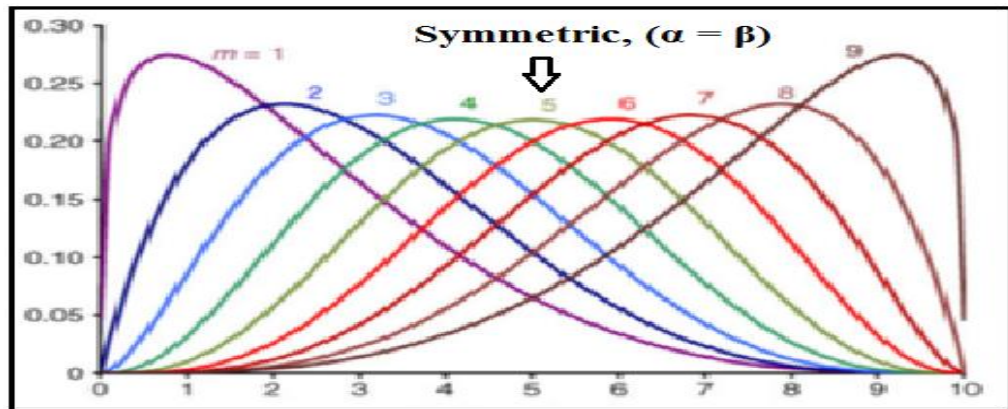
a value. When $\text{Min}=0$ and $\text{Max}=1$, it is called Standard Beta Distribution and is suitable for modeling percentages (e.g., the proportion of defective items in a production cycle). The Beta's first to fourth moments are dependent only on its shape parameters (α and β). The Generalized Beta Distribution (hereafter, Beta), is not limited by the limited ($a=0$ and $b=1$) range, but it could take both positive and negative values of a and b providing $a < b$.

In Standard Beta, $\mu = (\alpha / (\alpha + \beta))$, if $\alpha > 1$ and $\beta > 1$, and the mode $= m = ((\alpha - 1) / (\alpha + \beta - 2))$, for any values of α and β . The parameter α is a homogeneity indicator, that is as α increases the distribution masses around the mode. Beta has positive skewness (right-tailed) for $\alpha < \beta$, and negative skewness (left-tailed) for $\alpha > \beta$. If $\alpha = \beta$, then $m = 1/2 = \mu = \text{median}$ and these location parameters have the highest point (peak) on the probability density function, and Beta is symmetrical. If m moves to the left, then μ (i.e., $(\alpha / (\alpha + \beta)) < 1/2$), and the distribution is positively skewed.

Figure (6) shows various Beta-PERT density functions by letting m vary in the range of $a=0$ to $b=10$ and m undertakes only integer values from 1 to 9. Rescaling or shifting of the range does not have an effect on α and β or their sum. The parameter α is a homogeneity indicator, that is as α increases the distribution masses around the mode. If $\lambda = 4$, then μ in equation (10) results in the symmetric density case ($\alpha = \beta$), that is when $m = 5 = \mu = [(0 + 4(5) + 10) / 6] = 5 = \text{median}$. One can see when using (10) (a deterministic model) that μ is from a low of $2 \frac{1}{3}$ to a high of $7 \frac{2}{3}$ for $m = 1$ and $m = 9$ respectively, which is different from using the Beta function with μ ranges from a low of $1 \frac{2}{3}$ to a high of $8 \frac{1}{3}$ for the same m values (see Regnier 2005 and Davis 2008). That is why one has to figure out the mean and variance and proper α and β that fit the Beta-PERT distribution.

Many of the software packages that might be used for simulation do not have the Beta-PERT built in. In these cases, a transformation is required to calculate the four Beta parameters that will produce the Beta-PERT distribution or other desired beta distribution. The mathematics of the relationship between the general beta and the Beta-PERT are hammered out by Golenko- Ginzburg (1988) and Davis (2008).

Figure 6



Beta-PERT is widely used to fitting probability distributions of variables in many areas of research investigations. For example, besides its applications in engineering systems, and decision science, it is also used in risk analysis for strategic planning, accounting, finance, and marketing research, and even subjective (Bayesian) probabilities (Fienberg, 2006). The reason why the beta distribution is so broadly utilized is that it is extremely versatile, in that a variety of uncertainties can be usefully modelled by it. For example, it can accommodate a variety of skewnesses, both positive and negative, and thus, when skewness is an important factor, in the case of CVP analysis, the beta distribution is often put to use.

The mathematics of the relationship between the general Beta and the Beta-PERT are hammered out in, among others, Golenko-Ginzburg (1988). The method of estimating the Beta-PERT distribution from elicited values (Max = b = Optimistic, Min = a = Pessimistic, and m = most likely) is first to obtain the mean and variance, using (10) and (11). And the second step is to use the μ and σ^2 to obtain the shape parameters (α and β), using the following two equations develop by Regnier (2005):

$$\alpha = [(\mu - a) / (b - a)] [\alpha + \beta], \text{ OR } \alpha = [(\mu - a) / (b - a)] \{[(\mu - a) (b - \mu)] / \sigma^2 - 1\} \quad (12)$$

$$\beta = [(b - \mu) / (b - a)] [\alpha + \beta] = \alpha [(b - \mu) / (\mu - a)] = (\alpha + \beta) - \alpha, \text{ OR} \\ \beta = [(b - \mu) / (b - a)] \{[(\mu - a) (b - \mu)] / \sigma^2 - 1\} \quad (13)$$

Defining the values of a and b for the CVP model, using the profit variable (Z) only (for other variables one could follow the same procedure), the Normal distribution results are utilized. In the Normalcy model it was shown that: $\mu (Z) \pm z_x \sigma (Z) = \$450,000 \pm (1.96) \$681,487$, representing the range of Z from $Z_1 = \$-885,714$ to $Z_2 = \$1,785,714$. Consider $a = Z_1 = \$-885,714$ and $b = Z_2 = \$1,785,714$ as the upper and lower bounds. First the median (= mode = mean) of the Normal distribution for variable Z will used as the mode for Beta-PERT calculations, if this is done then one would expect that α and β be equal. Equations (10) and (11) are utilized for the calculations of $\mu (Z)$ and then $\sigma (Z)$ then using them in (12) and (13) to obtain α and β that fit the Beta-PERT distribution.

$$\mu (Z) = (-885714 + 4 * 450000 + 1785714) / (4 + 2) = \mathbf{\$450,000}$$

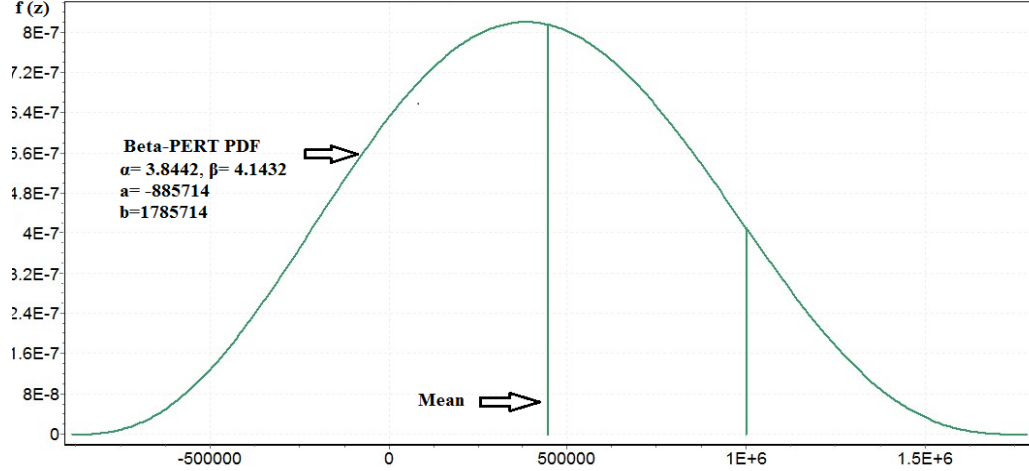
$$\sigma^2 = [1785714 - (-885714)]^2 / 36 = \mathbf{1.982368767 * 10^{11}}$$

$$\alpha = [(450000 - (-885714))] / [1785714 - (-885714)] \{[(450000 - (-885714)) (1785714 - 450000)] / 1.982368767 * 10^{11} - 1\} = \mathbf{4}$$

$$\beta = [(1785714 - 450000) / (1785714 - (-885714))] \{[(450000 - (-885714)) (1785714 - 450000)] / 1.982368767 * 10^{11} - 1\} = \mathbf{4}$$

Said

Figure 7



As expected α and β are equal that signifies symmetrical distribution. The bound of Z will be retained since they represent fair estimation of the extreme values, but consideration of the mode as an elicited value is in question. Experienced experts may have different opinions as to the mean value but largely agree on the most likely value of the mode, that is the motivation behind the use of the mode. And since positive skewness is to be expected the mode is elicited at \$400,000 this time and a repeat of the calculations above are in order.

$$\begin{aligned}\mu(Z) &= (-885714 + 4 * 400000 + 1785714) / (4 + 2) = \mathbf{\$443,333} \\ \sigma^2 &= [1785714 - (-885714)]^2 / 36 = \mathbf{1.982368767 * 10^{11}} \\ \alpha &= [(400000 - (-885714)) / [1785714 - (-885714)]] \{ [(400000 - (-885714)) \\ &\quad (1785714 - 400000)] / 1.982368767 * 10^{11} - 1 \} = \mathbf{3.8442} \\ \beta &= [(1785714 - 400000) / (1785714 - (-885714))] \\ &\quad \{ [(400000 - (-885714)) (1785714 - 400000)] / 1.982368767 * 10^{11} - 1 \} = \\ &\quad \mathbf{4.143191} \text{ (see figure 7)}\end{aligned}$$

Again and as expected the result is $\alpha < \beta$. The four parameters (a, b, α , β) are fitted into the Beta-PERT distribution function to get the median, shape of the density, higher moments and other relevant information. The median of Z is $\mathbf{\$395,627}$ and as a measure of relative variability $CV_Z = \mathbf{111.3\%}$, relatively less than that obtained by the Normal result. At the 95% confidence level the probability to generate a loss $P(Z < 0)$ is 20.10% and the chance of breaking even is about 80%, and the probability of generating profit more than $\mu(Z) = \$443,333$ and a probability for less than a million dollars is 0.36.32%. Skewness is small but positive at $\mathbf{0.045}$ level and Excess Kurtosis is $\mathbf{-0.54332}$.

D. Kumaraswamy Distribution Approach

As an alternative to the beta distribution, Kumaraswamy (hereafter K, (1980) proposed a two-parameter Kumaraswamy distribution on (0, 1), and denoted by K

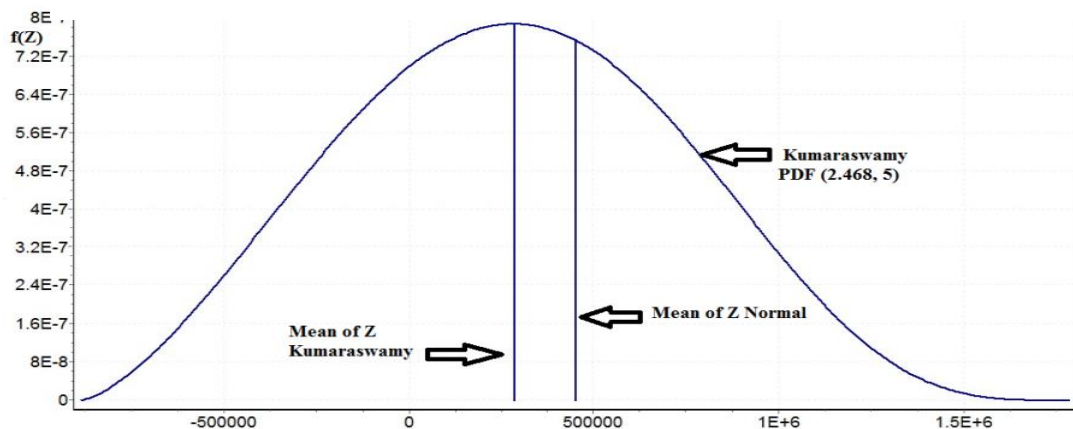
(q, p). The K distribution was initially proposed for applications in hydrology, but in the few years it has often been used in several other areas e.g., engineering and simulation studies and hydrology. This distribution is applicable to many natural phenomena whose outcomes have bounded limits, such as the height of individuals, scores obtained on a test, atmospheric temperatures daily stream flow, daily rain fall, reliability, cash flow, etc. One factor for this increased interest in this distribution is due to its simple mathematical form and closed functions. And this research is attempting to proclaim it in the business area.

Nadarajah (2008) has discussed that the K distribution is a special case of the three parameter Beta distribution. The basic properties of the distribution have been given by Jones (2009). Garg (2009) considered the generalized order statistics for K distribution. While the interest is mainly in the unimodal distributions, Jones has shown that the K distribution has two boundary parameters (c and b) and two shape parameters (p and q), and the following density function in its generalized form:

$$f(z) = \left[\frac{1}{b-c} \right] pq \left[\frac{(z-c)}{(b-c)} \right]^{p-1} \left[1 - \left[\frac{(z-c)}{(b-c)} \right] \right]^{q-1}, c < z < b$$

If $p > 1, q > 1$, then K distribution is unimodal, if $p = 1, q = 1$ then K distribution is unimodal (uniform), If $p < 1, q < 1$, then K distribution is unimodal, if $p > 1, q \leq 1$, then K distribution is increasing, and If $p \leq 1, q \geq 1$, then K distribution is decreasing. The interest here is in the K unimodal (both symmetrical and skewed) distribution, thus one is looking for shape parameters with $p > 1, q > 1$.

Figure 8



Conceivably the least attractive feature of the K distribution is that, unlike the beta distribution, it has no symmetric special cases other than the uniform distribution. The issue here is finding the proper shape parameters for the variable profit variable, given the results in the normal distribution. In Beta distribution if $\alpha = \beta$ one has a symmetrical shape, but with K distribution if we set $p = q > 1$, we have negative skewness that is increasing with the rise in parameters, shifting the mode to the right. According to Jones (2009) it is possible that skewness to the right is increased with decreasing p for fixed q, however, there is no simple property for

Said

changing q and fixed p . Jones also listed few shape parameters for the symmetric case. The attempt here is to find shape parameters that fit close enough symmetrical K distribution that has the same median value that equals pervious result obtained with the Normal distribution for the profit variable (Z). After few attempts experimenting with Jones's results, recognition of these values was more appropriate for CVP calculation that follows: $p = 2.468$ and $q = 5$.

Armed with these figures and using EasyFit software (because K is not available in Excel) the following CVP results are obtained:

$\mu(Z) = \$284,125$, Median = **\$281,038**, Mode = **\$281052**, $\sigma^2(Z) = 2.119 \times 10^{11}$, **CVz = 1.62%**, Skewness = **0.0517**, Kurtosis = **-0.578**.

Figure 8 shows that all location indicators are close to the median, and that the portability difference between the mean of Z in the Normal versus K distribution is $P(284,125 < Z < 450000) 12.85\%$. At the 95% confidence level the probability to generate a loss $P(Z < 0)$ is 28.75% and the chance of breaking even is about 71.24%, and the probability of generating profit more than $\mu(Z) = \$284,125$ and less than a million dollars is 43.37%. Nowadays, the Beta and Kumaraswamy distributions are the most popular models to fit continuous bounded data. Further, these models have many features in common and in a practical situation one question of interest is how to select the most adequate model (between the Beta and Kumaraswamy distributions) to fit a certain continuous bounded data set. Up-to-date, there is no preference in practical applications to favor the Beta against the Kumaraswamy model.

SUMMARY AND IMPLICATIONS

This endeavor tries to expand the seminal work JR (1964) applying their same numerical example to explore four different applications of the CVP model. Results of profit (z) using the four different distributions (Normal, Lognormal, Beta-PERT, and Kumaraswamy) are presented in Table (1). This study demonstrates how the deterministic model is being transformed into different stochastic models. The dissimilarity in means and other location parameters (mode, median) and variations in risk measurements (e.g., standard deviations, coefficient of variations, skewness, and kurtosis) are to be taken into consideration when making current (using historical records) or future (budgeting) decisions. The extreme simplicity of the basic deterministic CVP model enables a clearer perception of the elements added by generalizing the model to stochastic ones. When independency between inputs (Q, P, V, C, F) is suspect then the CVP model may not produce the factual reality of risk, hence a flawed decision is made, as the case with the Normal distribution. Correlation between these variables should be examined initially using the most common and simple method of Pearson correlation. Thus, managers must overcome of these pitfalls and appreciate a deeper understanding of dependency issue needed to model the real world's facets of uncertainty.

Another issue is the skewness and symmetry of the variables in the data when fitted to the wrong distribution. Minor abnormality could be tolerated, but

significant deviation from normalcy may exhibit significant skewness or kurtosis that clearly indicate that data need to be fitted with the proper distribution of adjusted (e.g., transformation through log) to fit normalcy. And if there is asymmetry, are those extreme values equally befalling, or is one more likely occurring than the other. Inaccuracies in elicited values from experts are likely to be larger for lower than upper bounds, because of availability bias that essentially arises from managers' judgment based on available information. Like all fallible expert's expectations, even knowledgeable managers tend to underestimate the pessimistic case leading to miscalculation by a wide margin. Drawing on prior managerial experience and know-how to predict projected results as to elicit benchmarks (costs, profits, sales, and production levels) helps capture uncertainty inherent in the decision-making process.

Distribution-fitting software are alternative approaches that use various quantitative measures (e.g., estimation and goodness-of-fit) to rank the suitability of among distributions for the data. Fitting and simulating variables and application of risk in the workplace are common now in both government and businesses. The application of Beta PERT and Kumaraswamy Distributions explored here highlights the fact that they can be applied without much statistical rigor for analysis of uncertainty given the advancement in software technologies. They are pedagogical tools that were expensive or unavailable in the past, the study of risk and familiarity with common distributions should be part of the textbook material in several human behavioral sciences including business. Although students as well as managers may use the surrogate (deterministic model) and forgo the more intricate analytical applications, they must not, however, be relied upon to the exclusion of more sophisticated methods whenever circumstances warrant and resources permit their execution.

Table (1) Profits (z)							
Distribution	μ (Z) (000)	Median (000)	Mode (000)	$\sigma^2(z)$	CV(z) %	Skewness	Kurtosis
Normal	\$450	\$450	\$450	4.644×10^1 ₁	7.21	0.154	0.0328
Log Normal	\$450	\$328	\$120.6	50.17×10^1 ₀	1.31	6.185	110.94
Beta-PERT	\$443	\$396	\$400	1.982×10^1 ₁	111.3	0.045	- 0.543
Kumara-swamy	\$ 284	\$281	\$281	2.12×10^{11}	1.62	0.0527	- 0.578

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SARBANES-OXLEY AND THE FISHING EXPEDITION

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ABSTRACT: As part of the Sarbanes-Oxley Act of 2002, Congress enacted 18 USC § 1519, known as the anti-shredding provision, providing that a person may be fined and/or imprisoned for up to 20 years if he “knowingly alters, destroys, mutilates, conceals, covers up, falsifies, or makes a false entry in any record, document, or tangible object with the intent to impede, obstruct, or influence” a federal investigation. In *Yates v. U.S.*, 135 S. Ct. 1074 (2015), the Supreme Court ruled that a tangible object, for purposes of § 1519, “must be one used to record or preserve information.” It overturned a criminal conviction under § 1519 related to the destruction and concealing of legally undersized fish to impede a federal investigation, as fish are not tangible objects captured by § 1519. The Court determined the ordinary meaning of a “tangible object” utilizing dictionary definitions, the specific context in which “tangible object” is used in § 1519, and the broader context of the statute as a whole. Also, the Court employed the principles of *noscitur a sociis* and *eiusdem generis*. The Court interpreted § 1519 in light of Sarbanes-Oxley’s subtitle indicating Congress’s purpose in enacting it; namely, “An Act to protect investors by improving the accuracy and reliability of corporate disclosures made pursuant to the securities laws, and for other purposes.” It reasoned that “it would cut §1519 loose from its financial-fraud mooring to hold that it encompasses any and all objects, whatever their size or significance, destroyed with obstructive intent.”

Key Words: Sarbanes-Oxley, statutory law, tangible object

INTRODUCTION

Many may remember the corporate accounting scandals involving the collapses of Enron Corporation and WorldCom. Enron, the nation’s seventh largest corporation according to its reported revenues, was proven to be a house of cards resulting in the defrauding of its investors and the enrichment of insiders. Utilizing Enron’s document retention policy, Enron and its outside auditor Arthur Andersen LLP, purged Enron’s corporate records in anticipation of a soon-to-be investigation. Volumes of paper records and documents were shredded, and computer hard drives and the email system preserving any documentation relative to Enron were purged. *See, Arthur Andersen LLP v. U.S.*, 544 U.S. 696 (2005).

Arthur Andersen avoided criminal responsibility as the federal obstruction of justice statutes at the time of these actions did not criminalize the destruction of documents before the start of an official federal investigation. The Sarbanes-

Oxley Act of 2002 (Sarbanes-Oxley Act or Act or SOX) was enacted by Congress to address white-collar fraud and misconduct of the type involved in Enron Corporation. *See, Lawson v. FMR LLC*, 134 S. Ct. 1158, (2014). It is also known as the Public Company Accounting Reform and Investor Protection Act and the Corporate and Auditing Accountability and Responsibility Act. Its subtitle reads, “An Act to protect investors by improving the accuracy and reliability of corporate disclosures made pursuant to the securities laws, and for other purposes.” As stated in *Lawson*, 134 S. Ct., at 1161-62 (quoting S. Rep. No. 107-146, p. 2 (2002)), the Sarbanes-Oxley Act was enacted, “To safeguard investors in public companies and restore trust in the financial markets following the collapse of Enron Corporation,” and to “prevent and punish corporate and criminal fraud, protect the victims of such fraud, preserve evidence of such fraud, and hold wrongdoers accountable for their actions.”

Section 802 of Title VIII of SOX contains 18 U.S.C. § 1519 (§ 1519). It is known as the anti-shredding provision. § 1519 is one of the “Obstruction of Justice” provisions in Chapter 73 of Title 18 of the United States Code. 18 U.S.C. 1501 *et seq.* 18 USC § 1519 provides that a person may be fined and/or imprisoned for up to 20 years if he “knowingly alters, destroys, mutilates, conceals, covers up, falsifies, or makes a false entry in any record, document, or tangible object with the intent to impede, obstruct, or influence” a federal investigation.

In *Yates v. U.S.*, 135 S. Ct. 1074 (2015) (*Yates*), a case of first impression, the Supreme Court defined the term *tangible object* as used in § 1519 in a plurality opinion. It involved a situation where a commercial fisherman was charged with a criminal violation pursuant to § 1519 because he instructed a crew member to throw undersized fish overboard in contravention of an order issued by an officer. The Court addressed the issue of whether a fish constitutes a tangible object for purposes of § 1519. It held that *tangible object* as used in § 1519 must be one used to “preserve or record information.” *Yates* reversed the decision of the Eleventh Circuit in *U.S. v. Yates*, 733 F. 3d 1059 (CA-11, 2013) (*Yates I*), *rev’d and remanded*, 135 S. Ct. 1074 (2015), which held that a fish is a tangible object under § 1519. *Yates I* held that tangible means “having or possessing physical form;” thus, based on the plain meaning of the word, *tangible object* unambiguously applies to fish. On remand in *U.S. v. Yates*, 788 F.3d 1350 (CA-11, 2015), the Eleventh Circuit, in accord with *Yates*, vacated Yates’s conviction under § 1519 and remanded the case to the district court for further proceedings consistent with *Yates*. Initially, the district court, the order of which is not published in the Federal Supplement but is available at *U.S. v. Yates*, 2011 U.S. Dist. LEXIS 87413 (M.D. Fla., Aug. 8, 2011), and at 2011 WL 3444093 (*Yates II*), had denied Yates’s motion for judgment of acquittal, reasoning that courts have held the *tangible object* language in § 1519 to be a term independent of record or document. Thus, a reasonable jury could find that Yates is in violation of § 1519, as he caused the fish to be thrown overboard. In fact, Yates was later adjudicated guilty.

Before analyzing *Yates*, an overview of the relevant statutory law is necessary.

OVERVIEW OF THE RELEVANT STATUTORY LAW

18 U.S.C. §1519 provides:

“Whoever knowingly alters, destroys, mutilates, conceals, covers up, falsifies, or makes a false entry in any *record, document, or tangible object* with the intent to impede, obstruct, or influence the investigation or proper administration of any matter within the jurisdiction of any department or agency of the United States or any case filed under title 11, or in relation to or contemplation of any such matter or case, shall be fined under this title, imprisoned not more than 20 years, or both.” (Emphasis added.)

§ 1519, known as the anti-shredding provision, was passed as part of § 802 of Title VIII of the Sarbanes-Oxley Act, titled “Corporate and Criminal Fraud Accountability Act of 2002.” Title VIII contains seven substantive sections dealing with criminal corporate securities fraud. § 802 is titled “Criminal Penalties for Altering *Documents*.” Pub. L. 107-2014, Title VIII, § 802, 116 Stat. 745 (emphasis added). It contains only two new criminal offenses, namely §§1519 and 1520. § 1519’s caption is “Destruction, alteration, or falsification of *records* in Federal investigations and bankruptcy.” 18 U.S.C. § 1519 (emphasis added). § 1520’s caption is “Destruction of corporate audit records.” It requires the retention of all audit workpapers of any accountant conducting an audit of an issuer of regulated securities for a period of five years. Also it instructs the Securities and Exchange Commission to promulgate rules to ensure the retention of documents and records (including electronic records) as provided in § 1520. Furthermore, it provides for a fine and/or imprisonment for anyone who knowingly and willfully violates §1520(a)(1).

§ 1519 is contained in Chapter 73 of Title 18. Chapter 73 is captioned “Obstruction of Justice.” § 1519 and § 1520 are at the end of Chapter 73, following §§ 1516, 1517, and 1518, which each prohibit obstruction of justice acts in specific areas.

Chapter 73 did not expressly prohibit the destruction of evidence as a means to obstruct justice prior to the enactment of § 1519. Enacted in 1982, 18 U.S.C. § 1512, a witness-tampering provision, provides in § 1512(b) that it is an offense to “intimidat[e], threate[n], or corruptly persuad[e] *another person*” to “alter, destroy, mutilate, or conceal an object with intent to impair the object's integrity or availability for use in an official proceeding.” (Emphasis added). Thus, § 1519 fixed a loophole in the obstruction of justice laws by penalizing a person who destroys records themselves. Furthermore, § 1519 goes beyond the reach of § 1512(b) as it applies to “any matter within the jurisdiction of any department or agency of the United States.” The legislative history describes §1519 as “a new general anti shredding provision” and provides that “certain current provisions make it a crime to persuade another person to destroy documents, but not a crime

to actually destroy the same documents yourself.” *See*, S. Rep. No. 107-146, p. 14 (2002).

§ 1512(c)(1) was enacted at the same time as § 1519 as part of the Sarbanes-Oxley Act. It provides “Whoever corruptly alters, destroys, mutilates, or conceals a record, document, or *other object*, or attempts to do so, with the intent to impair the object's integrity or availability for use in an official proceeding ... shall be fined under this title or imprisoned not more than 20 years, or both.” (Emphasis added.) Whereas § 1519 uses the language “tangible object,” § 1512(c)(1) uses the language “other object.” Neither the term “tangible object” as used in § 1519 nor “other object” as used in § 1512(c)(1) is defined in the statute.

18 U.S.C. § 2232(a) provides

“DESTRUCTION OR REMOVAL OF PROPERTY TO PREVENT SEIZURE.—Whoever, before, during, or after any search for or seizure of property by any person authorized to make such search or seizure, knowingly destroys, damages, wastes, disposes of, transfers, or otherwise takes any action, or knowingly attempts to destroy, damage, waste, dispose of, transfer, or otherwise take any action, for the purpose of preventing or impairing the Government’s lawful authority to take such property into its custody or control or to continue holding such property under its lawful custody and control, shall be fined under this title or imprisoned not more than 5 years, or both.”

While § 2232 is part of Title 18, it is part of Chapter 109, titled “Searches and Seizures.”

YATES

In *Yates*, the Supreme Court reversed the Eleventh Circuit’s decision in *Yates I*, which affirmed the district court’s decision in *Yates II* and overturned the criminal conviction of Yates based on a violation of § 1519. The Court interpreted “tangible object” in the context of the Sarbanes-Oxley Act and employed rules of statutory construction in determining that a fish is not captured within § 1519. Rather, “tangible object” covers one used to record or preserve information as opposed to all objects in the physical world. The facts in *Yates* are not complex.

Yates, a commercial fisherman, captained the *Miss Katie*, a commercial fishing boat that harvested fish in the Gulf of Mexico. On August 23, 2007, six days into a fishing expedition, Officer John Jones of the Florida Fish and Wildlife Conservation Commission boarded the *Miss Katie* to check on the vessel’s compliance with fishing rules. Officer Jones was deputized as a federal agent by the National Marine Fisheries Service (NMFS), a division of the United States Department of Commerce’s National Oceanic and Atmospheric Administration. Thus, although the *Miss Katie* was exclusively within federal waters, Officer Jones had jurisdiction over it.

While on board the *Miss Katie*, Officer Jones noticed three red grouper that appeared to be undersized according to federal conservation regulations at the time, which required immediate release of red grouper less than twenty inches

long. 50 CFR §622.37(d)(2)(ii) (effective April 2, 2007). A violation of the regulations is a civil offense punishable by a fine or a fishing license suspension. *See*, 16 U.S.C. §§1857(1)(A), (G), 1858(a), (g).

Officer Jones inspected the ship's catch and set aside and measured only the fish appearing to be less than twenty inches and determined that Yates had illegally harvested seventy-two undersized fish. A fellow officer recorded the length of each of the undersized fish on a catch measurement verification form. None of the fish were less than 18.75 inches; three were less than 19 inches, and with few exceptions the fish measured were between 19 and 20 inches. Officer Jones placed the undersized fish in wooden crates and ordered Yates to leave the segregated fish in the crates until the *Miss Katie* returned to port the following day at the conclusion of her trip. Officer Jones issued Yates a civil citation for possession of undersized fish. It was not contained in the record what civil penalty, if any, Yates received due to the undersized fish.

When the *Miss Katie* docked in Cortes, FL, four days later, Officer Jones measured the fish segregated in the wooden crates, noting that although still less than twenty inches, the measured fish slightly exceeded the lengths recorded on board. Officer Jones deduced that the fish at port were different than those he had measured on the *Miss Katie* during his first inspection. Thomas Lemons, one of two crew members on the *Miss Katie* besides Yates, admitted under questioning that at Yates's direction he had thrown overboard the fish measured on the Gulf of Mexico, and that he and Yates had replaced them with other fish from the catch.

On May 5, 2010, Yates was indicted for destroying property to prevent a federal seizure, in violation of § 2232(a), and for destroying, concealing, and covering up undersized fish to impede a federal investigation by the NMFS, in violation of §1519 and for making a false statement to federal law enforcement officers in violation of 18 U.S.C. § 1001(a)(2). More than thirty-two months had passed before criminal charges were brought against Yates. While none of the measured fish fell below 18 inches, by the time of the indictment the minimum legal length for the fish was reduced from 20 inches to 18 inches. *See*, 50 CFR § 622.37(d)(2)(iv) (effective May 18, 2009).

In August, 2011, at the end of the government's criminal case in chief, Yates moved for a judgment of acquittal on the § 1519 count. Yates pointed to § 1519's title and origin in the Sarbanes-Oxley Act and argued that § 1519 is "a documents offense" applying only to the destruction of records. Also, Yates argued that the reference to "tangible objects" embraces only "notations in tangible objects, such as computer hard drives, log books, [and] things of that nature," and does not include fish. Yates acknowledged that there are sections in the Criminal Code other than § 1519 that the government could have pursued as a means to prosecute him for tampering with evidence. § 2232(a) could be one. The district court denied the motion for acquittal. It relied upon Eleventh Circuit precedent in reaching its decision. It stated: "The Eleventh Circuit has stated that while § 1519 was passed as part of the Sarbanes-Oxley Act, which was targeted

at corporate fraud and executive malfeasance, the broad language of § 1519 is not limited to corporate fraud cases, and ‘Congress is free to pass laws with language covering areas well beyond the particular crisis *du jour* that initially prompted legislative action.’ *United States v. Hunt*, 526 F.3d 739, 744 (11th Cir. 2008).” Thus, the court viewed *tangible objects* as a term *independent of record or document*. The court stated, “Given the nature of the matters within the jurisdiction of the government agency involved in this case, and the broad language of § 1519, the Court finds that a reasonable jury could determine that a person who throws or causes to be thrown fish overboard in the circumstances of this case is in violation of § 1519.” *Yates II*, 2011 U.S. Dist. LEXIS 87413, at 3. The jury found Yates guilty on the § 2232(a) and § 1519 counts, and acquitted him on the § 1001(a)(2) count. The § 1001(a)(2) count is not relevant to the decision in *Yates*. The district court sentenced Yates to 30 days of imprisonment, followed by 36 months of supervised release.

In *Yates I*, the Eleventh Circuit affirmed the district court, holding that the meaning of *tangible object* in § 1519 is *plain*, and reasoned that “[i]n statutory construction, the plain meaning of the statute controls unless the language is ambiguous or leads to absurd results.” *United States v. Carrell*, 252 F.3d 1193, 1198 (11th Cir. 2001) (internal quotation marks omitted).” The court reasoned that undefined words in a statute are given their “ordinary or natural meaning;” namely, its dictionary definition. It utilized Black’s Law Dictionary 1592 (9th ed. 2009) definition of *tangible* as “[h]aving or possessing physical form” and concluded that “‘tangible object,’ as § 1519 uses that term, unambiguously applies to fish.” *Yates I*, 788 F. 3d, at 1064.

Reversing the Eleventh Circuit, the Supreme Court rejected the government’s argument that § 1519 provides a general ban on the spoliation of evidence, as it covers all physical items relevant to any federal investigation. It accepted Yates’s arguments for a contextual reading of § 1519 and held that it doesn’t target all manner of evidence but covers records, documents, and tangible objects used to preserve them, *e.g.*, computers, servers, and other media on which information is stored. Based on its statutory interpretation of the Sarbanes-Oxley Act in general and § 1519 specifically, the Court determined that the provision of a general spoliation statute covering *tangible objects* of any and every kind in § 1519, targeting fraud and financial record-keeping, is not something that Congress is likely to do.

Noting that the ordinary meaning of a *tangible object* according to dictionary definitions is “a discrete ... thing” that “possess[es] physical form,” the Court reasoned that the government extrapolated from that definition that § 1519 “covers the water front, including fish in the sea.” However, the Court opined that dictionary definitions alone do not determine whether a statutory term is ambiguous. Instead, it stated, “‘The plainness or ambiguity of statutory language is determined [not only] by reference to the language itself, [but as well by] the specific context in which that language is used, and the broader context of the statute as a whole.’” *Robinson v. Shell Oil Co.*, 519 U.S. 337, 341, 117 S. Ct. 843,

136 L. Ed. 2d 808 (1997). ... Ordinarily, a word's usage accords with its dictionary definition. In law as in life, however, the same words, placed in different contexts, sometimes mean different things." *Yates* 135 S. Ct., at 1081-1082.

The Court noted that its precedents established that identical language may not contain the same content when used in different statutes and sometimes in various provisions of one statute. Referring to *Atlantic Cleaners & Dyers, Inc. v. United States*, 286 U.S. 427, 433 (1932), the Court noted that "Most words have different shades of meaning and consequently may be variously construed Where the subject matter to which the words refer is not the same in the several places where [the words] are used, or the conditions are different, or the scope of the legislative power exercised in one case is broader than that exercised in another, the meaning well may vary to meet the purposes of the law, to be arrived at by a consideration of the language in which those purposes are expressed, and of the circumstances under which the language was employed." Hence, while the dictionary definitions of *tangible* and *object* are relevant in determining the object of *tangible object* in § 1519, they are not dispositive.

The Court rejected the argument that *tangible object* in § 1519 should be defined in accord with the dictionary definitions, as it is also used and interpreted to mean any physical evidence in Federal Rule of Criminal Procedure 16(a)(1)(E), which requires the prosecution to grant a defendant's request to inspect tangible objects controlled by the government relevant to the defendant's defense. The Court opined that in the context of a discovery rule protecting defendants being prosecuted, interpreting *tangible objects* comprehensively to include any evidence is proper. However, it distinguished § 1519 as it "is a penal provision that refers to 'tangible object' not in relation to a request for information relevant to a specific court proceeding, but rather in relation to federal investigations or proceedings of every kind, including those not yet begun." Thus, the Court ruled that "Just as the context of Rule 16 supports giving 'tangible object' a meaning as broad as its dictionary definition, the context of § 1519 tugs strongly in favor of a narrower reading." *Yates*, 135 S. Ct., at 1083.

Turning to familiar interpretive guides, the Court noted that neither § 1519's caption, "Destruction, alteration, or falsification of records in Federal investigations and bankruptcy," nor § 802 of the Act containing § 1519, titled "Criminal penalties for altering documents," suggest that it covers any and all physical evidence regardless of how remote it is from records. Also, the only other provision in § 802 of the Act is § 1520, which is titled, "Destruction of corporate audit records." The Court reasoned that the headings are not controlling, but "they supply cues that Congress did not intend 'tangible object' in § 1519 to sweep within its reach physical objects of every kind, including things no one would describe as records, documents, or devices closely associated with them. ... If Congress indeed meant to make § 1519 an all-encompassing ban on the spoliation of evidence, as the dissent believes Congress

did, one would have expected a clearer indication of that intent.” *Yates*, 135 S. Ct., at 1083.

The Court opined that the placement of § 1519 within Chapter 73 of Title XVIII indicates that Congress did not intend it to function as a general ban on the spoliation of any kind of physical evidence. § 1519 and its companion provision § 1520 were placed at the end of Chapter 73 along with the pre-existing sections prohibiting obstruction of justice in specific, limited types of cases. Yet Congress directed codification of the other provision of the Sarbanes-Oxley Act to be added to Chapter 73 in areas with provisions addressing actions of obstruction relating broadly to official proceedings and criminal trials.

The Court viewed § 1519 in conjunction with § 1512(c)(1), which was contained in a separate section of SOX, noting that § 1512(c)(1) was drafted and proposed after § 1519. Its prohibition of the alteration, destruction, mutilation, or concealment of a record, document, or other object intending to impair the object’s integrity or availability for use in official proceedings includes any physical object. The Court reasoned that if *tangible objects* in § 1519 included all physical objects, then there was no reason to enact § 1512(c)(1). Any § 1512(c)(1) violation would also violate § 1519, as “the investigation or proper administration of any matter within the jurisdiction of any department or agency of the United States ... or in relation to or contemplation of any such matter” is even broader than “an official proceeding.” The Court stated, “We resist a reading of § 1519 that would render superfluous an entire provision passed in proximity as part of the same Act.”

The Court utilized two related canons of statutory construction to determine the meaning of *tangible object* as used in § 1519 in the context of its surrounding words; namely, *noscitur a sociis* (it is known from its associates) and *ejusdem generis* (of the same kind). The Supreme Court in *United States v. Williams*, 553 U.S. 285, 294, (2008), provided that under the principle of *noscitur a sociis*, “a word is given more precise content by the neighboring words with which it is associated.” As stated in *Gustafson v. Alloyd Co.*, 513 U.S. 561, 575 (1995), the Court relies on *noscitur a sociis* to “avoid ascribing to one word a meaning so broad that it is inconsistent with its accompanying words, thus giving unintended breadth to the Acts of Congress (internal quotation marks omitted).” Applying *noscitur a sociis*, the Court held that *tangible object* refers to the subset of tangible objects used to record or preserve information, as it is the last in a list of terms in § 1519, starting with “any record [or] document.” The Court referenced United States Sentencing Commission, Guidelines Manual § 2J1.2, comment., n. 1 (Nov. 2014), which provides that “‘Records, documents, or tangible objects’ includes (A) records, documents, or tangible objects that are stored on, or that are, magnetic, optical, digital, other electronic, or other storage mediums or devices; and (B) wire or electronic communications.” The Sentencing Commission amended the sentencing guidelines in response to the Sarbanes-Oxley Act.

The Court reasoned that its interpretation of *tangible object* is in accord with the actions prescribed in § 1519, as it applies to whoever alters, destroys, mutilates,

conceals, covers up, *falsifies*, or *makes a false entry in* any record, document, or tangible object with the requisite obstructive intent (emphasis added.) The Court stated, “The last two verbs, ‘falsif[y]’ and ‘mak[e] a false entry in,’ typically take as grammatical objects records, documents, or things used to record or preserve information, such as logbooks or hard drives...Furthermore, Congress did not include on § 1512(c)(1)’s list of prohibited actions ‘falsifies’ or ‘makes a false entry in.’ ... That contemporaneous omission also suggests that Congress intended ‘tangible object’ in § 1519 to have a narrower scope than ‘other object’ in § 1512(c)(1)...” *Yates*, 135 S. Ct., at 1086.

Washington State Dept. of Social and Health Servs. v. Guardianship Estate of Keffeler, 537 U.S. 371, 384 (2003), provides that under the principle of *ejusdem generis*, “Where general words follow specific words in a statutory enumeration, the general words are [usually] construed to embrace only objects similar in nature to those objects enumerated by the preceding specific words.” Also, in *CSX Transp., Inc. v. Alabama Dept. of Revenue*, 562 U.S. 277, ___, 131 S. Ct. 1101, 1113 (2011), the Court stated, “We typically use *ejusdem generis* to ensure that a general word will not render specific words meaningless.” Applying *ejusdem generis*, the Court reasoned that “[h]ad Congress intended ‘tangible object’ in § 1519 to be interpreted so generically as to capture physical objects as dissimilar as documents and fish, Congress would have had no reason to refer specifically to ‘record’ or ‘document.’ The Government’s unbounded reading of ‘tangible object’ would render those words misleading surplusage.” *Yates*, 135 S. Ct., at 1087.

The Court rejected the government’s argument that its broad interpretation of *tangible object* should be adopted, as the origins of the phrase “record, document, or tangible object” in § 1519 comes from a 1962 Model Penal Code (MPC) provision and related reform proposals. They would have imposed liability on anyone who “alters, destroys, mutilates, conceals, or removes a record, document or thing.” See ALI, MPC § 241.7(1), p. 175 (1962). The provision was understood to refer to all physical evidence. Hence, the government argued that § 1519 is intended to apply to any physical evidence.

Rejecting the government’s inference, the Court distinguished the 1962 MPC provision prohibiting tampering with any kind of physical evidence. It noted that the actions prohibited did not specifically relate to records, documents, and objects used to record or preserve information, the 1962 MPC provision ranked the offense as a misdemeanor, and it restricts the liability to instances in which the violator “believ[es] that an official proceeding or investigation is pending or about to be instituted.” MPC § 241.7(1), at 175. The Court reasoned that *Yates* had little reason to anticipate a felony prosecution under § 1519 due to harvesting undersized fish, especially one brought at a time when even the smallest grouper he caught came within the legal limit. In addition, § 1519 provides for a felony punishable by up to twenty years in prison, as opposed to a misdemeanor. Furthermore, § 1519 sanctions conduct intended to impede any federal investigation or proceeding, even those not on the verge of commencement.

The Court opined that it would invoke the rule of lenity if its statutory construction leaves any doubt about the meaning of *tangible object* in § 1519. *McNally v. United States*, 483 U.S. 350, 359-60 (1987) provides that the rule of lenity requires that “when there are two rational readings of a criminal statute, one harsher than the other, we are to choose the harsher only when Congress has spoken in clear and definite language.” In *Cleveland v. United States*, 531 U.S. 12, 25 (2000)(quoting *Rewis v. United States*, 401 U.S. 808, 812 (1971)), the Court noted that “ambiguity concerning the ambit of criminal statutes should be resolved in favor of lenity.” In *Liparota v. United States*, 471 U.S. 419, 427 (1985), the Court stated that “Application of the rule of lenity ensures that criminal statutes will provide fair warning concerning conduct rendered illegal and strikes the appropriate balance between the legislature, the prosecutor, and the court in defining criminal liability.” The Court opined that the rule of lenity is relevant in *Yates*, where “the Government urges a reading of § 1519 that exposes individuals to 20-year prison sentences for tampering with *any* physical object that *might* have evidentiary value in *any* federal investigation into *any* offense, no matter whether the investigation is pending or merely contemplated, or whether the offense subject to investigation is criminal or civil,” and that “Congress should have spoken in a language that is clear and definite in § 1519 if the Court is to choose the harsher interpretation of *tangible object*.” *Yates*, 135 S.Ct., at 1088.

Based upon its reasoning in *Yates*, the Court stated, “We resist reading § 1519 expansively to create a coverall spoliation of evidence statute, advisable as such a measure might be. Leaving that important decision to Congress, we hold that a ‘tangible object’ within § 1519’s compass is one used to record or preserve information.”

In a concurring opinion, Justice Alito applied traditional tools of statutory construction. Applying *noscitur a sociis* and *ejusdem generis*, he opined that *tangible object* in § 1519 refers to something similar to records or documents. He stated, “A fish does not spring to mind—nor does an antelope, a colonial farmhouse, a hydrofoil, or an oil derrick. All are ‘objects’ that are ‘tangible.’ But who wouldn’t raise an eyebrow if a neighbor, when asked to identify something similar to a ‘record’ or ‘document,’ said ‘crocodile’?” *Yates*, 135 S. Ct., at 1089. In addition, Justice Alito considered the verbs in § 1519: “alters, destroys, mutilates, conceals, covers up, falsifies, or makes a false entry in.” He stated, “Although many of those verbs could apply to nouns as far-flung as salamanders, satellites, or sand dunes, the last phrase in the list—‘makes a false entry in’—makes no sense outside of filekeeping. How does one make a false entry in a fish? ‘Alters’ and especially ‘falsifies’ are also closely associated with filekeeping. Not one of the verbs, moreover, *cannot* be applied to filekeeping—certainly not in the way that ‘makes a false entry in’ is always inconsistent with the aquatic.” *Yates*, 135 S.Ct., at 1090.

CONCLUSION

In *Yates*, the Supreme Court defined the term *tangible object* as used in § 1519, which was enacted as part of the Sarbanes-Oxley Act of 2002. It defined *tangible object* in § 1519 “to cover only objects one can use to record or preserve information, not all objects in the physical world.” It did not read the provision as a general ban on the spoliation of evidence covering all physical items relevant to any matter under federal investigation. It held that § 1519 targets records, documents, and tangible objects used to preserve them, e.g., computers, servers, and other media on which information is stored.

In reaching its decision, the Supreme Court viewed the ordinary meaning of an object that is tangible according to its dictionary definitions, as “a discrete ... thing” that “possess[es] physical form.” However, in determining whether the statutory term *tangible object* is ambiguous beyond the dictionary definitions of *tangible* and *object*, the Court viewed the language in the specific context in which it was used in § 1519 and the broader context of SOX and of Chapter 73 of Title 18. The Court noted that SOX was enacted following the collapse of Enron Corporation and was designed to protect investors and restore trust in financial markets. The Court referenced Sarbanes-Oxley’s subtitle; namely, “An Act to protect investors by improving the accuracy and reliability of corporate disclosures made pursuant to the securities laws, and for other purposes.” It viewed § 1519 in light of its financial-fraud mooring within SOX. It considered the legislative history of SOX and viewed the language in § 1519 in light of the language *other object* in § 1512(c)(1).

Applying the doctrine of *noscitur a sociis*, the Court reasoned that *tangible object* refers to the subset of tangible objects involving records and documents. Also, the verbs *falsify* and *mak[e] a false entry in* “typically take as grammatical objects records, documents, or things used to preserve or record information, such as log books or hard drives.” Applying *ejusdem generis*, the Court reasoned “Congress would have had no reason to refer specifically to ‘record’ or ‘document’” if it “intended ‘tangible object’ in § 1519 to be interpreted so generically as to capture physical objects as dissimilar as documents and fish.” In addition, the Court opined that it would invoke the rule of lenity if its statutory construction leaves any doubt about the meaning of *tangible object* in § 1519.

The Court’s decision avoids the absurd result that the destruction of undersized fish, which were the subject of a civil fishing citation, would result in a felony conviction under SOX. It limits the breadth of the anti-shredding provision of SOX to its intended reach. It will be interesting to see how the courts apply *Yates* when determining the scope of whether something is a tangible object used to preserve or record information in light of the ever-changing digital world.

If one sees a creature that looks like a fish, swims like a fish, and tastes like a fish, it is a fish, but it is not a *tangible object* captured by § 1519. Justice Alito summed it up: “How does one make a false entry in a fish?”

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EFFECTIVENESS OF AUDITING CURRICULA REVISTED

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ABSTRACT: The auditing environment is constantly faced with new challenges calling for the revision of auditing curriculum. Passage of the Sarbanes-Oxley Act of 2002 (SOX), resulting from accounting fraud leading to prominent business failures, has impacted the auditing environment significantly and is considered by many to be the most significant legislation affecting accounting since the 1933 and 1934 Securities Acts. Previous research by Blouch et al. (1999), reported auditing educators' assessment of the effectiveness of the auditing curriculum with respect to 54 auditing topics. The purpose of revisiting this research is to assess the relative effectiveness of contemporary Post-SOX auditing curriculum and identify any perception changes in the relative effectiveness of the curriculum. Responding to the legislation, the number of auditing topics is expanded to 63. Study results should be helpful both to auditing educators and auditing textbook authors in evaluating curriculum and designing appropriate modifications to improve its effectiveness. Consideration of a second auditing course may be in order at either the undergraduate level or graduate level in a 150-hour program due to the potential crowding out of important existing auditing topics due to insufficient time in a single course. Furthermore, the greater comprehension of the auditing gestalt required as a result of the Sarbanes-Oxley Act necessitates educational paradigms, such as cases, which require time and a solid understanding of the auditing basics that is difficult to achieve in a one semester course.

Key Words: Auditing, curriculum, Sarbanes-Oxley, survey

INTRODUCTION

An important entry-level position for a large number of accounting students is that of auditor. Thus, it is important that these students are well prepared to undertake the duties and assignments of an auditor and to understand the importance of auditing to the overall accounting function. Not surprisingly, more than 90 percent of accounting programs require an introductory financial auditing course at the undergraduate level (AAA Auditing Section Education Committee, 2003). Triggered by highly publicized financial scandals that alarmed the public, Congress passed the Sarbanes Oxley Act (SOX) in 2002 that called for stricter

corporate accountability, the establishment of additional oversight of CPA firms auditing publicly-held companies, and is considered by many to be the most significant legislation affecting accounting since the 1933 and 1934 Securities Acts.

Interviewing corporate directors Cohen et al (2013) found that the legislation influenced both audit committees and internal auditors. For the former, the perception is that the Act led to a more structured formal approach to accounting policy decision making by audit committees and external auditors. With respect to the latter, they found that SOX led to a substantial improvement in the scope, responsibility, and status of internal auditors. Other influences are found at the SEC and the security exchanges. The SEC now requires executive compensation plans to be fully disclosed and new rules of professional conduct for corporate lawyers and accountants have been enacted (Reed et al, 2007). At the exchanges a greater independence requirement for boards of directors has been adopted in new exchange listing requirements by both the NYSE and NASDAQ. Arens and Elder (2006) report that auditing today is performed significantly differently than before the legislation, and that these changes in the accounting profession have a significant effect on the knowledge and skills students need to be auditors. As a result, they emphasize the SOX legislation will also result in needed changes in auditing curriculum.

Reed et al (2007) studied the impact SOX and related regulatory changes will have on undergraduate business and four-year accounting programs. They noted many undergraduate business programs will most likely have to incorporate SOX material into existing courses given the inability to increase required credit hour requirements. BizEd conducted a survey of accounting department chairs and faculty that focused on how SOX was incorporated into their curricula (Bisoix, 2005). Twenty eight of thirty six schools surveyed responded either they slightly changed a course or redesigned courses. Only one school changed its curriculum by adding a new course or program just on SOX.

Revising curriculum is part of the continuous improvement process adopted by many schools. Accordingly, auditing professors have to determine which current material is more worthy of being retained in a course and which material should be removed to include the more current and necessary SOX material. The purpose of this study is to help faculty make these decisions in an undergraduate auditing course as they reevaluate curriculum in light of SOX expectations and requirements.

Past research confirms the content of the first auditing course is strongly connected to textbook content. Previous research by Engle & Elam (1985) established a direct relationship between undergraduate auditing classroom emphasis and auditing textbook emphasis. In addition, a study commissioned by the American Accounting Association's (AAA) Auditing Section to assess the status of auditing courses in the undergraduate accounting curriculum found the content of the first auditing course to be textbook dependent (Frakes, 1987). Bryan and Smith (1997) surveyed auditing educators to determine their

perceptions concerning the importance of 31 auditing topics based on the content of several leading auditing textbooks. More recently, the AAA's Auditing Section Education Committee (2003) conducted a survey in which course syllabi from 285 auditing and assurance courses were analyzed on a number of dimensions, including identifying auditing topics, and compared to prior surveys of auditing courses (Frakes, 1987; Groomer and Heintz, 1994). Like Frakes, the AAA study (2003), Bisoux (2005), and Reed et al (2007), also found that textbooks are the most common learning activity in introductory auditing courses.

Ulrich et al (2003) surveyed auditing educators regarding the importance of 54 audit topics found in introductory auditing courses. Like Bryan and Smith (1997), contemporary leading auditing textbooks were used to identify 54 topics used in this study. While some of Ulrich's et al (2003) results show consistency with prior research findings, differences also exist. For example, Bryan and Smith's (1997) highly ranked topics deal with general standards, audit reports and professional responsibility, and legal liability. Ulrich's et al (2003) highly rated topics deal with audit processes, including internal control and risk assessment, evidence collection, audit preparation, internal control tests, and detail account balance tests.

While the preponderance of previous research has examined the relative importance of various auditing topics within the auditing curriculum from both the perspective of the auditing educators (Bryan & Smith, 1997; Ulrich et al, 2003) and practicing CPAs (Bryan & Smith, 1998; Blouch et al, 2004), only Blouch et al (1999) compiled data on the apparent relative effectiveness of auditing curricula in developing specific auditing topics. Due to time constraints, clearly auditing professors must focus on the most critical topics. Using 54 auditing topics identified in leading auditing textbooks, Blouch et al (1999) surveyed auditing educators with respect to the relative effectiveness of the auditing curriculum in developing these topics. Unfortunately, these results were obtained before the passage of the Sarbanes Oxley Act, Pre-SOX. The purpose of revisiting the effectiveness of auditing curricula is to assess the effectiveness of contemporary, Post-SOX auditing curricula and provide a longitudinal perspective of resulting changes over time. Thus, this research updates the Blouch, et al (1999) survey on the relative effectiveness of the auditing curriculum with respect to the same 54 auditing topics and nine additional topics that pertain specifically to the Sarbanes-Oxley legislation. The results of this study should be helpful to auditing educators, as well as auditing text authors, in evaluating their curriculum and designing appropriate changes to improve its effectiveness in preparing accounting graduates to meet the demands and challenges of today's global business environment. Thus, the challenge for accounting faculty is to examine the auditing curriculum thoroughly and take the necessary steps to enhance the curriculum so as to ensure its effectiveness as well as its relevance.

METHODOLOGY

Questionnaire: Using 54 auditing topics identified in leading auditing textbooks, Blouch et al (1999) surveyed auditing educators with respect to the relative effectiveness of the auditing curriculum in developing these topics. Nine additional topics were added to the questionnaire that directly relate to the Sarbanes-Oxley legislation. These 63 individual auditing topics were grouped under fifteen major categories for purposes of clarity and uniformity of presentation of results. Table 1 lists the 63 individual auditing topics along with their category grouping.

TABLE 1 AUDITING TOPICS & TOPICAL CATEGORIES			
ID	Topic Category	Code	Individual Auditing Topic
1	Audit Concepts	AC	Nature of the audit profession and how it differs from that of other practicing accountants
2	Audit Concepts	AC	Generally Accepted Auditing Standards
3	Audit Concepts	AC	Statements on Auditing Standards - their origin and use in audit practice.
4	Audit Concepts	AC	Quality Control Standards - their origin and use in audit practice.
5	Opinion Decision Type Analysis	OD	Auditor's decision process for issuance of an audit report
6	Opinion Decision Type Analysis	OD	Detailed analysis of the unqualified audit report
7	Opinion Decision Type Analysis	OD	Conditions requiring departure from the standard unqualified audit report
8	Opinion Decision Type Analysis	OD	Materiality
9	Opinion Decision Type Analysis	OD	Detailed analysis of the qualified audit opinion
10	Opinion Decision Type Analysis	OD	Detailed analysis of an adverse audit opinion
11	Opinion Decision Type Analysis	OD	Detailed analysis of a disclaimer of an audit opinion
12	Special Reports	SR	Other audit engagements or limited assurance engagements
13	Special Reports	SR	Attestation engagements
14	Special Reports	SR	Auditor association with prospective financial statements
15	Special Reports	SR	Reporting on internal control structure related to financial statements
16	Compilation and Review Services	CR	Compilation services and reports
17	Compilation and Review Services	CR	Review services and reports
18	Compilation and Review Services	CR	Review of interim financial information
19	Ethics	E	Business ethics and ethical dilemmas

TABLE 1
AUDITING TOPICS & TOPICAL CATEGORIES

ID	Topic Category	Code	Individual Auditing Topic
20	Ethics	E	Code of Professional Conduct, including concepts such as independence, objectivity, confidentiality, etc.
21	Ethics	E	Enforcement of Code of Professional Conduct
22	Legal Liability	LL	Definition of audit risk, business failure and audit failure
23	Legal Liability	LL	Legal concepts, terminology, and auditor liability to clients and third parties under common law
24	Legal Liability	LL	Legal concepts, terminology, and auditor liability to clients and third parties under federal securities law
25	Evidence Collection	EC	Nature of persuasive audit evidence
26	Evidence Collection	EC	Types of audit evidence
27	Evidence Collection	EC	Purpose and timing of analytical procedures
28	Evidence Collection	EC	Management's and auditor's responsibilities concerning financial statements
29	Audit Preparation	AP	Planning the audit
30	Audit Preparation	AP	Working papers and documentation
31	Audit Preparation	AP	Assessing business risk
32	Audit Preparation	AP	Materiality and risk in preliminary phase of the audit
33	Internal Control & Risk Assessment	ICRA	Internal control reportable differences
34	Internal Control & Risk Assessment	ICRA	Overview and understanding of internal control structure
35	Internal Control & Risk Assessment	ICRA	Assessing control risks and testing of key controls
36	Internal Control & Risk Assessment	ICRA	Audit objectives and tests related to accounting transactions
37	Internal Control & Risk Assessment	ICRA	Design and use of audit program procedures related to tests of balances
38	Internal Control Tests	ICT	Business functions-cycles (revenue, acquisition, inventory, etc.) and related records, transactions, and documents
39	Internal Control Tests	ICT	Tests of internal controls and substantive tests of transactions for business functions
40	Internal Control Tests	ICT	Evaluation and effects of results of tests of internal controls and substantive test of controls
41	Detail account Balance Tests	ABT	Tests of details of account balances
42	Detail account Balance Tests	ABT	Evaluation and effects of details of account balance tests
43	Statistical Sampling	SS	Statistical and non-statistical sampling concepts
44	Statistical Sampling	SS	Attribute sampling and applications
45	Statistical Sampling	SS	Sampling for tests of details of balances – e.g. monetary unit sampling and variable sampling procedures
46	Statistical Sampling	SS	Analysis of statistical results and implication on audit procedures

TABLE 1
AUDITING TOPICS & TOPICAL CATEGORIES

ID	Topic Category	Code	Individual Auditing Topic
47	EDP Controls	EDP	Internal EDP controls
48	EDP Controls	EDP	Use of computers in the audit of client records and financial statements
49	Completing the Audit	CA	Contingent liabilities
50	Completing the Audit	CA	Subsequent events review
51	Completing the Audit	CA	Discovery of facts subsequent to issuance of audit report
52	Completing the Audit	CA	Evaluation of results and communication of facts to audit committee and management
53	Completing the Audit	CA	Internal auditing and various tasks performed by internal auditors
54	Completing the Audit	CA	Governmental auditing and generally accepted government accounting principles
55	Sarbanes-Oxley	SOX	SOX section 404 combined report on financial statements and internal control over financial reporting
56	Sarbanes-Oxley	SOX	SOX - auditor independence
57	Sarbanes-Oxley	SOX	Public Companies Accounting Oversight Board, including concepts such as ethics, independence, etc.
58	Sarbanes-Oxley	SOX	SOX - Audit Committee responsibilities
59	Sarbanes-Oxley	SOX	SOX - Requirements for auditor reporting on internal control
60	Sarbanes-Oxley	SOX	Fraud - SAS 99 - Consideration of fraud in a financial statement audit
61	Sarbanes-Oxley	SOX	Fraud and analytical procedures
62	Sarbanes-Oxley	SOX	Recognize specific fraud areas and develop procedures to detect fraud
63	Sarbanes-Oxley	SOX	Corporate governance oversight to reduce fraud risks

A dilemma inherent in asking faculty to assess the effectiveness of contemporary auditing courses is that individual faculty members design the content of their auditing courses. Accordingly, inquiring as to the effectiveness of their course in developing specific auditing topics amounts to self-assessment and an accompanying lack of independence. Conveniently, auditing textbooks play a very significant role in determining contemporary auditing course content at the undergraduate level. Accordingly, auditing educators are asked to rate the effectiveness of the auditing textbook used in their course in developing each of 63 (Post-SOX) individual auditing topics in preparing students for entry-level work and career advancement. With respect to effectiveness, the questionnaire uses a six-point Likert scale with the following ratings: very effective (6), effective (5), slightly effective (4), slightly ineffective (3), ineffective (2) and very ineffective (1).

Topic selection was determined by analyzing the topical coverage in several prominent auditing texts that span the undergraduate auditing-textbook

market. Given the inclusion of these topics within prominent auditing textbooks, there is an implied assumption of importance for professional development.

Survey Population: Selection of the survey populations utilized three criteria: (1) membership in the Audit Section of the American Accounting Association; (2) teaching at an AACSB business accredited institution; and (3) having auditing as an area of teaching and research interest. Although Engle and Elam (1985) and Bryan and Smith (1997) found no differences among faculty at AACSB business accredited schools and those at non-accredited schools, the current AACSB standards (focusing on mission, process, assessment, mandate for continuous assessment of curriculum, and involvement of all stakeholders, including practitioners) accord auditing faculty at AACSB accredited schools increased awareness and understanding of the contemporary needs of the public accounting profession. For these reasons, the selection criteria employed establishes an appropriate population for performing an effectiveness assessment analysis of the topical coverage of auditing curriculum.

In the Pre-SOX survey, questionnaires were sent to 310 auditing professors. Each faculty member received a cover letter describing the study, a questionnaire, and postage-paid return envelope. A second request was sent four weeks after the original mailing. Responses were received from 101 professors, representing a 32.6% response rate. In the Post-SOX survey, questionnaires were sent to 276 auditing professors. Each faculty member received a cover letter describing the study, a questionnaire, and postage-paid return envelope. A second request was sent four weeks after the original mailing. Responses were received from 71 professors, representing a 25.7% response rate. These response rates compare favorably with other surveys involving accounting faculty (cf., Bryan & Smith, 1997: 30.3%; Morris et al, 1990: 22.3%; Cargile and Baublitz, 1986: 24.8%).

Demographics: In the Pre-SOX survey, with respect to faculty rank, 38 of the faculty respondents are full professors, 29 associate professors, and 32 assistant professors. Seventy-three respondents indicate that in addition to having AACSB business accreditation, their school also has AACSB accounting accreditation. Ninety respondents hold a Ph.D. degree, and 61 are CPAs. In the Post-SOX survey, with respect to faculty rank, 29 of the faculty respondents are full professors, 25 associate professors, and 17 assistant professors. Fifty-eight respondents indicate that in addition to having AACSB business accreditation, their school also has AACSB accounting accreditation. Sixty-five respondents hold a Ph.D. degree, and 36 are CPAs.

MANOVA Comparisons: Given that each respondent rated 54 or 63 different auditing topics, it is appropriate to employ multivariate analysis of variance tests (MANOVA) to determine whether any of the demographic variables has an impact on the effectiveness-rating outcomes for either survey. One-way

MANOVA tests were performed to determine whether rank of respondent (full, associate, or assistant professor), AACSB accounting accreditation status (yes or no), and professional certification (CPA) influenced the mean responses. No statistically significant differences were found in any of these cases in either survey. Table 2 shows the results of these statistical tests.

Olson (1974) found that when performing MANOVA the test statistic based on Pillai's trace is the most robust and has adequate power to detect true differences under different conditions. Moreover, Pillai's trace can be transformed into an exact F-ratio, and for the case when comparing two groups, Pillai's trace can be transformed into Hotelling's T or an exact F-ratio. Accordingly, the ratings on effectiveness of the 54 and 63 auditing topics appear to be consistent among the responding accounting educators despite differing demographic variables as no significant differences are present with the MANOVA analysis. In addition, chi-square analyses were performed to determine whether the current survey respondents' demographic profile differed from the earlier survey. No significant differences were found for faculty rank ($X^2 = 1.53$), AACSB accounting accreditation ($X^2 = 1.48$) or CPA certification ($X^2 = 2.01$).

TABLE 2			
MANOVA TEST RESULTS			
Variable	Pillai's Trace	F-value	Significance
<u>Pre-SOX Survey</u>			
Rank (full, assoc. or asst.)	1.748	1.412	0.177
AACSB Accounting Accreditation	0.891	1.521	0.242
CPA vs. non-CPA	0.723	0.531	0.938
Non-response Bias	0.773	0.756	0.767
<u>Post-SOX Survey</u>			
Rank (full, assoc. or asst.)	1.817	1.106	0.443
AACSB Accounting Accreditation	0.944	1.861	0.197
CPA vs. non-CPA	0.933	1.543	0.285
Non-response Bias	0.925	1.375	0.351
<u>Post-SOX Vs. Pre-SOX Survey</u>			
Multivariate Test of Mean Differences	0.559	1.503	0.059

Non-Response Bias Considerations: The potential for non-response bias is present in every mail survey due to the inability to obtain responses from all members of the original sample. Research has found that those subjects who respond less readily are more like non-respondents, and that average responses from successive mailings can be used to estimate the potential responses of non-

respondents (Armstrong & Overton, 1977). To test for non-response bias, we compare the effectiveness mean responses between the first and second mailings for each of the 54 and 63 auditing topics employing MANOVA. The results are in Table 2. The lack of significant differences in the foregoing tests indicates the absence of material non-response bias in either survey.

RESULTS

The interpretation of the data is based on the arithmetic mean (average) response for each of the auditing topics listed on the questionnaire. The arithmetic mean provides a single figure that summarizes the responses and serves as a basis for comparing the degree of relative effectiveness that the responding auditing educators attribute to each topic. The mean for a single topic is nothing more than the sum of the point values accorded it by the respondents, divided by the total number of respondents. Given the large set of auditing topics, a macro-perspective is provided by reporting a grand mean of the effectiveness ratings for both surveys as well as the means for the fourteen common categories of auditing topics in both surveys. These results are presented in Table 3 where the category means are ranked using the Post-SOX means. Each category's list of audit topics are in Table 1.

TABLE 3					
LONGITUDINAL COMPARISON OF AUDITING TOPIC EFFECTIVENESS RATINGS BY CATEGORIES					
Category	Code	Post- SOX Mean	Post- SOX Rank	Pre- SOX Rank	Pre- SOX Mean
Evidence Collection	EC	4.76	1	3	4.52
Opinion Decision Type Analysis	OD	4.63	2	1	4.58
Detail Account Balance Tests	ABT	4.58	3	3	4.52
Audit Concepts	AC	4.49	4	3	4.52
Legal Liability	LL	4.49	4	2	4.54
Internal Control Tests	ICT	4.47	6	8	4.45
Internal Control & Risk Assessment	ICRA	4.42	7	3	4.52
Audit Preparation	AP	4.35	8	7	4.46
Statistical Sampling	SS	4.29	9	10	4.23
Ethics	E	4.22	10	9	4.25
Special Reports	SR	3.91	11	13	3.91
Completing the Audit	CA	3.91	11	11	4.05
Compilation and Review Services	CR	3.61	13	12	4.03
EDP Controls	EDP	3.32	14	14	3.52
Grand Mean	GM	4.28	-	-	4.32

Macro-Perspective: The grand means of the common 54 topics in both surveys are 4.28 and 4.32 for the Post-SOX survey and the Pre-SOX survey, respectively. A t-test of the grand means showed no significant difference (significance = 0.791) on overall relative effectiveness of the auditing curriculum between the two surveys. Using the grand mean in each survey as a reference point for the average relative effectiveness rating assigned by the accounting educators by which auditing texts prepare students for entry level work and career advancement, we are able to gain a macro-perspective of the results.

Looking first at the Post-SOX category ratings on effectiveness, Table 3 shows nine of the fourteen categories are rated as above average effectiveness (i.e., means above the Post-SOX grand mean). Of these, three have means above 4.50. *Evidence Collection* ($\mu = 4.76$), *Opinion Decision Type Analysis* ($\mu = 4.63$), and *Detail Account Balance Tests* ($\mu = 4.58$) are ranked 1, 2 and 3, respectively. *Audit Concepts* ($\mu = 4.49$), *Legal Liability* ($\mu = 4.49$), *Internal Control Tests* ($\mu = 4.47$) and *Internal Control & Risk Assessment* ($\mu = 4.42$) all have means above 4.40 and are ranked 4th through 7th. The remaining two categories with ratings above the grand mean are *Audit Preparation* ($\mu = 4.35$) and *Statistical Sampling* ($\mu = 4.29$). Of the five categories with ratings below the grand mean on the Post-SOX survey, one has a mean greater than 4.00 and that is *Ethics* ($\mu = 4.22$). *Special Reports* ($\mu = 3.91$), *Completing the Audit* ($\mu = 3.91$), and *Compilation and Review Services* ($\mu = 3.61$) have means above 3.5. The remaining category is *EDP Controls* ($\mu = 3.32$).

For the Pre-SOX category ratings on effectiveness, Table 3 shows eight of the fourteen categories are rated above average effectiveness (i.e., means above the Pre-SOX grand mean). Of these, six had means above 4.50. They are *Opinion Decision Type Analysis* ($\mu = 4.58$) and *Legal Liability* ($\mu = 4.54$), which are ranked 1 and 2. Next are *Evidence Collection*, *Detail Account Balance Tests*, *Audit Concepts*, and *Internal Control & Risk Assessment*, all with means equal to 4.52. The other two categories with means above the grand mean are *Audit Preparation* ($\mu = 4.46$) and *Internal Control Tests* ($\mu = 4.45$). Of the six categories with ratings below the grand mean on the Pre-SOX survey, four have means greater than 4.00. They are *Ethics* ($\mu = 4.25$), *Statistical Sampling* ($\mu = 4.23$), *Completing the Audit* ($\mu = 4.05$), and *Compilation and Review Services* ($\mu = 4.03$). The remaining two with below average relative effectiveness ratings are *Special Reports* ($\mu = 3.91$) and *EDP Controls* ($\mu = 3.52$).

From this macro-perspective, the two surveys appear to be very similar. Eight of the nine categories that are above the grand mean in the Post-SOX survey are above the grand mean in the Pre-SOX survey. The correlation coefficient between the two sets of category means is 0.949 (significance = 0.000). Furthermore, a comparison of the Post-SOX and Pre-SOX category means employing t-tests found only one difference that was mildly significant and that was *Compilation and Review Services* (significance = 0.102).

Micro-Perspective: To facilitate interpretation, the results of both the current Post-SOX survey and the Pre-SOX survey are presented in Table 4 along with the mean difference, computed as Post-SOX mean less Pre-SOX mean, for each of the original 54 auditing topics common for both surveys. The auditing topics are listed by mean rank from highest (1) to lowest (54) for the Post-SOX survey.

With each respondent rating 54 common auditing topics in the two surveys, it is appropriate to employ multivariate analysis of variance tests (MANOVA) to determine whether the relative effectiveness-rating outcomes differ between the two surveys. Table 2 shows that a statistically significant difference at the 0.059 level of significance was found between the two surveys' mean responses on relative effectiveness.

To ascertain which of the 54 topics are responsible for this significant difference, individual two-tailed t-tests were performed for each auditing topic. A total of nine tests were significant at the 0.10 level of significance with four auditing topics having lower Post-SOX ratings on relative effectiveness and five auditing topics having higher Post-SOX ratings. These individual topics are listed in Table 5 along with their levels of significance and have their mean differences in Table 4 designated with one asterisk if significant at the 0.10 level and two asterisks if significant at the 0.05 level.

TABLE 4 LONGITUDINAL COMPARISON OF AUDITING TOPIC EFFECTIVENESS RATINGS BY RANK							
ID	Code	Auditing Topics	Post-Sox		Mean Difference	Pre-SOX	
			Rank	Mean		Rank	Mean
2	AC	Generally Accepted Auditing Standards	1	5.20	-0.02	1	5.22
7	OD	Conditions requiring departure from the standard unqualified audit report	2	5.00	0.02	4	4.98
28	EC	Management's and auditor's responsibilities concerning financial statements	2	5.00	0.98	42	4.02
26	EC	Types of audit evidence	4	4.99	-0.02	2	5.01
6	OD	Detailed analysis of the unqualified audit report	5	4.89	-0.09	4	4.98
20	E	Code of Professional Conduct, including concepts such as independence, objectivity, confidentiality, etc.	6	4.87	0.11	6	4.76
22	LL	Definition of audit risk, business failure and audit failure	7	4.82	0.30*	20	4.52
41	ABT	Tests of details of account balances	8	4.73	0.08	9	4.65
29	AP	Planning the audit	9	4.69	-0.31	3	5
9	OD	Detailed analysis of the qualified audit opinion	10	4.63	-0.04	8	4.67

TABLE 4 LONGITUDINAL COMPARISON OF AUDITING TOPIC EFFECTIVENESS RATINGS BY RANK							
ID	Code	Auditing Topics	Post-Sox		Mean Difference	Pre-SOX	
			Rank	Mean		Rank	Mean
36	ICRA	Audit objectives and tests related to accounting transactions	10	4.63	0.04	12	4.59
10	OD	Detailed analysis of an adverse audit opinion	12	4.61	0.05	15	4.56
34	ICRA	Overview and understanding of internal control structure	12	4.61	0.06	16	4.55
25	EC	Nature of persuasive audit evidence	14	4.59	-0.06	9	4.65
50	CA	Subsequent events review	14	4.59	-0.02	11	4.61
38	ICT	Business functions- cycles (revenue, acquisition, inventory, etc.) and related records, transactions, and documents	16	4.58	0.00	13	4.58
39	ICT	Tests of internal controls and substantive tests of transactions for business functions	17	4.54	0.10	23	4.44
1	AC	Nature of the audit profession and how it differs from that of other practicing accountants	18	4.49	0.05	23	4.44
11	OD	Detailed analysis of a disclaimer of an audit opinion	18	4.49	-0.08	14	4.57
44	SS	Attribute sampling and applications	20	4.48	0.05	25	4.43
27	EC	Purpose and timing of analytical procedures	21	4.44	0.05	28	4.39
49	CA	Contingent liabilities	21	4.44	0.02	26	4.42
42	ABT	Evaluation and effects of details of account balance tests	23	4.42	0.03	28	4.39
5	OD	Auditor's decision process for issuance of an audit report	24	4.41	0.16	34	4.25
8	OD	Materiality	24	4.41	0.36**	39	4.05
37	ICRA	Design and use of audit program procedures related to tests of balances	26	4.39	-0.15	18	4.54
51	CA	Discovery of facts subsequent to issuance of audit report	26	4.39	0.02	30	4.37
3	AC	Statements on Auditing Standards - their origin and use in audit practice.	28	4.38	-0.07	22	4.45
35	ICRA	Assessing control risks and testing of key controls	28	4.38	-0.03	27	4.41
24	LL	Legal concepts, terminology, and auditor liability to clients and third parties under federal securities law	30	4.37	-0.18	16	4.55

TABLE 4
LONGITUDINAL COMPARISON OF AUDITING TOPIC EFFECTIVENESS
RATINGS BY RANK

ID	Code	Auditing Topics	Post-Sox		Mean Difference	Pre-SOX	
			Rank	Mean		Rank	Mean
32	AP	Materiality and risk in preliminary phase of the audit	30	4.37	0.09	33	4.28
43	SS	Statistical and nonstatistical sampling concepts	32	4.34	0.01	31	4.33
15	SR	Reporting on internal control structure related to financial statements	33	4.31	0.43**	47	3.88
40	ICT	Evaluation and effects of results of tests of internal controls and substantive test of controls	34	4.30	-0.03	31	4.33
23	LL	Legal concepts, terminology, and auditor liability to clients and third parties under common law	35	4.27	-0.27	18	4.54
45	SS	Sampling for tests of details of balances - e.g. monetary unit sampling and variable sampling procedures	36	4.24	0.01	35	4.23
52	CA	Evaluation of results and communication of facts to audit committee and management	37	4.23	0.07	36	4.16
30	AP	Working papers and documentation	38	4.17	-0.51	7	4.68
31	AP	Assessing business risk	38	4.17	0.29**	47	3.88
46	SS	Analysis of statistical results and implication on audit procedures	40	4.10	0.19*	46	3.91
33	ICRA	Internal control reportable differences	41	4.07	-0.44*	21	4.51
13	SR	Attestation engagements	42	4.03	0.04	43	3.99
12	SR	Other audit engagements or limited assurance engagements	43	3.92	-0.13	39	4.05
19	E	Business ethics and ethical dilemmas	44	3.89	-0.06	45	3.95
21	E	Enforcement of Code of Professional Conduct	44	3.89	-0.16	39	4.05
4	AC	Quality Control Standards - their origin and use in audit practice.	46	3.87	-0.10	44	3.97
16	CR	Compilation services and reports	47	3.70	-0.45*	38	4.15
17	CR	Review services and reports	48	3.65	-0.51**	36	4.16
47	EDP	Internal EDP controls	49	3.51	-0.08	51	3.59
18	CR	Review of interim financial information	50	3.49	-0.28	49	3.77
14	SR	Auditor association with prospective financial statements	51	3.37	-0.35	50	3.72

TABLE 4 LONGITUDINAL COMPARISON OF AUDITING TOPIC EFFECTIVENESS RATINGS BY RANK							
ID Code Auditing Topics			Post-Sox		Mean Difference	Pre-SOX	
			Rank	Mean		Rank	Mean
53	CA	Internal auditing and various tasks performed by internal auditors	52	3.34	-0.16	52	3.5
48	EDP	Use of computers in the audit of client records and financial statements	53	3.13	-0.31	53	3.44
54	CA	Governmental auditing and generally accepted government accounting principles	54	2.48	-0.74*	54	3.22
GRAND MEAN (54) =				4.28			4.32

Given that SOX legislation has had considerable impact on the accounting profession, the four topics showing significantly lower ratings and the five topics showing significantly higher ratings on effectiveness may provide insight on the changing focus of auditing faculty teaching approaches and the resulting auditing course content. SOX topics have now been integrated into the auditing textbooks, and these topics invariably will displace other topics if only for the reason that the first auditing course has a limited number of contact hours.

Auditing educators consider topics **16**, **17**, **33** and **54** are being covered less effectively. The two topics dealing with compilation and review services are specialized and relate more to practitioners in smaller practice offices. *Governmental auditing and generally accepted government accounting principles* is governmental related and might be considered again a more specialized topic. As such, these topics may be encountering crowding out due to the increased coverage of SOX material in the auditing texts and as a result are rated lower in effectiveness. *Internal control reportable differences* seems a bit unique in that it has a great deal to do with SOX requirements. It appears this may be diminished since during the last decade audit clients and audit firms may have had a better appreciation of the importance of internal controls so less time needs to be spent on this topic, and SOX requires other reporting means for internal controls.

TABLE 5			
POST VS PRE EFFECTIVENESS RATINGS DIFFERENCES			
ID	Code	Auditing Topics with Higher Post-SOX Ratings	Significance Level
8	OD	Materiality	0.029
15	SR	Reporting on internal control structure related to financial statements	0.005
22	LL	Definition of audit risk, business failure and audit failure	0.082
31	AP	Assessing Business Risk	0.049
46	EDP	Analysis of statistical results and implication on audit procedures	0.084
ID	Code	Auditing Topics with Lower Post-SOX Ratings	Significance Level
16	CR	Compilation services and reports	0.020
17	CR	Review services and reports	0.029
33	ICRA	Internal control reportable differences	0.059
54	CA	Governmental auditing and generally accepted government accounting principles	0.075

Topics **8, 15, 22, 31 & 46** have taken on greater emphasis since the PCAOB has stressed these topics as part of the planning stages of the audit. However, *Reporting on internal control structure related to financial statements* experiencing a rating increase while *Internal control reportable differences* experiences a rating decrease seems to be contradictory. In spite of this, it might be that the focus of internal controls as part of the financial reporting function is more critical than the overall concept of reportable differences. *Analysis of statistical results and implication on audit procedures* seems to have increased its status since the audit profession is now looking into the use of large data bases

in analyzing the clients' financial results and this may influence the focus of statistical procedures. Audits are dealing with greater complexity and the auditors must avail themselves of computer technology to assess the status of their clients and work efficiently in developing their opinions.

With only nine individual topics having significantly different means out of 54 total topics, it is not surprising that the correlation coefficient between the two sets of individual topic means is 0.862 (significance = 0.000). Perusing Table 4, one finds 17 topics with a Post-Sox mean effectiveness ratings greater than 4.50. This group has 9 positive differences, 6 negative differences and 2 zero differences with an average mean difference of 0.031. Two topics have mean differences greater than 0.10, both positive. Twenty topics have a Post-Sox mean effectiveness ratings between 4.50 and 4.20. This group has 13 positive differences and 7 negative differences with an average mean difference of 0.027. Ten topics have mean differences greater than 0.10, 6 positive and 4 negative. Seventeen topics have means ratings less than 4.20. This group has 4 positive differences, 13 negative differences with an average mean difference of -1.82. Nine topics have mean differences greater than 0.10, all negative. In both surveys, the consistency in the ratings is greater among the higher rated topics than among the lower rating topics as both surveys had increasing coefficients of variation as the topics decreased in their effectiveness rating.

Sarbanes-Oxley Topics: The nine Sarbanes Oxley auditing topics listed as topics 55 through 63 in Table 1, are combined and ranked with the 54 common topics in the Post-SOX survey to determine their relative effectiveness. The grand means for the 63 topics and the nine SOX topics are 4.26 and 4.13, respectively. Both of these means are less than the grand means for the 54 auditing topics in both Post-SOX and Pre-SOX surveys. This doesn't necessarily mean faculty and textbooks are less effective in covering these auditing topics. SOX topics have become important because of legal ramifications established by the SOX legislation. Lower effectiveness implies spending less time on some non-SOX topics because time is needed to fully address SOX topics.

Table 6 highlights SOX topic effectiveness ratings. SOX topics **55, 56, 57, 59, & 60** have mean effectiveness responses above the grand mean. These topics include awareness of auditor independence as well as requirements for auditor reporting on internal controls and combined reports on financial statements and internal control over financial reporting. These topics represent areas that less experienced staff deal with on a daily basis through their audit assignments in their early years. These topics also represent major emphasis topics on the CPA exam.

Sox topics **58, 61, 62 & 63** are topics that are generally addressed by more experienced seniors and managers. The mean effectiveness responses for these topics fall below the grand mean. These experienced auditors are entrusted with more responsibility associated with audit committee responsibilities as well as consideration of procedures to detect fraud and reduce fraud risks. This may

indicate that experience is a better teacher for learning how to handle these specific audit topics.

Again, a single undergraduate auditing course may squeeze out time available to cover these topics. The 150 hour requirement adds to the credits students need to satisfy CPA licensing requirements. Our study results may indicate a second auditing course would allow more time for coverage of topics that get crowded out of a single auditing course or topics that simply need more time to be dealt with effectively. It also implies faculty and textbook authors are still searching for the best means of addressing SOX topics in the auditing course; perhaps the best means of teaching SOX topics have not yet been perfected.

TABLE 6		
SOX TOPICS EFFECTIVENESS RATINGS		
ID	SOX Topics With Effectiveness Ratings Above Grand Mean (4.26)	Mean
56	SOX - auditor independence	4.54
60	Fraud - SAS 99 - Consideration of fraud in a financial statement audit	4.46
57	Public Companies Accounting Oversight Board, including concepts such as ethics, independence, etc.	4.41
59	SOX - Requirements for auditor reporting on internal control	4.34
55	SOX section 404 combined report on financial statements and internal control over financial reporting	4.27
ID	SOX Topics With Effectiveness Ratings Below Grand Mean (4.26)	Mean
58	SOX - Audit Committee responsibilities	4.00
61	Fraud and analytical procedures	3.93
62	Recognize specific fraud areas and develop procedures to detect fraud	3.65
63	Corporate governance oversight to reduce fraud risks	3.56

As a result, the Post-SOX study results reflect lower effectiveness mean values. Table 4 results reflect this in many cases.

In summary, SOX legislation appears to have modified the viewpoints of educators and changes in the curriculum. SOX requirements have modified textbook coverage of topics resulting in changes in emphasis and effectiveness of coverage of topics. This outcome does seem consistent with the expectation that students must be aware of the current issues that the auditing profession must address. Survey results disclose changes in educators' perceptions regarding effectiveness of coverage of auditing topics to be emphasized in an undergraduate auditing course.

CONCLUSIONS

Arens and Elder [2006] contend that the auditing environment after SOX demands students have a greater understanding of 1) risk assessment, including business and fraud risks; 2) forensic accounting skills; 3) the ability to understand and document controls and link controls to assertions and audit evidence; 4) and the competence to deal with corporate governance and other Public Companies Accounting Oversight Board (PCAOB) requirements. They also contend that acquiring these skills will require changes in the basic auditing course. Also, textbooks will change to respond to changes in the business environment so they adequately address the needs of students entering the profession. Our research results offer strong evidence that auditing faculty generally agree that topic emphasis shifts and textbooks need to effectively address these shifts so students are prepared as they enter the profession.

The results appear consistent with the expectation that educators and textbook authors will modify their viewpoints to adapt to the continuous changes that make up the fabric of the auditing profession. This paper provides general guidance for those educators who wish to modify their course content and approach. The results found in this paper can form a benchmark from which curriculum change — specifically the auditing course — can evolve. As with any longitudinal study, these results are a snapshot in specific time periods. Educators and textbook authors must continually adapt and re-assess the auditing course's content and provide effective coverage of topics as the auditing and accounting profession seeks to service the investing public and client needs.

LIMITATIONS

As with many longitudinal studies, there is no assurance that the respondents to the first survey participated in the follow up study. Also, new respondents were not identified. While demographic profiles between the two studies showed no significant differences, this uncertainty between the current and prior set of

respondents is a factor that cannot be fully adjusted for and analyzed. Likewise, the nature of this study precludes yielding an objective measure of effectiveness, since in gathering opinions the respondents were left to form their own benchmark from which to respond. Finally, the list of topics presented in this study is not exhaustive. Therefore, there is the possibility that several key topics have been omitted. This omission could lead to slightly different results.

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AN INVESTIGATION OF DETERMINANTS OF OPERATIONAL EFFICIENCY OF CPA FIRMS IN THE UK

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ABSTRACT

This paper investigates the determinants of operational efficiency of chartered accounting firms using a two stage DEA and Tobit Regression model. In the first stage, data for 36 U.K. firms from 2009 to 2015 were used to measure the efficiency scores using data envelopment analysis technique. In the second stage of the analysis, the Tobit regression model was used to identify potential determinants of efficiency of these firms for the year 2015. The efficiency scores obtained from the first stage were regressed on a set of independent variables, which we suspected would affect the firms' performance and would explain the differences in technical efficiency of the firms. We investigated the effects of the firm's size, age, ownership and the number of branches the firm operates on technical efficiency. We also employed two dummy variables in the model. The first dummy variable is used to incorporate the firm's organizational structure and the second one is employed to include information about the number of branches the firm operates. The findings of the first stage indicated that the overall mean efficiency score was only 71%. However, the big four firms are highly efficient with a mean efficiency score of 98%, whereas the mid-sized and small firms had mediocre performance with mean score of 61.42% and 72.42% respectively. In addition, results for each size category were consistent over the seven-year period. The results of the second stage indicate that the size of the firm, its organizational structure, the number of managing partners it employs and the number of branches it operate have a critical effect on the operational efficiency of the firm.

Keywords: Efficiency, Data Envelopment Analysis, Tobit regression

INTRODUCTION

In our previous research (Djerdjouri and Kandiel, 2013), we closely examined the performance and productivity changes of public accounting firms in the United Kingdom by selecting a sample of 43 of the top accounting firms for the period beginning in 2009 and ending in 2012. For each period, a nonparametric mathematical technique (an input oriented DEA) was applied to compute the technical efficiency of each firm. The technique we used was the input-based Malmquist productivity index using DEA to compute output distances and to construct the index directly from the multiple inputs and outputs

data. The index is further bifurcated into two components, efficiency change and technical change. In this paper, we will try to identify the determinant factors that influence the efficiency index of chartered accounting firms in the United Kingdom using a two stage DEA and Tobit Regression model. In the first stage, we will first compute the efficiency index for 36 chartered accounting firms using DEA technique for the years beginning 2009 and ending 2015. The inputs will include the number of offices, the number of partners, and the number of professional staff for each firm while the output will be the total revenues for each respective firm. In the second stage, we will apply the Tobit Regression models in order to identify the determinants of efficiency for these firms for the year 2015. We selected 2015 to do our testing for these determinant factors as it is the only year for which the data for the selected exogenous variables are available. In the following section, we review the relevant literature. Then a brief description of the mathematical and regression models is presented together with a description of the sources of the data and the variables used in this study. Next, the empirical results, along with a discussion of the findings and a conclusion will follow.

LITERATURE REVIEW

Numerous researchers have applied various methods in order to try to quantify how productive and efficient public CPA firms are. However, the majority of the papers published about this topic have applied a specific set of predetermined ratios in assessing this productivity. Jerris and Pearson (1996) took a novel approach in that they correlated revenues to the resources required to generate said revenues. They concluded that CPA firms could benchmark and assess their performance relative to their competitors by specifically focusing on the ratios of the firms' revenue to the following factors: revenue per partner, revenue per professional, revenue per employee, revenue per office, etc. Jerris and Pearson revisited the topic a year later (1997) and updated their conclusions based on their most recent findings. They noticed that the strongest performing CPA firms during a two-year period (1994 & 1995) had perceptibly higher percentages of revenue from management advisory services (MAS) as opposed to tax services. Jerris and Pearson concluded that while the CPA firms are often ranked based on their total revenues, doing so does not accurately depict how efficiently they are utilizing their resources. Franz and Jerris (2005) applied the same ratios previously introduced by Jerris and Pearson (1996) to analyze the performance of the largest ten CPA firms. Using two sample groups Franz and Jerris found that when revenues were the only measure of productivity and efficiency, the Big Six in 1994 and the Big Four in 2004 were the top revenue producers and held the top spots on the list of largest CPA firms, ranked in descending order. However, when the ratios of revenues per partner, per professional, per employee and per office were analyzed, the Big Six in 1994 and the Big Four in 2004 were not consistently on the top of the list. Djerdjouri and

Djema (2012) found that these traditional evaluation methods are centered on calculating basic ratios and productivity indicators. Partial productivity calculates the ratio of one type of input (or one input) and relates it to a single output. This approach provides only a limited view of efficiency. Total ratio of productivity takes into account all outputs and inputs in order to calculate a single ratio. However, the authors noted that there is an aggregation problem associated with selecting the appropriate weights to be used in calculating this single ratio. Furthermore, this approach requires quantity and price information. Thus, the productivity changes for each weight of an input or output. As such, the total ratio of productivity is highly sensitive to price fluctuations. All of these limitations do not allow for a comprehensive measure of both efficiency and performance. The DEA technique compensates for the aforementioned drawbacks by substantially improving on the weaknesses of productivity ratios. It is the dominant non-parametric technique in productivity analysis. This technique has many advantages, several of which are discussed in section 2.1 Chang and Cunningham (2003) examined to what degree, if any, input-output efficiency is dependent on the share of compensation given to partners and other professionals i.e. inputs. Their study was based on a dataset of 64 CPA firms from 1995-1999 that was previously published in *Accounting Today*. They found that partners, on average, were not over-compensated when compared to professionals and other type of employees. Banker, Chang, and Natarajan (2007) applied Data Envelopment Analysis (DEA) in order to evaluate the efficiency of using aggregate revenue/cost when the data is available. Their findings indicated that the public accounting industry has operated under significant allocative inefficiency, which further implies that US public accounting firms had not fully realigned their resources in response to a changing market and could generate significant cost savings by better utilizing their human resources. Gregoriou, Kandiel, and Read (2011) focused on public accounting firms in the United Kingdom that offered services in the following three areas: Accounting and Auditing, Tax Services, and Management Advisory Services during the five-year period starting in 2004 and ending in 2008. Gregoriou, Kandiel and Read applied the Data Envelopment Analysis approach in order to analyze the input-output efficiency of these United Kingdom public accounting firms and the empirical results clearly demonstrated that DEA could provide consistent results in the ranking of CPA firms. They concluded that the DEA methodology could provide users with meaningful insights when measuring the efficiency of CPA firms while also being supplemental when reviewing the various other performance measures available. Several other studies have reported DEA applications in manufacturing, banking, healthcare and various other industries to assess technical as well as scale efficiency of firms and organizations. With respect to the assessment of productivity changes, the same drawbacks are encountered with existing ratio methods. One other noteworthy shortcoming noted by Chen et al. (2004) is related to the ordinary index of productivity, which does not reflect productive efficiency opportunities.

METHODOLOGY AND DATA

1- The VRS DEA input model

Measuring technical efficiency can be done using essentially one of two methods, either the parametric approach or the non-parametric one. The two techniques use different methods to determine the efficiency frontier (that is to envelop data). Parametric or econometric methods include deterministic frontier production functions, stochastic frontier methods, and panel data models (Gul et al., 2009). Data Envelopment Analysis (DEA) is a nonparametric method widely used in efficiency measurement studies. DEA is a mathematical programming technique which constructs a frontier in relation to which the relative technical efficiency of a group of organizations is measured. It was developed by Charnes, Cooper and Rhodes (1978). The approach expanded on the efficiency concept outlined by Farrell in 1957. The DEA helps in identifying the best practices in the use of inputs (resources) to obtain a certain level of outputs or the maximum level of output that can be obtained with a certain level of resources (Inputs). The frontier is constructed using the piecewise linear combination that connects the set of efficient organization in the sample. The DEA method can be input or output orientated. In the input orientated model we determine the minimum level of inputs for which the observed level of outputs is observed, whereas in the output orientated model we find the maximum level of output of the unit given the observed level of inputs. Moreover, the model can include constant returns to scale or variable returns to scale assumptions. The VRS input-oriented model considers n units (U_j , $j=1,2,\dots,n$) to be evaluated. Each unit j uses the amount $X_j = \{x_{ij}\}$ of m different inputs ($i=1,2,\dots,m$) and produces the amount $Y_j = \{y_{rj}\}$ of r outputs ($r=1, \dots, s$). The efficiency of a particular unit U_0 under the assumption of variable returns to scale can be obtained by solving the following linear program:

$$\theta^* = \text{Min } \theta \quad (1)$$

Subject to: n

$$\sum_{j=1}^n \lambda_j x_{ij} \leq \theta x_{i0} \quad ; \quad i=1,2,\dots,m \quad (2)$$

:

$$\sum_{j=1}^n \lambda_j y_{rj} \geq y_{r0} \quad ; \quad r=1,2,\dots,s \quad (3)$$

$$\sum_{j=1}^n \lambda_j = 1 \quad (4)$$

$$\lambda_j \geq 0 \quad ; \quad j=1,2,\dots,n \quad (5)$$

The unit sum of the DEA weights λ_j ensures variable returns to scale. If $\theta^* = 1$, then the current input levels cannot be proportionally improved, indicating that unit U_0 is on the frontier and is therefore relatively efficient. Otherwise, if $\theta^* < 1$, then U_0 is a relatively inefficient unit and θ^* represents its input-oriented

efficiency score. Moreover, a VRS assessment implies that firms are only compared to other firms of roughly similar size. An excellent review of the DEA method can be found in Emrouznejad et al. (2010) and Cooper et al. (2011).

2- Tobit regression

DEA efficiency scores are limited to the interval]0; 1]. The purpose of the second stage of the analysis is to investigate the determinants of these efficiency scores, that is, to explain the relationship between the obtained efficiency scores of the units and a set of factors believed to influence the level of efficiency. To this end, a frequently used approach to estimate this relationship is the two limit Tobit regression, as DEA scores resemble corner solution variables (Wooldridge, 2002). Tobit has been employed by a number of authors (Gul et al. (2009); Marshall et al. (2011) and Shaoa et al. (2002)). Moreover, Tobit regression is an alternative to ordinary least squares regression (OLS) and is employed when the dependent variable is bounded from below or above or both (Esmeralda A. Ramalho, 2010). It is also known as a truncated or censored regression model. The standard Tobit model can be defined as follows for Unit i :

$$y_i^* = \beta x_i + \varepsilon_i \quad (6)$$

$$y_i = y_i^* \text{ if } y_i^* \geq 0 \quad (7)$$

$$\text{and } y_i = 0 \text{ otherwise} \quad (8)$$

where ε_i are residuals that are independently and normally distributed, with mean equals to zero and common variance σ^2 ; β unknown parameters and x_i are vectors of explanatory variables. The y_i^* is a latent variable and y_i is the DEA efficiency score. The estimated coefficients of the Tobit model indicate the expected proportionate change of the efficiency score with respect to one unit change in independent variable x_i , given that all other factors are held constant. A more detailed description of the Tobit model and relevant applications can be found in Long (1997).

3- Data and variables

The inputs considered include the following three: the number of offices, the number of partners, and the number of professionals. Professionals, specifically refers to the group of qualified staff members who are not partners. These inputs represent the different categories of human capital which are the main revenue generators for the accounting firms. The only output used in this study is revenue, expressed in millions of dollars. The data as it relates to the inputs and outputs for the public accounting firms referenced in this study were obtained from the United Kingdom publication, Accountancy Age as well as from the Accountancy Magazine.com and Accountancy live.com websites. In order to ensure consistency, our dataset consisted of only accounting firms that offered services in the following three areas: Accounting and Auditing (A & A), Tax Services (Tax), and Management Advisory Services (MAS). We excluded those firms that did not disclose their total revenues, number of partners,

number of offices and number of professionals available each year. These exclusions reduced the number of chartered accounting firms to thirty six. The accounting firms included in our study are ranked by revenue, in descending order, from largest to smallest and are tracked during the entire investigative period beginning in 2009 and ending in 2015. For the second stage of our study we used the following variables: firm's size, firm's age, ratio of auditing revenue to total revenue, tax revenue to total revenues, consultancy revenue to total revenue, ratio of partners to professional staff, ratio of partners and staff to total number of employees, and the firm's organizational form. The data for the variables that are used in the Tobit regression model were obtained from the United Kingdom publication, Accountancy Age as well as from the Accountancy Magazine.com, Accountancy live.com websites, and from direct contact with some of the chartered accounting firms referenced in your study.

FINDINGS AND DISCUSSION

1- Evaluating technical efficiency

The descriptive input and output statistics for the sample data are shown in table 1 below:

Table 1. Summary statistics of inputs and outputs (2009-2015)

	2009	2010	2011	2012	2013	2014	2015
<u>Inputs</u>							
1) # Offices							
- Mean	14	15	14	14	14	14	14
- Std. Dev	12.35	13.39	13.5	12.39	12.09	12.35	12.18
- Min	1	1	1	1	1	1	1
- Max	45	49	52	51	53	53	51
2) # Partners							
- Mean	134	132	140	142	144	148	147
- Std. Dev	202.21	201.23	226.78	233.97	236.09	240.23	235.38
- Min	8	12	12	12	12	12	12
- Max	853	858	953	991	1011	1008	967

3) # Professionals							
- Mean	1459	1498	1600	1552	1704	1650	1684
- Std. Dev	2760	2995	3428.9	3234.44	3625.79	3250.18	3233.08
- Min	86	89	85	83	67	63	54
- Max	10529	13306	16533	14973	16700	12354	12354
<u>Outputs</u>							
1) Revenue							
- Mean	258550833	259843889	259547500	272790000	293544444	309276111	324197778
- Std. Dev	569711381	572393026	575720033	614102259	664058408	693158157	721917168
- Min	11700000	11720000	11600000	12050000	12300000	12380000	11260000
- Max	2244000000	2248000000	2331000000	2461000000	2621000000	2689000000	2814000000

Furthermore, the companies were assigned to one of three categories based on the size of the firm, which is defined here as the total number of partners and professionals employed by the firm.

Table 2. Classification of firms by size

Size of the company	Number of companies	Mean number of partners	Mean Number of Professionals	Mean # of offices	Mean Revenue
Greater than 5000	4	768	10345	26	2274500000
501 to 5000	11	137	1342	23	181173637
Under or equal to 500	21	35	215	8	33130000

In the first stage the DEA-Solver was used to compute efficiency scores of the firms over the period 2009-2015. In Table 3 below overall mean scores per year are shown.

Table 3. Mean Efficiency Scores (2009-2015)

Year	Mean Efficiency Score
2009	0.734490278
2010	0.711088056
2011	0.714753889
2012	0.743038611
2013	0.716716111
2014	0.715434167
2015	0.692733889
Mean = 0.718322143	

The study finds that the mean technical efficiency over the period between 2009 and 2015 to be about 72% (Table 3). This indicates that there is still a significant room for improvement in the technical efficiency of the 36 UK Chartered Accounting firms. The average technical efficiency ranged between 69.3 % and 74.3 % per year. There is also consistency over the years with a slight drop (2%) from 2014 to 2015. However, as shown in Table 4 below, there are significant differences in efficiency based on the size of the companies.

Table 4. Mean efficiency score by size category

Size of the company	Number of companies	Mean Efficiency Score (2009-2015)
Greater than 5000	4	0.981074643
501 to 5000	11	0.611462467
Under or equal to 500	21	0.724248163

Table 5. Mean Efficiency Scores (2009-2015) for the big four companies

Year	Mean Efficiency Score
2009	0.948953
2010	0.984598
2011	0.974013
2012	0.986958
2013	1
2014	0.984425
2015	0.988578
Mean = 0.981075	

For the big four accounting companies, the mean technical efficiency for the period is 98.10%, which clearly indicates that the big four are highly efficient. The mean technical efficiency for the big four ranges between 94.9% and 100%. This is consistent with the findings in Djerdjouri and Kandiel (2013).

Table 6. Mean Efficiency Scores (2009-2015) for the mid-size companies

Year	Mean Efficiency Score
2009	0.600277273
2010	0.622051818
2011	0.610777273
2012	0.628441818
2013	0.617563636
2014	0.622004545
2015	0.597704545
Mean = 0.614117273	

The medium size companies are shown to be the least efficient with the mean score of 61.41%. The mean efficiency score ranges between 59.77% and 62.84 %. No significant improvements in technical efficiencies were observed over the years. Results were consistent over the years.

Table 7. Mean Efficiency Scores (2009-2015) for the small companies

Year	Mean Efficiency Score
2009	0.760259524
2010	0.703258571
2011	0.72163619
2012	0.758164762
2013	0.718518095
2014	0.717717143
2015	0.690182857
Mean = 0.724248163	

And the small firms perform about 10% better than the mid-sized ones. Their mean efficiency score ranges from 69% in 2015 to 76% in 2009, with an overall mean of 72.42% over the seven years. Except for a 5.7% drop from 2009 to 2010 and a 4% drop from 2012 to 2013, the mean efficiency score was consistent around 71%. A closer look at the data in table 1 above reveals that although the mid-sized firms have a much smaller number of partners (mean= 137) and professionals (mean = 1342) compared to the large ones, they have a comparable number of offices or branches (mean=23) to the large firms which have a mean of 26 branches. This suggests that the inefficiencies of the mid-sized firms might be due to them being too spread out given their scale. A consolidation of their operations might be beneficial to them. That could also explain why the smaller firms which have on average only 8 branches, have an 11% higher mean efficiency score. Moreover, Table 6 and Table 7 above show that there were no improvements in efficiency scores and the bad performance results were consistent over the years. This fact strongly suggests that the managers of these firms were satisfied with the operational performance of their firms and that they were not even aware of the extent of the inefficiencies of their operations and the increases they could achieve in revenues with the existing levels of inputs used. In the next section, we will use the results of the DEA model to attempt to identify a set of crucial factors that affect efficiency scores, enabling the firms to better understand the reasons of the inefficiencies of their operations.

2- Examining determinants of efficiency

In the second stage of the study, the technical efficiency scores were regressed on a set of independent variables which we suspected would affect the firms' performance and would explain the differences in technical efficiency of the firms. We consider the effects of the firm's size, age, ownership and the number of branches the firm operates on technical efficiency. Size is measured by the total number of employees (partners and professionals). Age represents the number of years since the establishment of the firm and here age is considered as a proxy for experience; the index of the firm's service concentration; the ratio of managing partners to professionals; the ratio of managing partners and professionals to the total number of employees. We also employ two dummy variables in the model. The first dummy variable is used to incorporate the firm's organizational structure and the second one is employed to include information about the number of branches the firm operates. Consequently, the regression model for examining the relationship between technical efficiency and the firms' specific attributes can be built as follows:

$$E = f(FS, AGE, A, T, C, RCPA, OFD, BD, TEPE) \text{ where,}$$

E denotes a firm's efficiency and FS = the firm size (measured by total number of employees); AGE = the age of the firm in years; A = Auditing to total revenues ratio; T = Tax to total revenue ratio; C = Consultancy to total revenue

ratio; RPPS = ratio of Partners to professional Staff ; RCPAE = Ratio of partners & professional staff to total number of employees; OFD = Dummy Variable which indicates the firm's organizational form (1 = Partnerships, 0 = Others, including network, mixture, and public limited company) and BD = Dummy variable which indicates whether the firm has a branch (or branches) or not (1 = They have branches, 0 = they don't have branches).

The following table summarizes data used to estimate the regression coefficients

Table 8. Summary data for 2015

Variable	Mean	St. Dev	Min	Max
FS	1832	3463.715952	66	13208
AGE	94.9722	52.39164934	8	227
Audit	0.3460638	0.193071908	0	0.692717584
Tax	0.20990136	0.123175572	0	0.481972038
Consultancy	0.074551138	0.101187979	0	0.33164557
RPPS	0.150873	0.06094519	0.050545896	0.335684062
RCPAE	0.506064	0.339778063	0.0297	0.975
OFD	0.86111	0.350736187	0	1
BD	0.888889	0.318727629	0	1

Since relative to the other variables Age and Size have very large values, we will use the logarithm scale of AGE and FS in the regression model. Changing the scale of the variable will lead to a corresponding change in the scale of the coefficients and standard errors, but no change in the significance or interpretation. The Tobit regression model is:

$$E = \beta_0 + \beta_1 \text{LogFS} + \beta_2 \text{LogAGE} + \beta_3 \text{Audit} + \beta_4 \text{Tax} + \beta_5 \text{Consultancy} + \beta_6 \text{RPPS} + \beta_7 \text{RCPAE} + \beta_8 \text{OFD} + \beta_9 \text{BD}$$

Table 9 below reports the result of the Tobit regression. The dependent variable in the model is the DEA efficiency score. A positive coefficient implies an efficiency increase whereas a negative coefficient suggests a decline in efficiency. The computations were conducted using IBM SPSS

Table 9. Results of the Tobit regression model (Coefficients)

	Coefficient	Std. Error	z Value	Sig.
(Intercept)	-.286	.362	-.790	.430
LOGFS	.199	.081	2.465	.014 **
LOGAGE	.148	.096	1.539	.124
Audit	-.105	.188	-.559	.576
Tax	.134	.258	.520	.603
Consultancy	.047	.305	.155	.877
RPPS	1.159	.575	2.015	.044 **
RCPAE	-.023	.106	-.214	.830
OFD0	-.213	.070	-3.032	.002 **
BD0	.603	.121	4.996	.000 **
Log(scale)	-2.026	.129	-15.713	.000

Lower bound: 0, Upper bound: 1

Tobit (formula = E ~

LOGFS+LOGAGE+Audit+Tax+Consultancy+RPPS+RCPAE+OFD+BD);

left=0; right=1; dist = "gaussian"; data = dta; na.action = na.exclude)

Scale: 0.1319; Residual d.f.: 25; Log likelihood: 5.873; D.f.:11;Wald

statistic: 46.988; D.f.: 9; ** : significant at 95% or higher

The coefficient of LOGFS has a positive sign and is significant at 5% level. This implies that according to the results of the Tobit regression model, firms with big size are more efficient. This is consistent were DEA results which found that the big four companies (which are the largest companies too) were consistently very highly efficient over the seven year period. Also, the coefficient of RPPS is positive and significant indicating that the higher the ratio of managing partners to professionals in the firm is, the more efficient the firm tends to be. In addition, the findings show that the coefficient of the dummy variable OFD, which was used to model the organizational structure of the firm, is negative and significant (for OFD=0, meaning other structure than partnership). This reveals that if a firm adopts an organizational form other than partnerships, its operational efficiency will suffer. The coefficient of the other variable BD, which indicates if the firm has branches or not, is positive and significant (BD=0), indicating as expected that firms which do not have many scattered branches around the country, tend to be more efficient. And although not significant, the results show that efficiency is positively affected by the age of the firm, which can be thought of as a proxy for experience, and it makes sense that the more experience the firm has, the more efficient it becomes. The other variables that positively impact efficiency (but are not significant) are Tax and Consultancy which represent the proportion of the firm's concentration in Tax services and consultancy services respectively. However, interestingly enough, we found that variable Audit has a negative coefficient in the Tobit regression model, and this suggests that the more

Auditing services the firm offers, the less efficient the firm becomes. This also indicates that the overall efficiency of the firms is adversely affected by the inefficiency of the firms in delivering auditing services. One thing the firms can undertake to improve their performance is to review and improve their auditing processes and operations; especially that the input data reveal that Auditing services on average represent about 35% of the firms total business.

In summary, the findings show that the size of the firm, the number of managing partners it employs, its organizational structure and the number of branches it operates are significant determinants of operational efficiency for the firm.

CONCLUSION

The main objective of the study was to investigate the determinants of efficiency of chartered accounting firms in the UK. We first measured the technical efficiency scores of the 36 firms in the sample for the period between 2009 and 2015, using a non-parametric mathematical method. Then we used the Tobit regression model and a proposed set of exogenous variables to investigate the determinants of the firms' efficiency. The mean efficiency scores ranged between 69.3% and 74.3 for a mean of 72% over the seven years. However, there were significant differences in efficiency levels among the firms. For the big four firms (PWH, KPMG, Deloitte and Ernest & Young) the mean efficiency score was 98%, which indicates clearly that these firms are highly efficient with a very small room for improvement (around 2%). Also, the good operational of these firms was consistent over the years. However, the medium size firms had the worst performance with a mean efficiency score ranging between 59.77% and 62.84 % and an overall mean score of 61.41% over the 7 years. And the small size firms had a mean efficiency of 72.42% with values ranging between 69% and 76%. The small size firms performed 11% better than the medium size ones. We believe that this is primarily due to the fact that the mid-sized firms have too many branches and that consolidation of their operations might help them become more efficient. Another result from the first stage of the study indicates that for each size group, the performance was more or less consistent over the seven years. For the big four companies which were highly efficient, this is a good thing; however for the small size and the medium size firms this consistency of bad performance suggests that the managers of the firms were not even aware that their performance was at best mediocre and that their operations were very inefficient and thus there was ample room for improvement. In the second stage of the study, we investigated the effect of nine variables on the firms' operational performance. The results indicated that the size of the firm, its organizational structure, the number of managing partners it employs as well as the number of branches it operates are the main determinants of efficiency for the firms. Another interesting result was that, although not statistically significant, auditing part of the services the firm offers, negatively impacted on the efficiency score whereas the Tax and consultancy both have positive coefficients. This suggests that improving the operations of the auditing service, which represents

at least 35% of the total firms' business, will very likely improve the overall efficiency of the firms. Finally, the study indicates that in order to improve operational efficiency of the chartered accounting firms, managers need to identify and eliminate waste in inputs as well consider and assess the effects of determinants such as size, number of branches, number of managing partners and the organizational structure of the firm.

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AN ANALYSIS OF TRANSFER PRICING POLICY AND NOTABLE TRANSFER PRICING COURT RULINGS

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ABSTRACT: As a result of significant corporate tax disparity between the United States and other developed countries, businesses that have historically been United States based are exploring opportunities to utilize the more favorable tax laws of other developed countries through the establishment of affiliated entities in lower tax nations, or through inversion transactions. One method that can accomplish income shifting to lower taxed countries using entities established in these countries is through transfer pricing. Transfer pricing can be used between two related companies to generate taxable revenue in a lower taxed country and a related tax-deductible expense in the higher taxed country. Despite IRS regulations to assure that transfer-pricing transactions are always considered arm's length between related entities, there is significant opportunity for flexibility and income shifting, and opportunity for the IRS to audit and litigate against transactions considered to not be arms length or in violation of the established transfer pricing guidelines. This paper reviews a history of significant transfer pricing cases and discusses historical key court viewpoints, as well as a summary of select academic research that needs to be considered when transfer-pricing policy is established between related parties for both tangible property as well as intangible property.

Key words: transfer pricing, taxation, corporate taxes, globalization

INTRODUCTION

As a result of significant corporate tax disparity between the United States and other developed countries, businesses are exploring and utilizing many options to move income to lower tax nations. A US based company might use foreign marketing subsidiaries to market products overseas, or a US parent may engage in services to its subsidiaries in the form of management or administrative services for fees. A manufacturing plant in the US might sell components to an assembly plant in a foreign country for assembly and sale to other nations. When these transactions occur, a transfer price must be computed. In the case of financial reporting, a transfer price does not impact the overall income of a combined group of corporations, but from a tax standpoint there is a direct impact of how income is allocated between countries. For example, if a

subsidiary in India provides management services for a parent company in the US, the Indian subsidiary will charge a transfer price to the US parent. This transaction will result in an expense (reduced taxable income) to the US parent, and revenue (increased taxable income) to the subsidiary in India. As such, income has been shifted from the US to India. Due to the subjectivity involved in making the determination of what constitutes an arm's length transaction and allowable transfer price, this is an area that has been highly litigated in the courts. This paper examines significant historical cases where the taxpayer has been successful and looks at the specific reasons when courts have favored the taxpayer over the IRS when dispute arises.

TAX GUIDANCE FOR TRANSFER PRICING

Transfer pricing transactions are governed under §482 of the Internal Revenue Code. The regulations under §482 are designed to assure that transactions are arm's length and do not allow an unreasonable shifting of income with the intent to avoid tax. Of the available methods, the entity is required to select the method that would be most representative of an arms-length transaction. From the perspective of the IRS, a major audit contention is to assure that transfer pricing transactions, known as controlled transactions are truly recognized as arms-length, and using the method that is the most accurate presentation as arms-length based on all available information. If it cannot be proven that a transaction is arm's length, §482 states that income needs to be allocated between the US entity and any foreign subsidiary. The ultimate objective of this paper is to look at a history significant of significant court rulings on these transactions and discuss patterns that have previously been used by courts in making determinations mostly in favor of the taxpayer.

When a transaction is examined, the pricing method deemed most appropriate to represent an arms' length transaction is the one that would be considered most reliable of the available methods. When a method is deemed to be reliable, the pricing is then compared to the overall comparability between the transaction that is controlled (the transfer price) and uncontrolled transaction to an outside, independent party. This comparability is deemed based on quality of data used, as well as the assumptions used by management to perform the analysis per §1.482(c)(2).

§1.482-1(d)(1) presents the main factors that are to be utilized to assess the overall controllability of transactions, and these factors include functions performed, risks assumed, contractual terms, economic conditions, and nature of the property or services transferred. The five methods permitted for estimating the arm's length transaction to satisfy the factors as defined under §1.482-3(a) are the comparable uncontrolled price method, the resale price method, the cost plus method, the comparable profits method and the profit split method for tangible transfers. These rules differ slightly when the transfer of intangibles is involved. Intangible transfer prices can be computed using the comparable uncontrolled transactions method, comparable profits method and profit split

method. When the rules are applied, regardless of what rule the taxpayer and IRS agree is the best representation of an arm's length transaction, the court is not going to look at which method provides the most or least tax savings, but the court is going to exclusively focus on whether or not the taxpayer can demonstrate a business purpose for the transaction, and that the transfer price charged could reasonably be charged to an outside uncontrolled transaction. This pattern has been clearly established through the cases discussed within this paper.

Offshore structures have created significant opportunity for business, and also an issue for Congress to address and close what many would call a significant loophole. Under the regulation, transfer prices for the sale or transfer of intangibles must be "commensurate with income" attributable to the intangible. This requirement means that the transfer price of the intangible must reflect the actual profit experience realized before the transfer. To satisfy this regulation, the original selling price and royalty rate must be adjusted to reflect any changes in the income actually generated by the intangible. This adjustment typically must take place annually as governed under §1.482-4(f)(2)(i). To clarify with an example, company X develops a new patent that is significantly more successful than anticipated at the time the patent was licensed. In this case, the entity must adjust the intercompany royalty payments to reflect the revised profitability that was not anticipated initially. Even if the transaction was arm's length before the unexpected change in profitability, adjustments must be made for the change. This can be a burdensome adjustment, and to ease it in some limited cases allows a *de minimis* exceptions as well as a rare in which the profitability change meets the criteria of an 'extraordinary event.'

HISTORY OF TRANSFER PRICING LAW

The initial origins of transfer pricing date back to the War Revenue Act of 1917. Under this act, the government could require related companies to file consolidated returns as it saw fit in order to most equitably determine what net income should be (Levey and Wrappe, 2010). In 1928, Congress allowed the IRS to allocate gross income, deductions and credits between controlled taxpayers to prevent income shifting to evade taxes. In 1934 these regulations were further refined to define the concept of an arms length transaction, and the regulations at that point remained stable until 1968 (Reuven,1995). In 1968, the criteria for an arms length transaction was re-stated and specific tests were added for the first time to determine whether or not an arms length transaction exists creating what today is § 482 (Levey and Wrappe, 2010). This act was amended in 1986 to further adjust for the transfer of intangibles and add the "commensurate with income" standard. This standard was refined in 1988 to clarify how comparable transactions with external parties are to be used within rules to support the standard for an internal transaction (Levey and Wrappe, 2010). It was in 1992 and 1993 that the regulations were further reformed to create the methods presently in place while retaining the comparable uncontrolled price method from previous rules, and also provided guidance for

what constitutes a “best method” to be utilized by an entity. There have been clarifications of these regulations since 1993, but they have been as modifications to these rules set in place in 1993, and finalized in 1994 (Levey and Wrappe, 2010).

LITERATURE REVIEW

Xiaoling, Chen, Shimin, Fei and Yue (2015) look at specific factors and consequences of transfer pricing autonomy. In this paper, from a management accounting perspective, the authors show that tax rate differences do have an influence on a divisional managers performance evaluation. As such, when transfer pricing can provide a positive tax benefit for a division, managers will receive an influenced performance evaluation within the organization within that specific division. The relationship between tax benefits and management performance through transfer pricing was also examined by Cools and Slagmulder (2009). In their paper, the authors show that tax compliance has a direct impact on responsibility accounting. The research shows that when a single set of transfer prices are used for both tax as well as management control, segmentation of management responsibility becomes difficult and this can create dangerous management behavior. Shunko, Debo and Gavirneni (2014) look at transfer pricing strategies utilized for multinational firms. In their paper, the authors look at transfer pricing strategy relative to a trade off that exists between tax rates and good sourcing decisions for management. Firms with dual-transfer pricing policies that allow divisions to operate as a profit center for tax purposes and revenue center for control purposes has better segmentation of responsibility and more effective management. The authors show that multinational firms that use complex dual transfer pricing strategies, as opposed to a single strategy as mentioned by Cools and Slagmulder (2009) are often the most effective to balance tax savings and management performance.

Dalcan and Sabina (2009) look at how transfer pricing is used for tax optimization. They show through literature review that on an international level transfer pricing has a significant tax impact on countries that are subject to reduced revenue due to corporate transfer pricing practice. This behavior and impact on countries will cause taxing authorities to undertake aggressive collection actions to preserve their tax base. Some of the strategies can be very complex to manage the tradeoffs, which is addressed by Padhl, and Bal (2015), who look at the complexity of transfer pricing and the ability of a government to react to the strategies established. The authors look at transfer pricing from the perspective of the Indian Government, which is one nation in which US multinational companies may have subsidiaries where transfer pricing is conducted. The authors show that many of the transactions are so complex that the taxing governmental authorities lack the knowledge to understand the tax issues and related transactions. As a result of the lack of knowledge, this creates unnecessary disputes leading to litigation and expensive procedures to rectify differences. From the standpoint of the Indian Government, the study shows that

the lack of government expertise has indeed increased the number of litigation cases, which may also be the case in the US highlighted by the presentation and outcome of the cases within this paper.

When it comes to transfer pricing from the US, one consideration is that the US taxes all income earned globally, and is not a territorial tax based country like many other global competitors. As a result, US based companies would have a tendency to be more aggressive in the elimination of US tax through transfer pricing relative to other entities to shift income away from US companies than that of other countries, and have more regulation than other countries to make the shifting of income more difficult. Mandolfo (2007) looks at why the US should shift from regulation and its current practice to that of a territorial taxed country. The author finds that the intense regulation fails to account for international competition, and the increased regulation will simply detract business from entering US markets and render US companies unable to compete with foreign counterparts for long-term growth and stability. A territorial system would place the US on more of an even field to other nations and allow more open competition for business without costly regulation.

Regulation is significant, and it creates cost to businesses to defend its practices, as well as the government as they challenge companies who in the eyes of the regulators are violating regulation. The remainder of this paper profiles large-scale litigation that has emerged as a result of transfer pricing, regulation that is unique to US markets, and perhaps the knowledge gap in which the government simply cannot understand the rationale and practices being utilized by companies that are within the regulations, and saving significant sums of tax.

LITIGATION OF TRANSFER PRICING TAX CASES

Litigation of significant transfer pricing cases is a result of instances when it may be difficult to compare to an arm's length transaction, or when an arm's length transaction could be measured in a variety of ways, in which one method may allow a greater transfer of income than an alternative. These instances can occur with the transfer of services or sale of tangible personal property. This paper discusses significant historical pieces of litigation that has set precedence in transfer pricing policy, and still carries precedence at present on cases within the courts, one for tangible property, and one for intangible property.

United States Steel Corporation v. CIR: *United States Steel Corporation v. CIR* is a case that illustrates transfer-pricing application for the provision of services and tangible asset transfers. US Steel, a producer of steel required significant quantities of iron ore to produce its product. To supply the necessary iron ore, US Steel discovered significant amounts of iron ore in Venezuela. In order to mine the deposits, the ore was mined and transported from the discovery sites in Venezuela to the US steel mills that were incorporated in Delaware. As the transportation network was established, an additional corporation, classified as a

wholly owned subsidiary was established in Liberia, which at the time was considered to be a significant tax haven for international trade. The establishment of the subsidiary in Liberia allowed US Steel to partition the mining business from the transportation business. A transfer price was established in which the ore would then be sold through the Liberian corporation, mostly to the United States, but also other nations. The established shipping charges played a significant role as to how income was shifted. From the perspective of US tax avoidance, US steel paid the Liberian subsidiary shipping charges, as well as an established transfer price for the ore, and these charges created revenue to the subsidiary in Liberia, and expense to the US taxed entity. The Liberian entity purchased the inventory from the Venezuelan corporation at an established transfer price that was significantly lower than the sale price to the US.

In this specific case, US Steel used its own iron ore; it also worked in the capacity of supplier of ore to other steel manufacturers through an additional subsidiary, known as Oliver Mining Company. Annually, US Steel established a transfer price based on the same prices charged by independent producers using the comparable uncontrolled pricing method. When the ore sold to other producers was the product of the Venezuelan mines, it was still offered at a price consistent with the market; US Steel would not price below the price charged for like US sourced ore. As such, the Liberian subsidiary charged an inflated shipping charge and added it to the cost so that the imported ore was valued consistent with the market. This shipping charge was assessed consistently when US Steel was the purchaser, or any other outside purchaser of the ore was the purchaser, and these outside purchasers always had the option to utilize other shipping options if desired, which becomes an important factor utilized by the court when ultimately deciding the outcome of the case.

The IRS based on evaluation of § 482 in its decision deemed that 25 percent of the shipping charges and selling prices paid to the subsidiary from US Steel should be allocated back to US Steel and taxed as US income. This 25 percent differential, along with other miscellaneous income items amounted to approximately \$52 million of income. Specifically, § 482 states that when a transaction occurs between two or more related entities, the IRS has the authority at their discretion to allocate income between entities if it is determined that the transaction was commenced with the primary motive of evading taxes. Based on the fact that the shipping entity was located in Liberia, a tax haven country with no significant business purpose to be established in Liberia, it was not possible to establish a business purpose in the eyes of the IRS. Additionally, from the perspective of the IRS, the way the shipping charge was established, strictly to assure that the market price of the ore is consistent with the market cannot be established to be an arm's length pricing strategy. As a result, the tax court allocated \$27 million of additional taxable income to US Steel of the \$51 million initially proposed by the IRS.

The allocation of \$27 million was overturned on appeal and reversed in favor of US Steel. In this case, the reason for successful appeal was because the pricing of the transportation cost, no matter how inconsistent it was with the market, was the same that US Steel charged to outsiders. Though outside steel producers had the option to use outside shipping companies and pay charges that were priced significantly differently, some, though a small number of outside producers elected to pay shipping charges structured in the same way as US Steel paid to its subsidiaries. This transaction allows an adequate arm's length transaction to be established using the comparable uncontrolled price method regardless of how sound the business decision was to charge in this manner. To be defined as an arm's length transaction, the price is based on quality of pricing data, and not the price charged or method used to set the price. In this case, though the pricing strategy would be considered questionable business practice by many, it was still permitted and considered arm's length, regardless of how poor the policy may be to many, as outside vendors willingly paid it. Consistent with what has been previously stated, the court will strictly rely on the "commensurate with income" rationale if the taxpayer can demonstrate it.

Bausch & Lomb Inc v. Commissioner: *Bausch & Lomb Inc v. Commissioner* is another significant transfer pricing case from 1989, and on appeal in 1991, which heavily relies on *United States Steel Corporation v. CIR* in its decision, but it sets the bar for the transfer involving intangible value. In this instance, Bausch and Lomb was manufacturing soft contact lenses and conducted the manufacturing through a subsidiary in Ireland, which was wholly owned and also in a country that provides favorable tax structure to manufacturers. As a result of its ownership of the subsidiary, Bausch and Lomb was eligible for tax breaks in Ireland, as well as utilizing tax rates that are significantly lower compared to the United States. Bausch and Lomb transferred two licenses from the established US entity to the Irish subsidiary. These licenses transferred were not exclusive and allowed the usage of technology that was both patented and not patented. When these licenses were transferred, B&L using its own manufacturing process was able to produce soft contact lenses for approximately half of the cost of its competitors in Ireland. The Irish subsidiary would manufacture the lenses and in turn sell them back to other B&L affiliated companies for \$7.50 per lens. The cost to manufacture the lenses was \$1.50, and there were additional shipping charges of \$.62 per lens, plus additional royalty fees to the US affiliated entity to utilize the manufacturing process responsible for the low manufacturing cost. Based on the fact pattern, the IRS demanded significant adjustments under §482 for the prices charged to the US entity to purchase the manufactured lenses. Under §482, the first argument that is often investigated is the business purpose for the transaction, specifically the location of the affiliated entity, and whether or not there is a business purpose other than tax evasion to establish a facility in Ireland. The IRS argued that establishment in Ireland of the affiliated entity did not demonstrate a sound business purpose other than evasion of US tax. Under

the circumstances of this case, the court disagreed with the service and was convinced that there was a legitimate business purpose for the company to establish an entity in Ireland. The arguments supported were the facts that the present facility in Rochester, NY was not large enough to satisfy demand for the product. Additionally, having a facility overseas was integral to assure that there was more than one supply route for distribution of supplies, inventory and the ability to shift completed product to a European market that was growing significantly at the time the entity was established. The incentives to operate in Ireland reduced overall operating costs to justify the location as the best option to access the European market. The establishment of the foreign subsidiary to provide the best access to Irish financial institutions and Irish tax breaks that would not have been available had the facility operated in Ireland as a branch of the US based entity. Operation as a branch would have provided significantly increased tax revenue to the US, but also did not make business sense, so was not considered an intentional evasion of tax.

Though the court did not believe that the location was an issue to show intent to avoid US tax in an inappropriate manner, there was significant question as to the legitimacy of the transfer price charged by the Irish subsidiary to sell the lenses back to other Bausch and Lomb entities. It was argued by the IRS that there was no sound business sense for an entity to license a technology as successful as what Bausch and Lomb had developed to an outside party to make lenses for \$1.50 per lens, then re-purchase completed lenses for \$7.50 per lens. When examined by the tax court, there were no documents to show that there was a requirement to sell the product back to other B&L entities, hence this is a sale transaction, and the option was there for B&L Ireland to sell the completed lenses to other markets. The price of \$7.50 was not guaranteed in a contract, and in a subsequent year not part of this particular IRS review, the price was actually lowered to \$6.50 as market conditions adjusted. Bausch and Lomb was able to provide evidence from the outside through experts that the price charged of \$7.50 was consistent with market conditions that would be charged between other non affiliated entities. As a result, the court did not find this argument in favor of the IRS and supported Bausch and Lomb. The IRS made several other arguments, including the fact that a discount should have been offered on the \$7.50 based on volume, and that even if the \$7.50 was considered market, there should be an income reallocation based on a volume discount.

Overall, the court supported Bausch and Lomb charging a \$7.50 per lens transfer price and used *United States Steel Corporation v. CIR* as a basis for the decision. Based on the arguments in both cases, as long as a taxpayer can clearly demonstrate that the price charged for a product is the same as would be charged to an unrelated party no matter how little business sense the pricing strategy made, there will not be an income reallocation under §482 as proposed by the IRS, unless the only evidence provided shows that the sale took place solely to avoid US tax. The main question that needs to be examined by courts, as was examined in this case is whether or not the controlled transaction is truly similar

to the uncontrolled transaction. Though not all elements of the transactions may be 100 percent identical, one must determine whether or not the facts are similar enough to say that the transactions are the same. In this case, the court determined that the transaction is similar enough to support what was reported by Bausch and Lomb with no re-allocation needed. When an intangible asset such as a license is involved, as these licenses are so specialized, it is often very difficult to locate an outside transaction that is truly similar.

Overall, with these two cases, it was determined that *United States Steel Corporation V. CIR* applied this rule for the provision of a service, while *Bausch & Lomb Inc v. Commissioner* apply the same rule for the transfer of a product. Since the previous two aforementioned cases were upheld and set a significant precedent, several other cases have also gone through the courts with similar results based on the decisions in *United States Steel Corporation V. CIR* as well as *Bausch & Lomb Inc v. Commissioner* that also build on the aforementioned and supported the taxpayer over the IRS.

Compaq Computer Corporation and Subsidiaries v. CIR: The Compaq case concerned the manufacture of central processing units within its computers. The units were manufactured in Houston, Asia, Singapore and Scotland. The components to make the CPU's were also made in the same locations as the CPU's were assembled. Prior to forming subsidiaries in other countries such as Singapore, Compaq was purchasing many component parts to assemble the CPU's from outside companies, but due to quality concerns decided to manufacture the component parts in-house. As components were made in the various plants internationally, goods were often transferred between the different plants, specifically to the US plant, which would purchase from the foreign subsidiaries using a price set using a standard cost system that based on a price using the same criteria as if the transaction occurred with an outsider. Compaq also had various relationships with subcontractors at the same time the internal transactions occurred. The purchase transactions were similar, but also had additional costs, such as freight and duty costs. The main difference was that Compaq had to reimburse the subcontractors for unused parts. There were also differences in prices that resulted from increased manufacturing and assembly times at the subcontractor plants, which slightly increased costs in these cases. There were additional differences in payment times, as the average payment to the Asian subsidiary was 90.9 days, and 30.3 days to unrelated contractors. Compaq also paid an additional \$2.9 million in setup costs to outside contractors not paid to its own related subsidiary. Unlike the previous cases, the differences here were significantly greater.

Upon internal audit, Compaq determined under circumstances that the cost plus formula used was the most appropriate method of calculation. The IRS, based upon their audit, argued that a more accurate method should have been used and that the transactions were not arms length due to some of the differences that were present in how outside contractors were treated, as well as

inappropriate markups charged on labor and materials that failed to consider volume discounts and differences of the sort that in the opinion of the IRS would be standard. This argument on volume discount is the same one that was unsuccessfully argued by the IRS in *Bausch & Lomb Inc v. Commissioner*. The difference proposed by the IRS resulted in an additional \$232 million of income that had to be recognized by Compaq US. Additional penalties were also assessed as Compaq refused to provide necessary information that the IRS requested to make a reasonable determination of allocation. In the court decision, the court referenced *Bausch & Lomb Inc v. Commissioner* to emphasize that the focus of the court is not on the method or dollar amount of income shifted, but exclusively on reasonableness of the transaction and if it shows that the transfer price is reasonable to be considered substantially similar to an outside transaction. The burden of proof is exclusively on Compaq to prove that an arm's length price is used, and the court will accept it as the best method if proven by the taxpayer. In this case, Compaq was able to provide significant evidence of outside pricing with outside subcontractors. In each case, other than the differences previously discussed, Compaq argued that the transactions, though not 100 percent identical, were substantially similar and as a result consistent to justify an arm's length transaction. Based on the components of the cost plus model used, differences in manufacturing cost were adjusted in the calculation used to compute the transfer price. Based on the differences, it was calculated that the overall difference in cost was minimal and the price set was within reasonable business judgment of Compaq, which the IRS does not have the authority to replace with their own judgment under §482. Overall, because Compaq could justify markups charged, and all prices much in the same way as in Bausch and Lomb, no §482 adjustment was required by the court. Extra charges that would not be applicable to an internal sale are not considered significant differences that would void consideration as an arm's length transaction.

Also, significant in this case is the fact that the court did support Compaq in not allowing the IRS additional inside information access so that they could provide an alternate computation in order to dispute to support Compaq provided. The court relies strictly on whether or not Compaq can support its computation, not the IRS replacing the judgment of management.

United States of America v. John Cox, Tax Director of BMC Software and Subsidiaries: In 1999, in *United States of America v. John Cox, Tax Director of BMC Software and Subsidiaries* the IRS yet again lost on the same grounds as in the aforementioned cases. In this case, BMC, a manufacturer of computer software created a foreign subsidiary, and justified the creation of the subsidiary as a business necessity due to a documented increase in foreign sales. A distribution and license agreement was established between BMC and the affiliated subsidiary. In this case, the IRS argued that the royalty charged between BMC and the affiliated subsidiary was subject to reallocation under

§482. Not only did the IRS argue that the transaction was not arm's length, but they demanded copies of source code to examine changes to the code made between the US entity and affiliated subsidiary to most efficiently determine what should be allocated as part of the transfer price audit. The IRS was denied access to the software code and not permitted inclusion as part of the transfer price audit. This made the task of the IRS to present an argument of a §482 adjustment that could be supported by a court in future rulings against BMC difficult. In other future cases as a basis of precedence, if the IRS is denied the right to certain documentation demanded, it could in theory become impossible to build a case to argue a potential §482 adjustment that could be supported in a tax court. As long as the taxpayer can document an arms length price, and show the court convincing evidence that the price is compliant under their burden, the IRS will not have access to private documentation to compute its own suggested price using its own judgment to dispute. This is consistent with what was also stated in the Compaq case and significant to consider in dealings with the IRS. In order for a taxpayer to lose, it is not the IRS refuting the method of price, but simply whether or not the court is convinced of the evidence supporting the calculation provided by the taxpayer. In the event the court is not convinced that the calculation provided by the taxpayer supports the justification of a transfer price, they will decide how a fair price will be determined at that time, but not allow the IRS advanced access to information to propose an alternate price as a defense during argument.

CONCLUSION

The cases discussed in this paper are an historical sampling of cases that have been decided by courts relative to application of income reallocation under §482 for both tangible and intangible asset transfers. There are many other cases not discussed in this paper, and there will be many other cases to be decided in the foreseeable future as the ease to conduct business internationally increases and businesses find it necessary to for business purposes to establish foreign subsidiaries and transfer products and services between entities. From an accounting standpoint, these transactions are typically not relevant, as they are eliminated in the preparation of the consolidated financial statement. From a tax standpoint, these transactions can be significant as they shift and reallocate income from one tax jurisdiction to another. As the income (and losses) are reallocated, countries are going to fight for what they believe is taxable income entitled to the respective country. From the standpoint of the United States, this is an issue heavily audited and argued in court based on the subjectivity of principles. From the standpoint of a business entity, as shown in a history of court legislation, the most important strategy needed is to clearly demonstrate an arm's length business purpose for a transaction. When these cases are argued, decisions are often reached based on precedence from the two historic cases profiled in this paper. No matter how obscure a transaction is, and no matter how much income it may shift away from the US to a foreign subsidiary, as long as

the taxpayer can show that it is very similar, nearly identical to normal practice with an outside uncontrolled party, and have a business purpose it will be supported by the courts. The burden of proof is exclusively on management to set transfer prices, and the court will support the taxpayer as long as the strategy is documented and clearly not an effort to avoid tax, but part of a significant business plan. As many of the significant cases are decided by the courts in favor of the taxpayer, one must look at the research of Padhl, and Bal (2015) to determine if the United States taxing authorities also have a similar lack of knowledge to understand the transfer pricing transactions conducted by taxpayers as a cause for the litigation.

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RADAR CHARTS AND THE PARADIGM OF COGNITIVE FIT: IMPLICATIONS FOR ACCOUNTING RESEARCH AND PRACTICE

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ABSTRACT: The objective of this paper is to discuss potential benefits of using a radar chart in certain accounting related decision-making contexts. We believe this is relevant for both researchers and practitioners. Effectively communicating relevant information to decision-makers is not typically emphasized in contemporary accounting education. Research supports the notion that the way information is communicated affects how that information is used in the decision-making process. Additionally, prior research investigates whether it is better to utilize graphical versus tabular information representations for managerial decision-making. However, these studies result in an accumulation of inconclusive results. We contribute to the literature by connecting the theory of cognitive fit (Vessey, 1991) to usage of a specific type of graph, the radar chart, in specific accounting related decision-making contexts and by addressing the potential for decision-making quality improvements.

Keywords: Radar chart; balanced scorecard; cognitive fit; managerial accounting; auditing

INTRODUCTION

Decision-makers in all but the smallest organizations typically rely on information supplied by others in the organization as a basis for their decisions. Two aspects of this information are important. First, information must be relevant to the decision, and second, information must be organized and communicated in an effective manner. The quality of the decision ultimately made, then, is a function of and is constrained by both of these aspects of information. The importance of decision quality extends to all organizational levels and all business disciplines. However, in this paper, we choose to focus on the potential for decision quality improvements in specific accounting-related applications. We do this by connecting the theory of cognitive fit to accounting-related decision contexts and introducing how utilizing a specific type of graphical representation, a radar chart, could improve decision quality.

Accounting education: Contemporary accounting education addresses the concept of information relevance as it relates to decision-making. For example,

management accounting courses examine in some detail specific types of decisions commonly made by managers. The focus in these courses is on identifying relevant information in decision-making with some attention paid to how that information might be reported effectively to management. Auditing courses typically are structured around the macro decision process that culminates in an overall audit opinion. A number of preliminary decisions must be made which contribute to the overall decision about which type of audit opinion is most appropriate. Again, the focus is on relevant information related to decision-making but with very little attention given to how information might be communicated effectively to decision-makers. Financial accounting courses differ from management accounting and auditing courses in that financial accounting courses are not structured around decisions made by those receiving and using information. Decision-makers external to the organization may use the information in a variety of ways. Therefore, the issue of identifying relevant information is not directly addressed. However, information relevance is indirectly addressed in the sense that the content of general purpose financial statements is assumed to be relevant if compiled according to Generally Accepted Accounting Principles (GAAP). In other words, information contained in financial statements is relevant because GAAP rules were developed to promote relevance. Likewise, the issue of how to communicate financial statement information effectively is addressed only in the context of GAAP requirements.

The issue of how to effectively communicate relevant information to the decision-maker is typically not addressed in contemporary accounting education. The primary reason is that accounting curricula are heavily weighted toward financial accounting, which accepts the format of general purpose financial statements as a given. Therefore, there is little need to discuss the merits of alternate modes of communication when, in general, accountants have no discretion in the matter. However, this logic does not apply in auditing or in management accounting.

External auditors follow Generally Accepted Auditing Standards (GAAS) which results in relatively prescribed processes when it comes to selecting auditing procedures and appropriate audit opinions. However, as auditing procedures are performed, information is gathered and communicated to senior audit personnel who use the information for decisions related to the timing and extent of subsequent auditing procedures and ultimately in selecting an appropriate audit opinion. External auditors do have discretion with regard to how information is communicated for these types of decisions. Examples of this would be alternative methods of presenting results of analytical review procedures and internal control evaluations to senior audit personnel.

Internal auditors are likely to have significantly more discretion than external auditors when it comes to gathering and reporting information for decision-making. This is primarily due to internal auditors being involved in consulting projects and various types of audits, such as financial, compliance, operational,

etc., where primary users of information are managers within the same firm. Likewise, in management accounting, those communicating information have significant discretion in how information is communicated to management inside the firm.

Practicing accountants and auditors, both internal and external, have discretion in how decision information is gathered and reported. Nonetheless, little attention is given to this issue in accounting education even though there is a sizable body of research that supports the notion that the way in which information is communicated does have a significant effect upon the way information is processed when making decisions.

Mode of information presentation: The mode of presentation refers to the way in which information is communicated to the decision-maker. At a general level, there are three nonverbal modes or formats: tabular, graphical, and narrative. The tabular format is the most common format used both in accounting practice and education. The graphical and narrative formats are used much less frequently than the tabular format but still are commonly found in practice. Many reports utilize more than one of these formats, such as annual reports filed with the Securities and Exchange Commission (SEC). In SEC filings, general purpose financial statements are primarily tabular, and footnotes as well as auxiliary information are primarily narrative. However, auxiliary information often includes graphs. Nonetheless, the tabular format is overwhelmingly the most prevalent.

THEORY OF COGNITIVE FIT

The effectiveness of communicating information using a graphical presentation mode compared to using a tabular presentation mode has been researched somewhat extensively over the past thirty years. Early research was inconclusive about which mode is the most effective. More recent research, guided by a seminal article by Vessey (1991), theorizes that effective communication of information depends on a match between characteristics of the decision task for which information is being reported and the mode of information presentation. Vessey refers to this as the paradigm of cognitive fit. Interestingly, decisions can be made effectively without cognitive fit. However, there are advantages when cognitive fit is present.

Early prior research addresses how to best present information to managers in decision-making contexts. One aspect of this research examines when (and if) it is better to utilize graphical rather than tabular information representation for managerial decision-making. Vessey (1991) points out that results in this research area are inconclusive with some studies suggesting that tabular representations are better than graphical representations, while other studies suggest that graphical representations are better than tabular representations.

In order to explain the conflicting results related to graphical versus tabular information representations, Vessey (1991) presents the paradigm of cognitive fit which helps explain why a particular information representation (graphical versus tabular) is better in a given decision situation. The theory explains that graphical representations emphasize *spatial* information such as “relationships in the data,” while tabular representations emphasize *symbolic* information such as “discrete data values” (Vessey, 1991, p. 225). Decision tasks for which information representations are used can also be classified as spatial or symbolic. Spatial tasks are those that tend to “assess the problem area as a whole rather than as discrete data values,” while symbolic tasks are those that “involve extracting discrete data values. . .” (Vessey, 1991, p. 226). When individuals are confronted with decision tasks supported by information representations that match, i.e., both spatial or both symbolic, cognitive fit is said to exist. The theory asserts that when there is cognitive fit, decision accuracy and timeliness are enhanced.

Vessey (1991) re-examines prior research studies on graphical versus tabular information representation in the context of the theory of cognitive fit. The theory predicts that task performance is enhanced when graphical representations support spatial tasks and when tabular representations support symbolic tasks, i.e., when there is cognitive fit. Vessey’s re-examination finds that the prior research results are highly consistent with the theory of cognitive fit.

RADAR CHART

The theory of cognitive fit discussed above posits that spatial information representation supports spatial tasks most appropriately. Therefore, graphs which are types of spatial information representations would most appropriately support spatial tasks. In a decision-making context, these spatial tasks are those which value comparative relationships more than specific magnitudes or values.

In this article, we focus not on the graphical presentation format in general, but instead on a particular type of graph called the radar chart which is relatively unknown in accounting and business reporting with a few exceptions. The reason for this focus is that the radar chart is particularly well suited for specific types of decisions which tend to be relatively complex and critically important in business and accounting. Several synonyms exist in the literature for “radar chart” including spider chart, spider graph, web chart, star plot, cobweb chart, and polar chart. We do not differentiate between these terms in our paper. We choose to use “radar chart” throughout the paper as a representation of these types of charts or graphs.

Different versions of the radar chart have appeared in the literature over the past century and a half. One of the earlier versions was named the star plot. In an article that chronicles the history of the use of graphs, Friendly (2009) identifies use of the star plot in Germany as early as 1877. In the same article, Friendly

reports the first documented use of a star plot in the United States in 1971. This first use in the United States was for reporting and tracking crime rates, not for business decision-making. Soltero (2007) identifies one of the earliest references to radar chart usage in business. This reference was a 1977 recommendation from the Japanese Union of Scientists and Engineers in which the radar chart was recommended as a decision-making tool for upper-level management to visually compare actual firm performance with performance targets.

There are several more recent, documented uses of the radar chart in business. More of these uses are found in the healthcare industry than in any other industry. For example, Elg and Langstrand (2010) analyze a Swedish healthcare firm and report that their balanced scorecard methodology is represented in a radar chart (referred to as a “spider” chart in their paper). Also, Josey and Kim (2008) report how Barberton Citizens Hospital, part of a large for-profit U.S. hospital company, created a radar chart to illustrate performance results generated from a balanced scorecard application.

Strengths: Versions of the radar chart have been used for a variety of applications. Schmid et al. (1999) discuss the radar chart and point out strengths of this particular type of graph. They suggest that primary advantages of radar charts include providing a good summary description of multiple performance measures, disclosing a good overall measure of performance, and allowing managers to visually identify the trade-offs among the performance measures.

Design: There are different designs of the radar chart. However, the design we prefer resembles a wagon wheel with multiple, equally spaced spokes. Each spoke represents a meaningful and measurable attribute of interest. For example, each spoke might represent a performance measure. The length of each spoke is the same. The midpoint of each spoke represents the expected or budgeted value of that attribute. All spokes are scaled in percentages with positive percentages outside of the midpoints and negative percentages inside the midpoints. The end of each spoke represents a percentage that is greater than any percentage by which actual performance would practically exceed expected performance on all attributes. These endpoints are connected producing a visual appearance similar to a wheel. The center of the wheel represents a negative percentage that is greater in absolute value than any percentage by which actual performance would practically fall short of expected performance on all attributes. In practice, it is not necessary that the expected (or budgeted) values of the attributes be the midpoints of the spokes. The spokes could be scaled differently so that the expected value of each attribute is represented by a point somewhere between the midpoint of the spoke and the outside limit of the radar chart. For example, the expected values could be located two-thirds of the distance away from the center of the wheel. Visually, this may allow radar chart users to more readily recognize attributes that fall inside of the expected areas.

Expected values or midpoints on all spokes are connected using straight lines forming a regular polygon. The point on each spoke that represents actual performance on that attribute is positioned some percentage of the distance from the midpoint either outward or inward depending on whether actual performance exceeds or falls short of expected performance. Finally, the actual performance points on all spokes are connected by straight lines forming a second polygon which is virtually always irregular in shape. The two polygons can be displayed in different colors or by using different line styles to easily differentiate them and promote efficient mental processing of information. In our example chart (see Figure 1), we use a dashed line to form the regular polygon of expected values and a solid line to form the irregular polygon of actual performance. Regardless of the method used to differentiate the two polygons, it is relatively easy to visually identify how actual performance on each attribute corresponds to expected performance. Furthermore, by strategically positioning related attributes adjacent to each other and in the same area or section of the radar chart, the decision-maker can easily evaluate relative performance on groups of related attributes as well as on individual attributes. For example, the irregular, actual performance polygon may bulge out beyond the expected regular polygon on one set of related attributes which would quickly be identified as an area performing above expectation. On the other hand, the irregular, actual performance polygon may fall inside the regular, expected polygon on another set of related attributes which would quickly be identified as an area of concern that should be looked into more closely. In our explanation, an actual measure of performance that exceeds the expected measure is considered better performance. We acknowledge that for some attributes this might naturally be exactly the opposite. For these attributes, measures can be transformed through alternative methods of scaling so that a greater scaled measure represents better performance if that is considered desirable. Thus, for simplicity, we will consider a higher measure as better performance. In the next section of this paper, we have included an example that illustrates these relationships (See Figure 1).

Illustration: Prior research does not address benefits of using one information representation format over another within different accounting related decision-making contexts. However, the theory of cognitive fit provides guidance for matching information representations to decision tasks. Therefore, we utilize the theory of cognitive fit to identify accounting applications that match with spatial information representation provided by a radar chart. Several potential accounting applications will be identified and elaborated upon in the next section of this paper. However, for purposes of providing an example to illustrate a potential use of the radar chart, we select the balanced scorecard. The reason for this choice is twofold. First, the balanced scorecard is relatively widely used for business performance evaluation, and second, prior research points to some limited usage of the radar chart in practice for displaying balanced scorecard results.

Balanced scorecards highlight and summarize performance along several dimensions using both financial and non-financial performance measures. We contend that users of balanced scorecard results are often non-accounting managers whose objectives are to make associations and perceive certain relationships in the data (i.e., not to extract specific data points). Within the cognitive fit framework previously described, spatial tasks would require these types of perceptual processes to examine sets of data points at the same time. If utilizing a balanced scorecard is a *spatial* task, and we believe it is, then cognitive fit theory purports that information representations should emphasize *spatial* information (i.e., be graphical in nature) in order to lead to more accurate and timely decision-making.

In Figure 1, we provide a simple example of how information generated from a balanced scorecard can be depicted in a radar chart using Microsoft Excel. The four general perspectives in a classical balanced scorecard are: financial, customer, internal business process, and learning and growth. We derive two example measures for each balanced scorecard perspective that firms could utilize which are similar to measures presented in Horngren et al. (2012). For the financial perspective, we use “income from growth” and “revenue growth”; for the customer perspective, we use “market share” and “customer satisfaction”; for the internal business process perspective, we use “first-time quality” and “on-time delivery”; and for the learning and growth perspective, we use “employee satisfaction” and “employees trained in quality management (QM)”.

We derive example “Goal” and “Actual” values for each of these measures and generate the corresponding radar chart shown in Figure 1. To maximize usefulness for decision-making purposes, we include the goal, or expected value, for each measure as the midpoint of each axis in the radar chart. Then, the “Actual” value for each measure represents the percentage that it exceeds, or falls short of, the expected value $[(\text{Actual} - \text{Goal})/\text{Goal}]$. In our example, if the “Actual” value was the same as the “Goal” value, then the “Actual” and “Goal” data point would be the same, which represents an actual 0% variance relative to the goal.

Figure 1 provides a visual example of how non-accounting managers would be able to synthesize balanced scorecard information and analyze several data points simultaneously. As noted earlier, if the balanced scorecard is a *spatial* task, then cognitive fit theory indicates information representations should emphasize *spatial* information. In our example, this spatial information is provided in a radar chart. In practice, the example radar chart in Figure 1 could be used by managers to quickly determine important relationships among the depicted balanced scorecard perspectives. For example, from information shown in Figure 1, managers would quickly determine that the firm is substantially outperforming their revenue growth expectations (by nearly 20%); however income generated from that growth falls short of expectations (by nearly 15%). This would direct managers to investigate how much of the revenue growth was due to pricing effects versus sales volume

effects. Related to revenue growth, it is also evident that market share substantially exceeds expectations. Quality and service to customers appears to be lacking with “First-Time Quality” and “On-Time Delivery” falling well below expectations. Moreover, “Employee Satisfaction” was below expectations and “Employees Trained in QM” was above expectations, both by less than 10%.

POTENTIAL ACCOUNTING APPLICATIONS

Our earlier theoretical discussion focuses on presenting information using a graphical mode. In particular, our intent has been to introduce the specific type of graph referred to as a radar chart. Based on our survey of the literature, the radar chart is being used relatively little for business and accounting applications. Yet it seems to be particularly well suited for presenting information in certain types of applications where the consideration and integration of multiple performance measures is required. The most obvious application which was mentioned above is the balanced scorecard. However, the balanced scorecard is not the only application in which the radar chart might be well suited. In this section, we include the balanced scorecard as a fruitful application but also suggest a number of other potential applications.

Managerial accounting: Although our survey of the literature identified little use of the radar chart in business, we did find evidence of limited use in the healthcare industry where the radar chart has been used for displaying the balanced scorecard in hospitals and health clinics. Other industries also may be particularly well suited for using a balanced scorecard married with the radar chart. One example is banks which, like hospitals, tend to use multiple performance measures, some of which are financial and some of which are nonfinancial. Another industry with similar characteristics is the transportation industry, both trucking and airline.

Budgeting and analysis of variances represent other applications in which the radar chart may be particularly useful. In these applications, as was the case with the balanced scorecard, there are multiple performance measures that must be considered. A radar chart may help the decision-maker conceptualize the big picture by visually displaying these measures together on one graph. This should help prevent decision-makers from focusing on one or two measures and ignoring others. Our survey of the literature found no documented uses of the radar chart for budgeting and analysis of variances.

Auditing: Radar charts may be useful in the auditing arena. The reason is that auditors must gather and evaluate many different, but related, items of information about the company being audited. This is true for external auditors performing audits of clients’ financial statements as well as for internal auditors performing various types of audits, such as financial, compliance, and operational, for their organizations.

Analytical review is one auditing application for which the radar chart may be particularly well suited. Auditors often use analytical review procedures to compare actual performance with average industry performance. This same methodology also is used to compare current year performance to performance in prior years. Analytical review procedures typically use percentages and ratios. Furthermore, it is likely that multiple measures are included. By carefully organizing these measures in a radar chart, the auditor may be able to more easily identify individual measures that need further exploration as well as relationships among the measures without missing the big picture.

Our survey of the literature did not identify use of the radar chart in auditing. However, one article related to teaching finance promotes the use of radar charts for ratio analysis (DeBoskey & Doran, 2012). Ratio analysis and analytical review have some common characteristics. For example, both focus on interpreting relationships between actual and expected performance. However, our survey found no examples of radar chart usage for ratio analysis or financial statement analysis in real-world applications.

Internal control evaluation required by the Sarbanes-Oxley Act of 2002 (SOX) (U.S. House of Representatives, 2002) is another potential radar chart application that relates to auditing. Historically, external auditors recognized the importance of an effective system of internal control and its relationship to the design of an efficient and effective financial audit. This recognition is the basis for what is often referred to as a risk-based audit in which auditors conduct an evaluation of the client's internal control system as a determinant of the nature, timing, and extent of subsequent auditing procedures. The results of the auditor's internal control evaluation were communicated to the client as part of the formal audit findings. However, the auditor's internal control evaluation was not communicated to outside parties. SOX changed that for publicly held companies. Now, SOX requires that public companies include in their SEC filings the auditor's evaluation of their system of internal controls along with the financial statements and the auditor's opinion. Consequently, internal control evaluation now is a required service rendered by all of the larger public accounting firms due to the requirements of SOX.

SOX does not require a specific format for reporting the auditor's internal control evaluation to the client nor to outside parties. However, since a company's internal control system is multidimensional, a radar chart may provide advantages if included in these communications, especially the communication between the auditor and the client. Our survey of the literature found no indication of radar chart usage for internal control evaluation. However, one risk management related article suggests radar chart usage for evaluating risk throughout an enterprise (Ciorciari and Blattner, 2008) which is similar to internal control evaluation.

OPPORTUNITIES FOR RESEARCH

The intent of this paper is to introduce radar charts to the reader. Our survey of the literature identified very few documented applications of this potentially useful method for presenting information. Our survey also found no attempts to empirically test whether radar chart usage results in improved decision-making. In this section of the paper, we discuss several opportunities to test whether using a radar chart has one or more significant effects upon the decision process. The four effects presented below are not intended to be exhaustive.

Positive effects upon the decision process could come in several forms. The first and most important effect would be that decisions or judgments made using radar charts are “better” than those made when radar charts are not used. Testing for this effect is somewhat problematic because “better” must be defined in an unambiguous manner and, then, must be measurable. Although, in general, this is not easily done, it is possible for certain types of decisions or judgments. A second important effect would be a quicker decision time. Using a radar chart of decision information in which the decision-maker can visually consider at least large subsets of multiple measures at the same time should speed the process of coming to a decision. A third important effect would be more confident decisions. The theory of cognitive fit implies that using a radar chart of multiple measures where the decision-maker can visually consider at least large subsets of multiple measures at the same time should increase confidence in the final decision. A fourth important effect would be that decision-makers prefer decision information presented in radar charts to other modes of presentation. The theory also implies that this should be the outcome. There is some empirical evidence that already supports this hypothesis. DeBoskey & Doran (2012) find that MBA student subjects prefer financial information presented in radar charts over the same information presented in a more traditional tabular format for ratio analysis.

An interesting question related to the fourth effect, preference for decision information presented in a radar chart, is whether decision-makers well experienced with the tabular format through education and practice might actually prefer the tabular format to a radar chart for spatial decision tasks. Accountants would be likely candidates for this because of the heavy use of the tabular format in education and practice. If accountants prefer tabular information presentation in these contexts, it might represent a contradiction to the theory of cognitive fit.

DISCUSSION AND CONCLUSION

The objective of this paper is to introduce the radar chart to both practitioners and researchers. We believe that using the radar chart in certain decision contexts should result in several desirable outcomes. Our beliefs are based on the theory of cognitive fit and the research related to that theory. We also provide the reader with several applications in which the radar chart might be particularly well suited.

Finally, we identify several potential advantages from utilizing the radar chart in appropriate contexts.

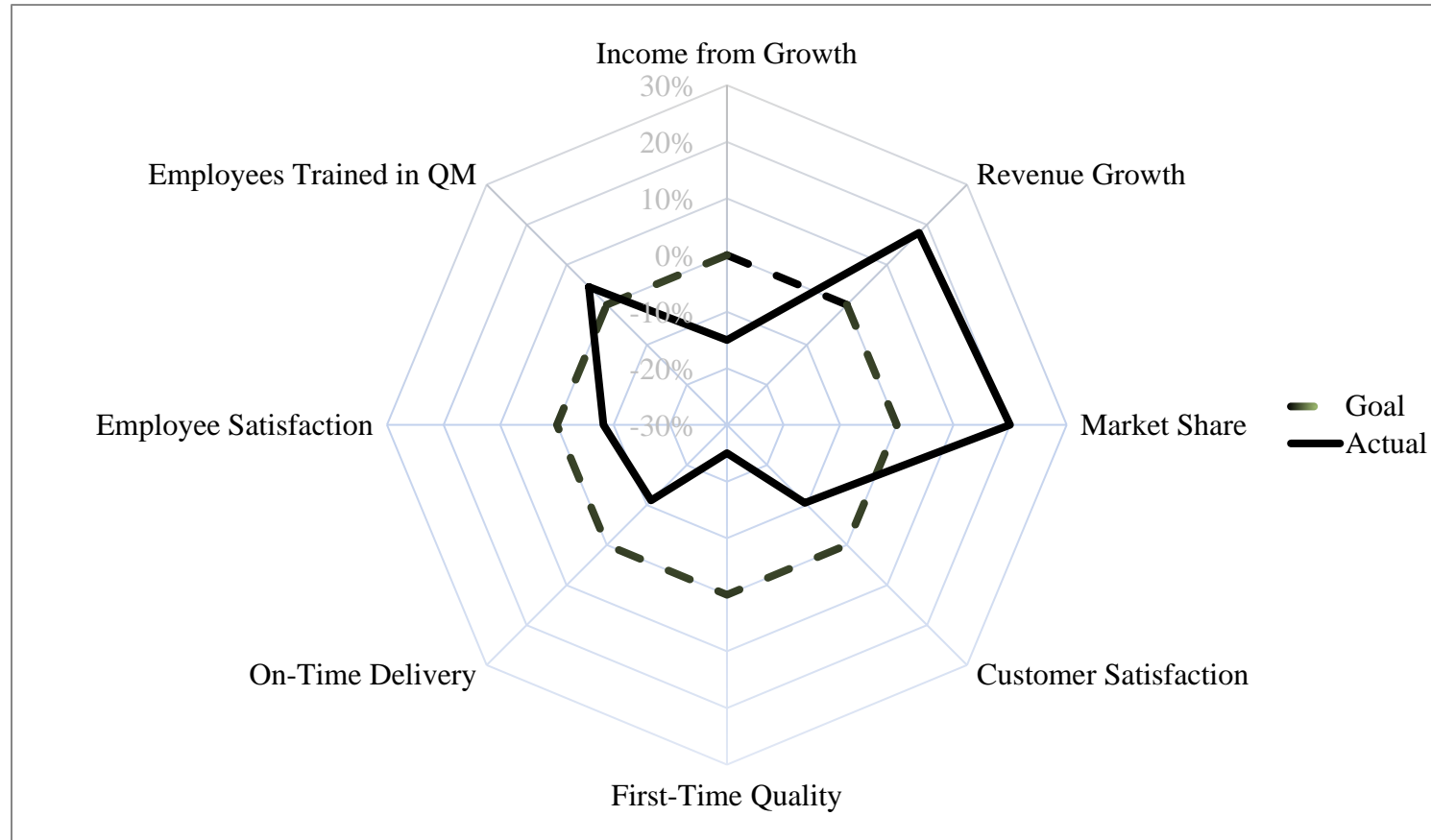
This paper contributes to the literature by connecting cognitive fit theory to specific accounting related decision-making contexts. Specifically, we address the potential for decision-making quality improvements when utilizing a radar chart in managerial accounting and auditing applications. We believe that our inquiry opens up potential research questions in this particular research arena. For example, how do decision-maker (user) characteristics, such as accounting managers versus non-accounting managers, affect nuances of cognitive fit theory and preferences between tabular and graphical information representations? It is our hope that future research would continue to address the importance of improvements in decision-making quality in accounting and business related contexts.

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Figure 1
Radar Chart Example - Balanced Scorecard



IMPACT OF EXPENSES, TURNOVER AND MANAGER TENURE ON BLEND FUND PERFORMANCE

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ABSTRACT: The universe of economic agents cannot deliver an excess investment rate of return. High expenses impede and impair the objective of wealth creation, thereby reducing the probability that equity mutual funds such as blend funds can generate economic returns that outpace broad market benchmarks. Differences in expense ratios are an influential factor in explaining blend funds' relative returns. Turnover ratios and manager tenure are additional factors affecting returns. Expenses are a deadweight loss to investors; hence, equity fund investors should vigilantly screen and weigh expenses prior to selecting blend funds for inclusion within portfolios.

Key Words: Blend (core) mutual funds, investment expenses, gross returns, net returns.

INTRODUCTION AND OVERVIEW

Equity mutual funds are often classified by their investment "style," as defined and assigned by Morningstar. Categories are differentiated by size (large cap, mid cap, small cap) in one dimension with investment orientation (growth, value, and blend) as a second dimension. "Growth" funds strive to create portfolios of companies whose projected sales and earnings are growing faster than the broad market. "Value" portfolios consist of stocks that are perceived to be undervalued by the market. "Blend" or "core" portfolios include stocks that may be characterized as having either a mixture of growth and value characteristics and/or an assembly of unrestricted-style investments that combine both growth stocks and value stocks. Neither growth nor value qualities are singularly dominant in blend funds. Blend funds invest in a wide range of industries rather than in a single industry.

Most investors gain exposure to stocks through mutual funds, especially through 401(k) accounts and other retirement-savings plans. Individual investors and professional money managers endeavor to design optimal portfolio allocations among various asset classes. Modern portfolio theory commonly performs an essential role in drafting these blueprints of investment plans.

The *efficient market hypothesis* postulates that the price of a financial asset such as common stock is identical to its underlying economic value. Investment professionals are persuaded that asset price and intrinsic value (the sum of the present value of a company's future cash flows) differ.

If the efficient market hypothesis is irrefutable then sophisticated portfolio construction methodologies, such as those designed by mutual fund managers, cannot succeed in delivering market-beating performance since these managers will not consistently discover undervalued securities.

INVESTMENT COSTS

The implication of the efficient market hypothesis is that an efficient stock market will likely induce relatively similar gross returns from investing, causing net returns to be highly dependent on fees and expenses. Since there is a direct relationship between low costs and high returns, low expenses are a potent advantage.

“The expense ratio is the most proven predictor of future fund returns.” (Kinneil, 2016, p. 1) “Expenses are just so dependable that it makes sense to make them an initial screen.” (Kinneil, 2015, p. 3)

Several researchers have examined these relationships and developed a methodology that is employed analogously in this study. Their focus has been various categories of funds, measured over various time frames.

Blake, Elton, and Gruber (1993) documented that high expense ratios reduced returns. Bogle (1994) concluded that higher expenses were highly correlated with relative returns. In a subsequent study, Bogle (1999) reiterated and re-emphasized the importance of selecting lower-cost bond funds. Reichenstein (1999) demonstrated that higher expenses consistently predicted lower returns for taxable bond funds. Domian and Reichenstein (2002) extended Reichenstein’s analysis to municipal bond funds. They concluded that expense ratios were consistent predictors of relative returns.

Domian and Reichenstein (2011) examined taxable bond funds and reported that expense ratios predicted a smaller fraction of bond fund returns than in earlier periods. They attributed this to the credit crisis. Moreover, they downplayed some of their results as a consequence of “errors in placing funds in their proper Morningstar categories.” (p. 112). This observation referred to research conducted by Deng, McCann, and O’Neal establishing that the linear scale used by Morningstar “understates the credit risk in bond fund portfolios” (2010, p. 61). Their analysis resulted in Morningstar correcting its metric for credit risk as of 2010.

Seminal research on money market funds was conducted by Domian and Reichenstein (1997). They endorsed the commodity view of money market funds (often associated with Bogle, 1994), observing that these funds “have little ability to distinguish their portfolios from those of their competitors,” (p. 171) and “primarily compete based on differences in expenses.” (p. 172) Bogle (2007) employed an ordinal ranking of taxable money market funds in terms of returns and expenses. He reported that “costs tell virtually the entire story in money market funds.” (p. 148)

The issue of expenses as a deadweight loss for bond funds has also been studied. Reichenstein reported strong statistical evidence of a one-to-one negative relation between expense ratios and net returns.

Bogle (1999) observed, with irony, that load funds typically had higher expense ratios, compounding the detrimental impact on investment performance. Reichenstein compared both the gross returns and net returns of load funds and no-load funds. The hypothesis that average gross returns were equal for load and no-load funds received robust support.

Legendary investor Warren Buffett addressed the issue of investment costs in Berkshire Hathaway's 2005 Annual Report. He commented that "investors have had experiences ranging from mediocre to disastrous" by not choosing a low-expense path. "There have been three primary causes: first: high costs, usually because investors traded excessively or spent far too much on investment management; second, portfolio decisions based on tips and fads rather than on thoughtful, quantified evaluation of businesses; and third, a start-and-stop approach to the market marked by untimely entries (after an advance had been long underway) and exits (after periods of stagnation or decline)...they should try to be fearful when others are greedy and greedy only when others are fearful."

Costs impede investment performance. Each dollar of fees, expenses, and sales charges is not merely removed immediately from investable assets, but is a continuous hemorrhage that mathematically compounds the cumulative penalty of the costs imposed.

The expenses extracted from an actively managed fund are a significant impediment to overcome. Accelerating fees and expenses are analogous to pouring sand on the gears of investment performance. Sustainable lower costs presage competitive advantages for equity mutual funds.

The portfolio management business is an intensely competitive search for undervalued securities. The stock and bond markets are dominated by highly sophisticated investors. Undervalued securities are those that have become disconnected from their intrinsic values, resulting in mispricing. These pricing mistakes are market inefficiencies. Two cautionary observations offered by Marks (2012) must be recognized and acknowledged. "Mispricings are hard to profit from...it's nearly impossible for most investors to detect instances when the consensus has done a faulty job of pricing assets, and to act on those errors." (p. 2) Also, "Risk control—and consistent success in investing—requires an understanding of the fact that high returns don't just come along for the picking; others must create them for us by making mistakes...Superior investing is all about mistakes." (p. 9)

The efficient market theory predicts that: (a) operating expenses and trading costs (bid-ask spreads and the market impact of trades) instigate a malign effect and trigger a deadweight loss that must be wholly offset in order for a fund's performance to match a benchmark; (b) security market pricing reflects all publicly available information, compromising fund managers' ability to exploit opportunities to deploy assets in undervalued securities; and (c) there is an inverse relationship between the net returns and expense ratios of funds.

The implication of these hypotheses is that an efficient stock or bond market will likely induce relatively similar gross returns from investing, causing net returns to be highly dependent on fees and expenses. That is, the high level of trading among active managers and their attendant costs undercuts and shrinks the net returns to investors. "People should engage in active investing only if they're convinced that (a) pricing mistakes occur in the market they're considering and (b) they—or the managers they hire—are capable of identifying those mistakes and taking advantage of them. Unless both of these things are true, any time, effort, transactions costs and management fees expended on active management will be wasted." (Marks, 2012, p. 2)

In such an environment, once investors have determined the asset classes appropriate for their portfolio, they should be vigilant sentinels and select investment vehicles such as index funds and/or low-cost competitors. The low-cost overhead of index funds accrues a formidable and durable advantage that compounds over time and elevates the probability of earning strong relative returns. Since there is a direct relationship between low costs and high returns, low expenses are a potent advantage. "There is a strong tendency for those funds that charge the lowest fees to the investor to produce the best net results." (Malkiel, 2007, p. 309)

If the empirical evidence from this research study affirms the efficient market theory, investors would maximize their prospects of attaining a market return by being assiduously focused on funds that do not extract high operating and trading costs or impose sales charges either as a price of admission or contractual exit outlay. In addition, presuming adequate diversification and an appropriate level of risk, other decision filters should be: the integrity of management as the stewards of shareholder capital, examples of which are transparent corporate disclosure and candid communications with shareholders; and alignment of interests with shareholders.

Manifestations of the latter are: rational allocation of capital, moderate asset turnover, sensitivity to tax consequences, a management team that implements policies designed to discourage short-term speculators and market timers, and periodic closing of funds to new investors either to inhibit asset bloat or when confronted by diminished investment opportunities.

These guiding principles would counterweight Bogle (2008, p. 96), who opined, "The mission of the fund business has turned from *managing* assets to *gathering* assets, from stewardship to salesmanship." The stewardship grade ratings reported by Morningstar (assigned by evaluating regulatory issues, board quality, manager incentives, fees, and corporate culture) are functional proxies for these screening variables.

Another factor to consider is whether or not fund managers invest substantial personal assets in their own fund, thereby increasing the alignment of investor:manager objectives. Mutual fund investors should "add managerial ownership to the list of variables to consider when choosing a mutual fund investment." (Evans, 2008, p. 532)

An examination of blend mutual fund data is warranted to highlight evidence in regard to the efficient markets hypothesis.

DATA AND METHODOLOGY

The database employed in this research study is *Morningstar Principia Mutual Funds Advanced*, dated May 2012. Each mutual fund and exchange-traded fund in Morningstar's fund universe is classified by investment objective and 3-year, 5-year, and 10-year compound average annual total return data (geometric total returns) are itemized along with allied information such as expense ratios. To be included in this study, a fund in a particular blend fund category must have at least ten years of rate of return data, as reported by Morningstar. The total number of blend funds satisfying this condition is 559. Table 1 enumerates the number of funds within various classifications.

Table 1: Blend Funds

<u>Category</u>	<u>Number of Funds</u>	<u>No-Load Funds</u>	<u>Load Funds</u>
Large Cap	339	248	91
Mid Cap	94	72	22
Small Cap	126	99	27
<i>Total</i>	<i>559</i>	<i>419</i>	<i>140</i>

The Morningstar data do not include total returns for terminated funds. This survivorship bias does not appear to be an issue of concern. "These non-surviving funds likely had poor returns...To the degree it exists, this bias would... tend to work *against* (emphasis added) the hypothesis that low-cost funds are likely to produce consistent winners." (Domian and Reichenstein, 2011, p. 109)

The Morningstar database incorporates different share classes, such as those labeled "A" shares, and both retail and institutional funds. Following Kinnel (2016, pp. 1-2): (a) multiple share classes of the same fund were eliminated; and (b) the oldest share class of a fund was maintained in this study. The database reports expense ratios as of the date of publication. As noted by Domian and Reichenstein, "Expense ratios are quite stable. Therefore, it is easy to predict funds that will have low actual expenses before the fact." (2002, p. 64) Also, "Low-cost funds tend to remain low-cost funds and high-cost funds tend to remain high-cost funds." (2011, p. 110) Similarly, they report a "general stability of expense ratios," (2011, p. 112) reiterating and confirming their prior observation that "Most funds maintain stable expense ratios." (1997, p. 182) Thus, while there is some variability, this research follows their path by employing the expense ratios reported by Morningstar for each fund, which are not averaged, as close approximations of operating costs. "The expense ratio is a nearly complete, all-in measure of the percentage of assets fundholders are paying in fees. (Kinnel, 2015, p. 2)

Blend funds consist of the following categories: large cap, mid cap, and small cap. This study will examine each of these categories over multiple time periods: 3 years, 5 years, and 10 years.

The purpose of this research study is to investigate two empirical issues that are of vital interest to individual and institutional investors.

The first issue will address the extent to which higher-cost blend funds penalize shareholders by delivering lower rates of return, on average, in comparison with lower-cost funds.

The conventional wisdom is that funds with high expenses will provide noncompetitive yields unless they increase risk. In contrast, low-fee funds (with low turnover of assets) will achieve a rate of return matching the market return as closely as can reasonably be expected. Hence index funds and other low-cost funds should garner yields superior to most actively managed funds since they are not handicapped and undermined by high costs.

This issue will be addressed for each component of the preceding blend fund categories, as classified by Morningstar, for three time frames: 3 years, 5 years, and 10 years. Expense ratio data for each fund category will be divided into three groups and an average total return computed for each group. The data will be analyzed to test the hypothesis that lower-cost funds deliver superior average total returns and that higher-cost funds provide inferior average total returns. The results of this analysis are indispensable to investment decision-making since rational, opportunistic economic agents would re-design portfolios based on information reporting whether or not the level of expenses is the best predictor of future blend fund performance.

The second issue of exploration in this research study will be to examine the proposition that expenses are a deadweight loss. Expenses do not simply reduce returns. Efficient market theory contends that there exists a roughly one-to-one inverse relationship between expenses imposed by mutual funds and their total returns. Evidence in support of this relationship was reported by Blake, Elton, and Gruber (1993). Domian and Reichenstein (2011, p. 110) declared: "If bond markets are perfectly efficient then the expense coefficient should be -1." This prediction is more demanding and precisely formulated than the first research issue to be addressed. It tests the hypothesis that the estimated slope coefficient in a regression analysis is not statistically different from negative one (-1). That is, if the expense ratio of a fund increases by one percentage point, then the fund's total return decreases by one percentage point. Regression analyses will be performed in testing the deadweight loss hypothesis for each of the three aforementioned fund categories for three time horizons: 3 years, 5 years, and 10 years.

SALES CHARGES

The first hypothesis to be tested is that mutual fund sales charges assessed either upon purchase or redemption are a deadweight loss. Since gross returns are independent of and liberated from sales loads, and thus exclude the

impact on portfolio performance, this test compares gross returns of load funds and no-load funds for each of the three blend fund categories.

The null hypothesis states that average gross returns are equal for load funds and no-load funds. That is, the average gross rate of return is not shaped or influenced by an investor's decision to pay or shun sales fees. Statistical support for this contention would affirm the deadweight loss hypothesis, wherein the deadweight loss is measured by the sales charge.

Section A of Table 2 through Table 4 addresses this issue. The initial step is to compute the gross return of each fund in each category. Gross return is equal to net return plus expense ratio. After separating load funds from no-load funds, the average 3-year, 5-year, and 10-year gross returns are computed for each fund category and reported in Section A. Finally, a two-sample hypothesis test is conducted to test whether or not gross returns on load funds can be discriminated from gross returns on no-load funds.

The hypothesis that there is no statistical difference between the means, applying a 95% level of confidence, cannot be rejected in 7 out of 9 (and in 9 out of 9 tests using a 96% level of confidence) tests (three time horizons for each of the three fund categories). There is little statistical support for the alternative hypothesis that average gross returns differ between load funds and no-load funds. Load funds do not deliver superior net returns. Managers of no-load funds are equally skilled in comparison with managers of load funds. (A secondary test compared average net returns for no-load funds and load funds in each time period. These data are not as pure as above since fund-management costs are affecting *net* performance whereas they have no impact on *gross* performance. In 9 out of 9 instances the no-load funds, as a consequence of their lower expense ratios factored into this analysis, earned either statistically equal or greater net returns.)

This conclusion garners support from logic as well as quantitative evaluation. Sales charges, whether collected at purchase or sale, are shared between brokerage organizations and affiliated investment advisors. They are not distributed to mutual fund management teams and hence should not affect investment performance.

The decision to consent to a sales load when allocating risk-capital is defensible for those economic agents unschooled in investment analysis and/or unwilling to commit the requisite time, resources and energy to researching no-load fund alternatives. But many investors who are not constrained by these parameters voluntarily pay commission charges. Apparently, with insufficient regard to empirical evidence, they have cultivated the impression that higher costs correlate with higher returns.

Sales charges deducted from capital intended for investment are a deadweight loss--a cost penalty and unnecessary tax on economic value. They are not committed to the investment decision-making process, but rather reduce or stimulate the forfeiture of profits for blend fund shareholders who choose to travel on this toll road. Furthermore, load funds also have higher annual operating costs (refer to the expense ratio data reported in Section B of Table 2

Table 2: Large Cap Blend Funds**A. Gross Return**

<u>Gross Return (%)</u>				
Fund				
<u>Category</u>	<u>N</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
No-Load	248	19.05	1.19	5.20
Load	91	18.44	1.25	5.36
Statistically Different Gross Return?		Yes*	No	No

*Not significantly different from 0 at a 96% level of significance.

B. Net Return

<u>Net Return (%)</u>					Expense <u>Ratio</u>	Combined <u>Load</u>
<u>Fund</u>	<u>N</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>		
No-Load	248	18.28	0.42	4.43	0.77	
Load	91	17.24	0.05	4.16	1.12	5.08
		<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>		
Slope Coefficient (339 observations)		-1.37	-1.37	-0.85		
<i>p</i> Value		9.14E-06	3.37E-10	7.03E-09		
<i>R</i> ²		.06	.11	.09		
Slope Statistically Different from 0?		Yes	Yes	Yes		
Slope Statistically Different from -1?		No	No	No		

C. Expense Ratio and Net Return

<u>Expense</u> <u>Category</u>	<u>Expense</u> <u>Ratio</u>	<u>Net Return (%)</u>		
		<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
Low	0.35	18.93	0.90	4.76
Middle	0.89	17.87	0.52	4.41
High	1.41	17.21	-0.46	3.91

D. Turnover Ratio and Net Return

<u>Turnover</u> <u>Category</u>	<u>Turnover</u> <u>Ratio</u>	<u>Net Return (%)</u>		
		<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
Low	5.96	18.45	0.87	4.59
Middle	34.87	17.45	0.30	4.35
High	117.19	18.11	-0.21	4.15

E. Manager Tenure and Net Return

<u>Tenure</u> <u>Category</u>	<u>Tenure</u> <u>Years</u>	<u>Net Return (%)</u>		
		<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
Low	2.10	18.19	-0.09	4.11
Middle	5.78	18.12	0.57	4.36
High	12.84	17.70	0.47	4.61

Table 3: Mid Cap Blend Funds**A. Gross Return**

<u>Gross Return (%)</u>				
Fund				
<u>Category</u>	<u>N</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
No-Load	72	21.85	2.43	7.60
Load	22	20.97	1.40	7.89
Statistically Different Gross Return?		No	No	No

B. Net Return

<u>Net Return (%)</u>						
Fund				Expense Combined		
<u>Category</u>	<u>N</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Ratio</u>	<u>Load</u>
No-Load	72	20.90	1.47	6.65	0.95	
Load	22	19.50	-0.07	6.42	1.47	5.16
		<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>		
Slope Coefficient (94 observations)		-1.56	-2.13	-1.26		
<i>p</i> Value		2.17E-44	1.44E-09	4.39E-36		
<i>R</i> ²		.05	.22	.14		
Slope Statistically Different from 0?		Yes	Yes	Yes		
Slope Statistically Different from -1?		No	Yes*	No		

*Not significantly different from -1 at a 99.2% level of significance.

C. Expense Ratio and Net Return

Expense		<u>Net Return (%)</u>		
<u>Category</u>	<u>Ratio</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
Low	0.50	21.97	2.62	7.48
Middle	1.13	19.85	0.78	6.43
High	1.61	19.86	-0.11	5.84

D. Turnover Ratio and Net Return

Turnover		<u>Net Return (%)</u>		
<u>Category</u>	<u>Ratio</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
Low	14.97	21.90	2.52	7.42
Middle	40.77	20.20	0.99	6.56
High	129.58	19.59	-0.21	5.78

E. Manager Tenure and Net Return

Tenure		<u>Net Return (%)</u>		
<u>Category</u>	<u>Years</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
Low	2.09	21.73	1.01	6.35
Middle	6.92	20.03	1.10	7.14
High	14.11	19.93	1.23	6.31

Table 4: Small Cap Blend Funds**A. Gross Return****Gross Return (%)**

Fund				
<u>Category</u>	<u>N</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
No-Load	99	22.13	2.38	7.41
Load	27	21.28	3.34	8.38
Statistically Different Gross Return?		No	No	Yes*

*Not significantly different from 0 at a 96% level of significance.

B. Net Return**Net Return (%)**

Fund					Expense	Combined
<u>Category</u>	<u>N</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>	<u>Ratio</u>	<u>Load</u>
No-Load	99	21.11	1.36	6.39	1.02	
Load	27	19.78	1.84	6.87	1.50	5.12
		<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>		
Slope Coefficient (126 observations)		-0.04	-1.18	-0.18		
<i>p</i> Value		1.04E-58	.0001	1.98E-27		
<i>R</i> ²		.006	.033	.002		
Slope Statistically Different from 0?		Yes	Yes	Yes		
Slope Statistically Different from -1?		No	No	Yes**		

**Not significantly different from -1 at a 96% level of significance.

C. Expense Ratio and Net Return

Expense		<u>Net Return (%)</u>		
<u>Category</u>	<u>Ratio</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
Low	0.63	21.25	1.78	6.45
Middle	1.16	20.37	1.66	6.61
High	1.59	20.87	0.94	6.43

D. Turnover Ratio and Net Return

Turnover		<u>Net Return (%)</u>		
<u>Category</u>	<u>Ratio</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
Low	16.79	21.40	1.79	6.74
Middle	39.31	20.50	1.55	6.86
High	107.81	20.58	1.04	5.89

E. Manager Tenure and Net Return

Tenure		<u>Net Return (%)</u>		
<u>Category</u>	<u>Years</u>	<u>3 Year</u>	<u>5 Year</u>	<u>10 Year</u>
Low	2.24	21.08	1.21	5.95
Middle	6.07	21.25	1.39	6.19
High	12.96	20.16	1.78	7.36

through Table 4), compounding the damage to wealth creation as the time frame of investing expands.

EXPENSES AND NET RETURN

Professional investment managers operate in competition with the efficient market hypothesis. They are enrolled in a challenging contest (performance derby) that demands that they repeatedly discover mispriced securities and purchase/sell these assets at prices that are beneficial to wealth creation.

In this highly competitive arena, costs of operating and trading play a decisive role in the outcome. Escalating costs consume the fertile, profitable opportunities that have been identified.

Efficient market theory predicts that there is an inverse relationship between a fund's annualized rate of return and its expense ratio. The initial test of this hypothesis employs bivariate regression analysis on the aforementioned data for all three time horizons and all three blend fund categories.

Consider Section B of Table 2 through Table 4. The slope coefficient is mathematically negative in 9 out of 9 regression analyses and is statistically negative in 7 of 9 regressions. Expenses decrease total return. The latter result indicates that there is less than a 5% probability that 7 of these 9 estimated slope coefficients is different from zero purely by chance.

The second investigation of the hypothesis that expenses and total returns are inversely related is strictly specified and therefore a much more demanding claim than the initial test. It asserts that expenses are a deadweight loss. An increase in the expense ratio results in a mathematically identical (one-to-one) reduction in net return. The null hypothesis states that the slope coefficients are statistically equal to negative one (-1).

The slope coefficient was statistically equal to negative one in 7 out of 9 regressions using a 95% confidence level. Increasing the confidence level to 96% increases the relationship to 8 out of 9, while increasing the confidence level to 99.2% improves the relationship to 9 out of 9. This empirical discovery that the expense ratio coefficient is repetitively indistinguishable from the hypothesized value of -1 is persuasively strong. In almost all tests, expenses inflicted approximately a one-to-one deadweight loss on blend funds' ultimate delivery of investment returns.

This conspicuously important empirical inference validates a fundamental message for investors and financial professionals: a below-average expense ratio provides a persistent advantage each year that increases the likelihood of an above-average net return.

A final issue demands empirical investigation. For blend funds classified in a particular category, do differences in expense ratios account for and explain differences in net returns?

The issue of the relationship between the net returns of blend funds and their operating expenses is examined further by segmenting each of the three fund categories into three sample groups, ranked by expense ratio.

The expense ratio data are ordered from lowest to highest, divided into thirds, and hereinafter designated the low-cost, middle-cost, and high-cost fund groups. The average expense ratio for each group in each category is computed in addition to the average annualized total return for time periods of three years, five years, and ten years.

In order to test this relationship, each of the three blend fund categories is divided into three groups of equal size and sorted and differentiated by their expense ratios. The average expense ratios for the high-cost, middle-cost, and low-cost groups are computed and compared with the calculated average net returns for each of the three groups for 3-year, 5-year, and 10-year time intervals.

The research issue under consideration is the degree to which lower expense ratios are linked with higher-return funds. More specifically, what is the degree of association and connection between higher expenses and lower returns?

Consider Section C of Table 2 through Table 4. The statistical linkage observed is very revealing. In 8 out of 9 observations the low-cost funds earned the highest average total return during 3-year, 5-year, and 10-year time periods.

Net total return decreased in 8 of 9 instances as the expense ratio increased from the low-cost group to the middle-cost group, in 7 of 9 instances as the expense ratio increased from the middle-cost group to the high-cost group (in 1 of the 2 inconsistent instances, the high-cost category return differed by merely 1 basis point from the middle-cost category return), and in 9 of 9 instances as the expense ratio increased from low to high (in 1 of the instances the difference in return for the low-cost category was only 2 basis points higher than the high-cost category). Overall, rising expenses correlated with lower returns in 24 of 27 (89%) data sets. Investors can anesthetize their portfolio from performance deficits by astutely applying this information advantage.

Each of the results reported in this section on expenses and net return and in the preceding section on sales charges is consistent with efficient market theory. Expenses reduce net returns and constitute a deadweight loss. Furthermore, as costs increase, blend funds' performance increasingly deviates from a market rate of return.

Investors must be alert to the level of investment costs in order to avoid needlessly diminishing wealth-creation. The expected total return of lower-cost funds exceeds higher-cost funds and earns compounded returns as the investment time horizon expands. Financial planners should demonstrate due diligence by drafting a personalized investment policy document that communicates and substantiates the target allocations of stocks, bonds, and cash. It is imperative that they also provide value-added education for clients about the relationship between expenses and net returns, counseling clients not to invest in funds that extract high operating costs and sales charges. Investors and advisors can readily eliminate self-inflicted financial injury by bypassing high-cost funds.

PORTFOLIO TURNOVER AND NET RETURN

The fifth hypothesis under review addresses the issue of portfolio asset turnover as a filtering strategy. Commissions, fees and bid/ask spreads are an additional thicket of costs confronted by mutual fund managers when they trade securities. These costs dissipate the power of compounding. Trading and transaction costs are not components of the expense ratio and should be scrutinized separately.

A basic contention of the efficient market hypothesis is that asset turnover activates a conspicuous cost of fund management that sacrifices net performance by inflicting a financial outlay borne by shareholders. Malkiel (2006) succinctly summarized this linkage: "low-turnover mutual funds have outperformed high-turnover mutual funds...The surest route to top-quartile performance is to buy funds with bottom-quartile turnover and expense ratios." Moreover, Malkiel asserted (2007, p. 379) "The two variables that do the best job in predicting future performance are expense ratios and turnover...The best-performing actively managed mutual funds have moderate expense ratios and low turnover." Analogously, Haslem (2003, p. 319) reports "Much of the long-term persistence in fund performance is due to persistence in expense ratios... Mutual fund expenses have at least a one-for-one negative impact on performance, and turnover also negatively impacts performance."

As validated above, mutual fund management fees and expenses are a persuasively effective indicator of blend fund performance. Another aspect to investigate is portfolio turnover.

Consider Section D of Table 2 through Table 4. In 9 of 9 observations the low-turnover funds earned the highest average total return during 3-year, 5-year and 10-year time periods.

Net total return decreased in 8 of 9 instances as the degree of portfolio trading increased from the low-turnover group to the middle-turnover group, in 7 of 9 instances as turnover increased from the middle-turnover group to the high-turnover group, and in 9 of 9 instances as turnover increased from low to high. Overall, rising expenses correlated with lower returns in 24 of 27 (89%) data sets.

Additional examination of the hypothesis of an inverse relationship between portfolio performance and portfolio turnover was obtained from regression analyses of net returns and turnover ratios for each of the three categories and each of the three time intervals. The estimated slope coefficients were negative in 7 of 9 regressions and statistically negative 6 times at a 95% confidence level (7 times at a 90% confidence level); two slope coefficients were both numerically and statistically equal to zero.

Trading securities is expensive, a direct deduction from a fund's assets. In addition to commissions and possible market-impact costs, behavioral errors arise when trading securities. The theory of behavioral finance reveals that investors (individual and professional) do not reliably implement investment decisions that are rational. This contention deviates from economic and financial

theory, namely the presumption that economic agents exhibit dependably rational behavior.

To cite one example from behavioral finance, households and fund managers are prone to trading based on recent market activity. This conduct "anchors" their buy/sell decision to criteria such as price momentum. This robotic, copycat tactic presents both opportunities (mispriced financial assets) and penalties (trading costs).

The data presented in Section D of Table 2 through Table 4 are fundamentally in accord with the declarations of Malkiel and Haslem, affirming that transaction costs generally reduce portfolio performance, and imparting evidence that trading costs are a deadweight loss.

MANAGER TENURE AND NET RETURN

A final avenue of exploration addresses the impact of blend fund manager tenure on performance. Although discovery of seasoned mutual fund managers cannot ensure above-average performance, is longer tenure associated with differences in mutual fund performance?

Tenure observations report total years of experience for single-manager funds and average years of experience for team-managed funds. The data presented in Section E of Table 2 through Table 4 are moderately in accord with the hypothesis that there exists a positive relationship between years of experience managing a specific blend fund and total returns. Net total return decreased in 4 of 9 instances as the years of manager tenure decreased from the high-tenure group to the middle-tenure group, in 7 of 9 instances as tenure decreased from the middle-tenure group to the low-tenure group, and in 5 of 9 instances as tenure decreased from high to low. Overall, lesser mutual fund manager experience correlated with lower returns in 16 of 27 (59%) data sets.

The hypothesis of a relationship between portfolio performance and manager tenure was also addressed by regression analyses of net returns and manager tenure for each of the three categories and each of the three time intervals. The estimated slope coefficients were statistically different from zero in just 2 of 9 regressions (one direct and one indirect relationship).

There appears to be a restrained association between performance and tenure that is less robust than the relationships identified both with expense ratios and turnover ratios. However, the data reported by Morningstar are imperfect analytical instruments since a manager's performance record in managing a blend fund at another investment company is omitted and unavailable.

SUMMARY AND CONCLUSIONS

Operating expenses and fees charged by mutual funds are direct deductions against earned revenue and thus rupture net income by siphoning profits. But the relationship between costs and returns is imperfect. For example, some funds impose above-average costs but deliver above-average

returns. The research presented herein investigated whether such occurrences are abnormal aberrations or routine results. The research results impart potent testimony in support of the hypothesis of the efficiency of the equity markets.

Investors are more likely to profit (robust relative returns) by electing mutual funds charging low or restrained expense ratios that do not impose sales loads. Investors increase the probability of earning a lower rate of return by entrusting capital to higher-cost mutual funds. Lower expenses enable fund managers to be competitive in the investment performance derby without necessitating higher-risk strategies designed to overcome the performance deficit induced by the drag of transaction costs on net return.

Costs are a critical determinant of blend fund performance. During measurement periods of 3 years, 5 years, and 10 years, lower-cost funds tended to gravitate toward and be clustered among an Honor Roll of equity funds that have earned satisfactory long-term returns.

Expenses prominently influence the ultimate total return delivered by mutual funds. However, many investors are unaware that the compounded erosion of returns precipitated by the operating expenses of mutual funds (particularly higher-cost funds) exerts a profound impact on fund performance. This research study has reinforced the principle that lower-cost blend funds outperform their more expensive peers over the long-term.

Mutual fund prospectuses, websites and promotional materials exhibit expense ratio data both in percentage terms and dollar values. It has become more difficult to conceal or camouflage expenses.

The empirical evidence and statistical barometers presented herein strongly affirm the financial scripture that low expenses play a crucial role by partially inoculating a fund from poor performance. Lower costs confer an enduring competitive advantage on blend funds. When assembling a portfolio, investors should concentrate their search for blend funds among the lower-cost funds and expand this due diligence by identifying funds within this subset whose net return exceeds the category average net return by an amount greater than their net annual expenses advantage.

Since exceeding a broad market index is a zero-sum contest before the deduction of financial intermediation costs, and an inferior outcome after withdrawing these investment expenses from the gross return, blend fund investors increase the probability of attaining their objectives by assiduously selecting investments from among the subset of low-cost funds.

The level of expenses is the best predictor of blend fund performance; expenses explain the bulk of the difference in relative performance. Investors can reduce the probability of sub par portfolio performance (and expand the odds of an above-average net return) by committing capital to funds that can authenticate economical expenses on their financial report card. Most higher-cost blend funds are suboptimal candidates and should be expunged from the roster of recommended funds.

Concentrating financial capital among lower-costs funds is the antidote for the destruction of shareholder wealth that accompanies investment in funds that persistently extract high operating costs.

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CHANGES IN STUDENT MORAL REASONING LEVELS FROM EXPOSURE TO ETHICS INTERVENTIONS IN A BUSINESS SCHOOL CURRICULUM

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ABSTRACT: In the wake of corporate scandals, accounting frauds, and losses of billions of dollars in the early 2000s, the Sarbanes-Oxley Act of 2002 (SOX) was enacted to restore investor faith and confidence in the markets and to remediate the wrongdoing seemingly prevalent in corporate America. One of the educational impacts of SOX was a demand for increased and improved teaching of business ethics to students enrolled in collegiate business programs, and this paper assesses the impact of the greater emphasis placed on business ethics instruction. The current study measures moral reasoning scores of business students prior to any specific business ethics instruction and compares those scores to their moral reasoning scores near the conclusion of their educational programs, after several business ethics interventions. The research is conducted using the Defining Issues Test 2, using paired sample t-test statistics. Results show that student scores increased between pretest and posttest, that male students scored more poorly than female students on both the pretest and the posttest, and that male students showed greater improvement in moral reasoning scores from pretest to posttest than female students. The findings suggest that ethics instruction within business school curricula has a positive impact on the moral development of students within business programs.

Key Words: Business Ethics, Defining Issues Test, Sarbanes Oxley, Curriculum

INTRODUCTION AND BACKGROUND

There are typically three options for accomplishing specific instruction in business ethics. Business curricula may mandate a course external to the business school in ethics or business ethics specifically from a course within liberal arts departments, typically philosophy. Alternatively, business programs may offer a business ethics course as a stand-alone course within the business school. Finally, business ethics instruction may be infused throughout several courses within the business curriculum in lieu of a separate course. The method of instruction under study represents the infusion approach, where students receive an introduction to business ethics in a management fundamentals course and a multi-step approach to reasoning through business dilemmas. Business ethics is reinforced using the same approach to solving dilemmas subsequently in marketing, upper level management, and strategic management courses. In an effort to assess the

effectiveness of the infusion approach, the authors surveyed students (pretest) in the management fundamentals course prior to receiving any ethics instruction. The same students were surveyed several semesters later (posttest) at the conclusion of ethics interventions in the upper level management capstone course. Results of the pretest/posttests were then compared to determine the impact of ethics education.

The study of ethics often investigates individuals' reported thought processes or ways of analyzing ethical issues. Actions are in many ways more difficult to capture and analyze, and as such ethics research often encompasses psychological aspects and moral reasoning about issues with ethical content, as opposed to the study of actions taken. Moral reasoning has its roots in the cognitive moral development theories of Kohlberg (1969), who proposed a three level, six stage (two stages at each level) model. Level one, the pre-conventional level, assumes individuals are primarily concerned with rewards and punishment. This level of moral reasoning has been referred as Personal Interest. Individuals reasoning at level two, the conventional level, consider the consequences of behavior in relation to others, and to laws and other codes of conduct. This level of moral reasoning has been referred to as Maintaining Norms. Level three, the post-conventional level, is the highest level and universal truths become a primary focus, often referred to as Principled Moral Reasoning.

James Rest (1986) proposed a four-component model of cognitive moral decision making that includes cognitive moral development as one component of the overall decision making model. Stage one, moral sensitivity, involves recognizing the ethical component of an issue and determining alternative courses of action. Stage two, moral judgment, relates to cognitive moral development and is the stage where alternatives are weighed against an individual's sense of morality and the most appropriate course of action is identified. The next stage, moral motivation (intent), involves placing moral judgments about the appropriate action above other considerations such as practical expediency and requires an individual to assume personal responsibility for outcomes. The final stage, moral character, requires an individual to carry out his or her moral intent despite obstacles and fatigue that may otherwise prevent the ethical action from being implemented (Rest, et al., 1999a). The stages would seem to logically move in a somewhat sequential fashion, although Rest theorizes that the components of the decision making model interact in a complex reciprocal manner. Notably, several models used in general business ethics research incorporate the four-component model (e.g., Jones and Ryan, 1997; Jones, 1991; Ferrel et al., 1989).

Rest (1979) also developed a survey instrument for assessing individual moral reasoning levels. The resultant Defining Issues Test (DIT) was a practical improvement over prior interview-based methods of discerning levels of moral reasoning. The DIT and its updated version, the DIT2, present a series of moral dilemmas with detailed instructions regarding making an action choice. Participants are also required to rank a list of statements as to the level of importance of each statement's main idea to the participant in judging the situation and choosing an action. Answers provided are used to determine level of cognitive moral development, or moral reasoning.

The current study is grounded in Rest's four component model of cognitive moral decision making and looks at the second component, moral judgment. Moral judgment relates to Kohlberg's work on cognitive moral development and the three levels and six stages described briefly above. The DIT-2 is an instrument used to measure level of cognitive moral development as described by Kohlberg, and is the instrument used to capture students' levels of moral development and any changes therein as a result of ethics instruction at the collegiate level.

METHODOLOGY

The sample: Students within the business school of a medium-sized public college were asked to participate in an ethics assessment using the DIT-2. Willing participants took the DIT-2 in the introductory level management course and then took it again in the capstone course of the business program. The total sample consists of 130 matched surveys. Students were mainly business majors (115), with a few accounting majors in the sample (15). The sample was split at very nearly two-thirds male and one-third female respondents, with 87 males and 43 females participating. Average age of the students was 20 for the pretest and 22 for the posttest.

Students were offered the opportunity to participate and participation was voluntary. It was explained that anonymity was not guaranteed, as names were necessary for the initial pairing of posttest with the pretest. However, upon pairing, students were assigned a number and then names were removed. Demographic information related to age, gender, major, and level of completion of the degree were gathered, but upon assignment of a number to each student, anonymity was maintained as the research progressed with the removal of students' names from the completed surveys.

The instrument, the DIT-2: For both iterations of the survey, the students were presented with five moral dilemmas (referred to as "stories") along with a detailed set of instructions. After reading a given scenario, subjects were asked to select an action choice. At the conclusion of each story was a list of twelve issues/questions that seek to gather information about which items were of highest importance in coming to an action choice for the scenario. Respondents rated (on a 1-5 scale) the importance of each issue to the story. Participants then ranked (in terms of importance) the top four issues. Scores are provided by level, or schema (i.e., Personal Interest, Maintaining Norms and Principled) and are based on the participants' ranking of the issues. Each level score represents the relationship between the actual score for each level to the total possible score. The P-score (principled score), which historically has been the most widely reported index in ethics research using the DIT, represents a quantitative measure of relative weight given to Principled moral reasoning. Thus, the higher the P-score, the greater the use of higher level of moral reasoning. The higher the incidence of principled reasoning when assessing the scenarios, the better the cognitive moral development of the individual. The scoring procedure also provides a test for social desirability bias. Subjects with an "M" (meaningless) score equal to or

greater than eight are eliminated from the sample (Rest, 1993). The DIT has been used to investigate the impact of educational interventions. Most recently Christensen, et al.'s (2016) meta-analysis reviews 43 studies that consider the effect size of several factors using the Defining Interest Test. The primary focus of the analysis relates to accounting students and accounting professionals. However, of particular interest is the impact of embedded ethics instruction where the authors found a statistically significant positive relationship with P-scores. Additionally, in the school at which the research was conducted, business majors and accounting majors take all of the same business core, and as such received the same ethics interventions.

The DIT-2 used in this study represents an updated version of the DIT. Rest et al. (1999b) introduced the new instrument, citing several improvements including the elimination of outdated dilemmas, reduction of the number of scenarios under consideration, and improved reliability checks. Improved validity is primarily due to the new N2 index (Rest, et al., 1997) and the reliability checks. Like Rest et al. (1999b), Bebeau and Thoma (2003) found a strong correlation ($r=.79$) between the two versions of the instrument.

The new N2 index uses both ranking and rating data. One component of the index is nearly identical to the P-score and the other component is based on the difference between average ratings given to lower stage (Personal Interest) items and the higher stage (Principled) items. The composite N2 is the sum of the P-score and the weighted rating data. Rest, et al.'s (1997) meta-analysis compares the effect size of the P index and the N2 index and shows that the N2 index generally outperforms the P index based on typical validity criteria. Rest et al. (1999a) cite over 400 published articles in assessing the validity of the DIT. Adequate reliability using Cronbach's alpha was found to be in the upper .70s for the P index and low .80s for the new N2 index (p. 92). Thoma and Dong (2014) provide a comprehensive summary of the evidence supporting the validity and reliability of the DIT, and address a number of questions related to the instrument.

Data Collection and Analysis: For all 130 surveys, scores were calculated for each stage (Personal Interest, Maintaining Norms, Principled Reasoning) along with the overall N2 score. Matched pre-and post-test scores were analyzed using paired samples T-tests at every level of moral reasoning. Students were not broken down by major due to the low number of accounting majors in the sample; however, the data were analyzed by gender to evaluate differences in results between male and female students.

RESULTS

A total of 130 usable matched surveys provide the following results of the study. Basic statistical information is provided in the three panels of Table 1.

Table 1a: Mean Responses for full sample by category for pretest and posttest

Category: (N=130)	Pretest Mean	Posttest Mean
Pre-conventional Level (Personal Interest Category)	30.1	27.2
Conventional Level (Maintaining Norms Category)	34.4	34.9
Post-conventional Level (Principled Reasoning Category)	29.0	31.7
N2 (Overall composite score)	27.6	32.1

Table 1b: Mean Responses by category for pretest and posttest – Males

Category: (N=87)	Pretest Mean	Posttest Mean
Pre-conventional Level (Personal Interest Category)	32.3	29.6
Conventional Level (Maintaining Norms Category)	34.4	35.2
Post-conventional Level (Principled Reasoning Category)	25.8	28.7
N2 (Overall composite score)	23.9	28.5

Table 1c: Mean Responses by category for pretest and posttest – Females

Category: (N=43)	Pretest Mean	Posttest Mean
Pre-conventional Level (Personal Interest Category)	25.8	22.3
Conventional Level (Maintaining Norms Category)	34.6	34.2
Post-conventional Level (Principled Reasoning Category)	35.5	37.8
N2 (Overall composite score)	35.0	39.2

The initial comparison looked at the difference in mean scores from pretest to posttest for the entire sample taken as a whole. Mean scores, along with pretest-posttest differences, t-value, and significance level, are provided in Table 2.

Table 2: T-test of Difference in Means from Pretest to Posttest (N=130)

Category:	Pretest	Posttest	Difference	t-value	Signif.
Personal Interest	30.1	27.2	(2.9)	2.487	.014*
Maintain Norms	34.4	34.9	0.5	0.329	.743
Principled Reasoning	29.0	31.7	2.7	2.211	.029*
N2 Score	27.6	32.1	4.5	3.514	.001*

All differences from pretest to posttest were in the anticipated direction. With greater exposure to ethical interventions that teach higher order ethical reasoning, one would expect a drop in responses that indicate a pre-conventional level of cognitive moral development (the Personal Interest category). The difference in mean score of -2.9 is significant at the .05 level. While there is no statistical difference in mean score for the Maintaining Norms category of conventional cognitive moral development, the difference indicates a move in the right direction of greater conventional thinking. It is noteworthy that the increase in mean score of 2.7 for the post-conventional level, or level of principled moral reasoning, is also significant at the .05 level. In other words, while the score at the conventional level for the sample was virtually unchanged, respondents showed a much lower amount of pre-conventional moral reasoning and a correspondingly higher amount of post-conventional, principled moral reasoning. It is likely that the gains were made from respondents initially scoring at the pre-conventional level increasing to the conventional level, and that simultaneously respondents scoring initially with responses at the conventional level improved on the posttest to more responses at the post-conventional level. The difference in N2 score from pretest to posttest is a composite of all levels of moral reasoning. As such, a decrease in answers at the Personal Interest level coupled with an increase in answers at the Principled Reasoning level in the current study led to the significant mean change in N2 score at the .001 level of significance. Analyzing results by gender revealed interesting differences in levels of cognitive moral development between the male and female respondents. Table 3 displays the results.

Table 3: T-test of Difference in Means by Gender (87 Males, 43 Females)

Category:	Male	Female	t – value	Significance
Personal Interest pretest	32.3	25.8	2.929	.005*
Personal Interest posttest	29.6	22.3	3.675	.000*
Maintain Norms pretest	34.4	34.6	0.091	.928
Maintain Norms posttest	35.2	34.2	0.393	.695
Principled Reasoning pretest	25.8	35.5	3.764	.000*
Principled Reasoning posttest	28.7	37.8	3.377	.001*
N2 Score pretest	23.9	35.0	4.275	.000*
N2 Score posttest	28.5	39.2	4.184	.000*

For every level on both the pretest and posttest, with the exception of the Maintaining Norms category, females' scores were more favorable than males' scores. The female respondents had significantly lower mean responses at the pre-conventional level of Personal Interest on both pretest and posttest. They also had significantly higher Principled Reasoning responses at both the pretest and posttest, leading to the higher N2 scores for females on both survey iterations. These findings are consistent with reported results from other studies that females score higher on the DIT than males (Bebeau, 2002; King & Mayhew, 2002; Christensen, et al., 2016).

We also investigated the difference in change from pretest to posttest between males and females to see if there were any observable difference in impact of ethics discussion and training on male versus female students. The results are reported in Table 4.

Table 4: T-test of Difference in Means from Pretest to Posttest by Gender

Category (N=87 Males, 43 Females)	Pretest Mean	Posttest Mean	Difference	Signif.
Personal Interest – Males	32.3	29.6	(2.7)	.064
Personal Interest – Females	25.8	22.3	(3.5)	.111
Maintain Norms – Males	34.4	35.2	0.8	.579
Maintain Norms – Females	34.6	34.2	(0.4)	.860
Principled Reasoning – Males	25.8	28.7	2.9	.044*
Principled Reasoning – Females	35.5	37.8	2.3	.334
N2 – Males	23.9	28.5	4.6	.004*
N2 – Females	35.0	39.2	4.2	.065

When the difference in score from pretest to posttest are examined by gender, only the male subsample produced differences that were significant at the .05 level of confidence. However, if the confidence level is relaxed to the .10 level, three of the four categories for males show significant differences from pretest to posttest, and the N2 score for females would also be significantly different from pretest to posttest. Nevertheless, it is clear from the data that male respondents had larger changes in scores than female respondents.

DISCUSSION

For the entire sample, Principled Reasoning and N2 scores increased, while Personal Interest scores decreased, between the pretest and the posttest. This result provides positive confirmation of the benefit of ethics training throughout the business curriculum. In a two year period, mean scores at the pre-conventional level decreased almost 3 points, mean scores of the post-conventional level increased 2.7 points, and overall N2 scores increased by 4.5 points. Studies have

demonstrated that scores on the DIT increase with age and also as a result of education (Mayhew & King, 2008; King & Mayhew, 2002). Specifically, Mayhew & King (2008) found that N2 scores increased by 4 points in a pretest/posttest design as a result of ethics interventions. Our results are similar, with an overall sample increase of 4.5 points from pretest to posttest after ethics interventions throughout the curriculum. While the increase in the female respondents' N2 scores was 4.2 points, the male respondents' mean N2 scores increased by 4.6 points.

When looking at the scores of male and female respondents, the current study is consistent with many others that females typically score higher on post-conventional (principled) reasoning than males. For all categories excepting Maintaining Norms, for both pretest and posttest responses, female mean scores were significantly different from male scores. Females demonstrate lower levels of pre-conventional moral reasoning, similar levels of conventional moral reasoning, and higher levels of post-conventional moral reasoning. Significant differences remain after administration of the posttest, indicating that males do not tend to "catch up" with females as a result of ethics instruction. This finding would indicate that more needs to be done to increase the level of principled moral reasoning in males than ethics interventions in business curricula. Surveys of corporate fraud indicate that men are more often the perpetrators of frauds and other corporate abuses (Weiss, 2009). That can partially be explained by the larger presence of men vs. women in upper levels of corporate management, but the findings of this study suggest that moral development levels may also have a part in explaining fraud survey results.

Worthy of note is that changes in mean principled reasoning scores (post-conventional level moral reasoning) and mean N2 scores for male respondents were significant. The numerical change was greater for men than women: the male subsample increased by 2.9 and 4.6 points on the Principled score and N2 score respectively, compared to an increase of 2.3 and 4.2 respectively for the female subsample. The finding that men increased levels of moral reasoning from pretest to posttest is encouraging because even though male mean scores remain significantly lower than female scores at the posttest, men appear to demonstrate greater increases in principled reasoning and N2 scores. Ethics interventions may not be bringing male responses up to the level of female responses, but it may be the case that ethics training throughout a business curriculum has a larger impact on men than women. In other words, though the men did not catch up to the women, it appears that they made greater strides in moral reasoning as a result of ethics interventions. It can certainly be suggested that more ethics training is needed, but the current study provides encouraging evidence that ethics training has a positive impact on students' moral reasoning levels and abilities.

Limitations: The study is limited in its ability to separate increases due to age and college education in general from the impact of ethics interventions. The increases after ethics instruction are similar to increases found by other researchers employing a similar study design and using ethics interventions, providing confirmatory evidence. Additionally, to the extent that the individuals

participating are not representative of students enrolled in business programs at four-year institutions, the results are potentially of low generalizability. We have no specific reasons to conclude that the students surveyed are not representative of other business students. Once again, the similarity in results from earlier studies (Mayhew & King, 2008) provides confidence of the applicability and generalizability of the findings.

CONCLUSION

The current study serves as confirmatory evidence of previous studies using the DIT-2. It also advances the field of business ethics training by suggesting that while men remain at lower levels of higher order (principled) moral reasoning than females after ethics instruction, men benefit more greatly from that ethics instruction, as demonstrated by significant differences in mean scores from pretest to posttest for men but not for women. While more needs to be done to further the ethical development of business students and effect changes in behavior of business professionals, the current study suggests that ethics instruction as part of a business curriculum serves to increase moral reasoning levels in business students.

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A TEACHING CASE ON THE BENEFITS AND COSTS OF RESTAURANTS USING *OPENTABLE* ONLINE RESTAURANT RESERVATIONS

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ABSTRACT: This teaching case puts students in the position of Jim Riddle, controller of Classy Cuisine Fine Dining, who is given the assignment to investigate whether or not it should employ an online restaurant reservation service and to make a recommendation to the general manager, who is not an accountant, and the CFO. The case requires students to identify and compare the financial and nonfinancial benefits and costs of using one of the three online reservation options provided by the current world-wide market leader, OpenTable, and a custom plan offered to the restaurant. The three standard OpenTable reservation systems --- *Electronic Reservation Book* (Plan A), *Connect* (Plan B), and *Guest Center* (Plan C) --- have different fixed and variable fee structures, as does the custom plan (Plan D). Plan A is OpenTable's original PC-based reservation system, Plan B is a newer web-based reservation system with less "bells and whistles" than Plan A, and Plan C is a cloud-based reservation system that is the most recent addition to OpenTable's service lineup. In terms of the financial costs and benefits, students should consider cost-volume-profit models including breakeven analysis. In addition, students are required to identify nonfinancial factors such as strategic factors, nonfinancial quantitative factors, and qualitative factors. There is a considerable amount of online material available that should help students identify some real-world nonfinancial factors.

Key Words: Teaching case, cost-volume-profit analysis, financial and nonfinancial factors.

INTRODUCTION

Jim Riddle stared at the report he had just printed out. It showed that sales for his employer, Classy Cuisine Fine Dining, had been flat for the last five months. Jim had just left a meeting with Classy Cuisine's general manager (GM) and CFO. They had expressed concern about the restaurant's lack of sales growth and its future prospects. Classy Cuisine had only been open for 18 months and performance was well below the expectations of Classy Cuisine's investors. Weekend business has been strong but Sunday through Thursday sales were weak.

Classy Cuisine is a stand-alone, medium-size, and fine dining restaurant operating in a beach community with a population of about 22,000. However, the community

is adjacent to a city with a population of over 800,000 people. Currently, a dinner at Classy Cuisine is likely to fall in the \$26 to \$58 range. Reservations are noted in a paper reservation book. Classy Cuisine endeavors to provide first-class service and has a recurring clientele.

At the meeting, Jim, as controller, had been tasked with analyzing a reservation system, OpenTable that the GM was considering adopting as way of energizing sales. Jim was already familiar with OpenTable: he had been using it for a few months to make restaurant reservations for himself. He had found it very user friendly and helpful; a wonderful free service that simplified making reservations at a wide variety of restaurants in his area and beyond. He had even used it for making dinner reservations in another city when he traveled there for a conference. He was a satisfied user and agreed with the GM's belief that OpenTable could be a useful tool for Classy Cuisine to improve its sales outlook.

An OpenTable representative had already submitted a proposal to Classy Cuisine, outlining the benefits of the service and presenting four choices for the way OpenTable could be implemented. Jim was to report back to the GM and CFO with his recommendation for whether OpenTable should be adopted, and if so, which of the four plans the restaurant should choose.

OPEN TABLE

OpenTable was born in 1998 because its founder, Chuck Templeton, identified a need to be filled when he observed his wife finding it difficult to make a dinner booking over the phone. Similarly, the idea for Disneyland was born when Walt Disney observed the lack of an amusement park where parents and children could experience attractions together and in a clean environment. OpenTable became a public company in 2009 and The Priceline Group acquired the company in July 2014.

OpenTable is the current world-wide leader in online restaurant reservations, operating in Australia, Canada, China, Germany, Ireland, Japan, Mexico, the U.K., the U.S., and elsewhere. OpenTable users can make reservations through the company's dedicated website, its mobile app, or through a partner site such as Zagat or Facebook. Although OpenTable has some 600 partners, only five to ten percent of the reservations are made through their sites.

Restaurants pay OpenTable for participating in its services. The different payment plans offered to restaurants are explained below in the next section.

Besides offering a convenient way of making reservations, OpenTable also has a "point" system for rewarding frequent diners. When a reservation is actually used, the member receives 100 points that accumulate in his or her account. When OpenTable members have accumulated dining points to a minimum level, they can

redeem their points for dining rewards that can be used at any participating OpenTable restaurant. Some restaurants sign up for 1,000-point offers to attract diners at off-peak times. Those restaurants pay OpenTable extra per diner for this.

It is not known to the general public that OpenTable offers more than just online reservations. The company also provides reservation management services to its client restaurants. These services, such as serving as a backend for a restaurant's own reservation system and providing historical reservation data, can be very valuable to the restaurants. A discussion on how OpenTable assists restaurants to implement "best practices" is outlined in the Appendix.

FOUR PLANS

To begin work on his report, Jim reviewed the information provided by OpenTable's representative. For simplicity, the four plans are described as Plan A, Plan B, Plan C, and Plan D. (The standard plans A, B, and C have other, more descriptive names in the OpenTable system.)

Plan A

This is OpenTable's original PC-based reservation system that replaces paper reservation books with its Electronic Reservation Book computer terminal. It is designed for reservation-intensive restaurants. The plan's cost structure is as follows:

- **Fixed costs** of at least \$199 subscription fee per month for software, some upgrades, and other benefits---the most popular bundle is \$249, *plus* a one-time installation fee ranging from \$200 to \$700 on average. Restaurants can also opt to pay OpenTable \$99 per month for "Promotional listings" for booking of private rooms and identifying event venues.
- **Variable costs** per seated diner of:
 - \$1.00 when booked using OpenTable's Internet site or its mobile app;
 - \$0.25 when booked using the restaurant's Internet site using software provided by OpenTable;
 - \$7.50 for off-peak days and times selected by restaurants that opt to participate in the "1,000-point program." The member receives 1,000 dining points (\$10 value) from OpenTable that incentivizes them to book at typically low occupancy times for the restaurant. At other dining times, members usually earn 100 dining points.

Plan B

This is an entirely web-based reservation system with fewer features than Plan A. It is designed for restaurants with mainly walk-in diners but some reservations and is geared for smaller restaurants; they are charged lower fixed fees but higher variable fees, as follows:

- **Fixed costs** of \$50 per month for using OpenTable's Electronic Reservation Book system;¹
- **Variable costs** per seated diner of \$2.50 when booked using OpenTable's Internet site and the same \$0.25 fee as Plan A when booked using the restaurant's Internet site using software provided by OpenTable.

Plan C

This is a cloud-based reservation system that is the newest addition to OpenTable's service lineup and is designed to serve as a next-generation replacement product for Plan A. The plan's cost structure is as follows:

- **Fixed costs** of at least \$249 subscription fee per month;
- **Variable costs** per seated diner of:
 - \$1.00 when booked using OpenTable's Internet site or its mobile app;
 - \$0.25 when booked using the restaurant's Internet site using software provided by OpenTable;²
 - \$7.50 for 1,000 point reservations.

Plan D

This is a low-cost custom plan designed for Classy Cuisine. For this plan, Classy Cuisine would access customer reservations through OpenTable using an iPad. The reservations would be transferred by hand to the restaurant's paper reservation book. Customer 'no-shows' would be notified promptly to OpenTable. At the end of each month, Classy Cuisine would use a debit card to pay OpenTable \$2.00 for each diner seated during the month who had booked using OpenTable. Classy Cuisine would not be charged a monthly subscription fee.

CASE QUESTIONS

As Jim Riddle, Classy Cuisine's controller, you have decided to perform the breakeven calculations presented in Questions 1 through 4 in preparation for making your recommendation to the GM and CFO. Also, you are identifying other cost-volume profit (CVP) calculations (Question 5) and nonfinancial factors (Question 6) that are pertinent to the OpenTable reservation system decision. Finally, you prepare the memo presenting your recommendation to Classy Cuisine's GM and CFO (Question 7).

1. Calculate the expected breakeven point in terms of number of diners and sales dollars if the restaurant adopts Plan A. Assume that the restaurant is likely to select the lowest cost Plan A option with a fixed cost of \$199 per month. For the purpose of these calculations, ignore the initial installation

fee that can range from \$200 to \$700 on average but this fee can be included in the discussion supporting your recommendation in addressing questions 5 and 7. As regards the restaurant's variable costs, assume that the expected sales mix is:

- 50 percent of OpenTable reservations (estimated to be 16 additional diners on average each month – 32 total diners x 50%) use OpenTable's Internet site or its mobile app with a restaurant charge of \$1.00 per seated diner;
- 25 percent of OpenTable reservations (estimated to be eight additional diners on average each month) use the restaurant's Internet site using software provided by OpenTable with a restaurant fee of \$0.25 per seated diner; and
- 25 percent of OpenTable reservations (estimated to be eight additional diners on average each month) are made for off-peak times under the "1,000-point program" with a restaurant charge of \$7.50 per seated diner.
- Also, assume that the restaurant has the following average sales check, variable cost percentage, and contribution margin per diner:

Average Check Per Diner ³	\$42.50
Variable Cost ⁴	35%
Contribution Margin Per Diner ⁵	\$28.00

2. Calculate the expected breakeven point in terms of number of diners and sales dollars if the restaurant adopts the less sophisticated Plan B at a fixed cost of \$50 per month. As regards the restaurant's variable costs, assume that the expected sales mix is:

- 50 percent of OpenTable reservations (estimated to be six additional diners on average each month – 12 total diners x 50%) use OpenTable's Internet site or its mobile app with a restaurant charge of \$2.50 per seated diner;
 - 50 percent of OpenTable reservations (estimated to be six additional diners on average each month) use the restaurant's Internet site using software provided by OpenTable with a restaurant fee of \$0.25 per seated diner.
 - Assume that the restaurant has the average check per diner, variable cost percentage, and contribution margin per diner as shown in Question 1.
-

3. Calculate the expected breakeven point in terms of number of diners and sales dollars if the restaurant adopts Plan C. Assume that the restaurant is likely to select the lowest cost Plan C options with a fixed cost of \$249 per month. For the purpose of the case calculations, ignore any initial installation fee that is assumed to be the same as for Plan A and range from \$200 to \$700 on average but this fee can included in the discussion supporting your recommended plan. As regards the restaurant's variable costs, it is assumed that they are the same as for Plan A as is the expected sales mix (but the *number* of additional diners is assumed to be different) as follows:
- 50 percent of OpenTable reservations (estimated to be 20 additional diners on average each month – 40 total diners x 50%) use OpenTable's Internet site or its mobile app with a restaurant charge of \$1.00 per seated diner;
 - 25 percent of OpenTable reservations (estimated to be 10 additional diners on average each month) use the restaurant's Internet site using software provided by OpenTable with a restaurant fee of \$0.25 per seated diner; and
 - 25 percent of OpenTable reservations (estimated to be 10 additional diners on average each month) are made for off-peak times under the "1,000-point program" with a restaurant charge of \$7.50 per seated diner.
 - Assume that the restaurant has the average check per diner, variable cost percentage, and contribution margin per diner as shown in Question 1.
-
4. Calculate the expected breakeven point in terms of number of diners and sales dollars if the restaurant adopts the customized Plan D with no fixed fee and a variable cost of \$2.00 for each diner seated during the month who makes a reservation using OpenTable. It is estimated that there will be eight additional diners per month from using the OpenTable online reservation system. Assume that the restaurant has the average check per diner, variable cost percentage, and contribution margin per diner as shown in Question 1.
5. Perform any other CVP calculations that you consider to be useful in deciding which, if any, OpenTable reservation plan to recommend. Also, incorporate the CVP calculations you prepared in addressing questions 1 through 5 and any other relevant financial considerations in a discussion that compares and contrasts the four OpenTable options. Again, assume

that the restaurant has the average check per diner, variable cost percentage, and contribution margin per diner as shown in Question 1.

6. Discuss strategic, nonfinancial quantitative, and qualitative factors that you would consider in deciding which, if any, OpenTable reservation plan to recommend.
7. Based on your analysis addressing case questions 1 through 6 above, draft a memo in good form to the GM and CFO making your recommendation of which, if any, OpenTable reservation plan to recommend with specific supporting justification. The GM is a non-accountant and does not understand technical accounting terminology.

APPENDIX: OPENTABLE AND RESTAURANT “BEST PRACTICES” ⁶

Miller (2011) identified the following two basic services provided by OpenTable:

1. sell restaurant tools to manage reservations, and
2. operates an online reservation service, both on its site and through partner sites.

These services help affiliated restaurants implement some recommended “best practices.”

For example, Laub (2010) identifies “10 common practices of highly successful restaurants” that includes: “2. Successful independents... revolve their marketing around a database.” OpenTable provides participating restaurants with an extensive database of potential patrons who use its services to search for restaurants “by location, price, cuisine and available times” and it stores the dining history and other useful marketing information for individual participating restaurant about its patrons (Miller 2011).

Technologically savvy Generation X, Millennial generation, and current Generation Z expect easy and smooth access to restaurant services using their mobile devices. For example, HT (2016) stated:

Today’s diner wants and expects more from a restaurant’s website. From mobile capabilities to a digitally driven online ordering system, customers want to connect without calling and know without asking. Is your restaurant evolving with the new technology that is available?

HT (2016) also listed the following six “best practices from Netwaiter”: 1. Create a static page for your menu. 2. Blog about it. 3. Make it easy to order online, 4.

Offer online reservations. 5. Let photos say what you can't. 6. Have a mobile-friendly website.

Restaurants can use OpenTable to offer user-friendly online reservations ("best practice" 4 above). In respect of "best practice" 6 above, many millions of diners have made restaurant reservations using OpenTable's mobile apps (Miller 2011). It was reported that 51 percent of OpenTable diners make reservations using its mobile apps (OpenTable 2016a). OpenTable's Internet site also states that it offers *OpenTable for iOS* and *OpenTable for Android*.

The company faces increasing competition from Eveve (Steinberg 2014), Groupon, and others (Miller 2011) and needs to keep at the forefront of "best practices." The latest offering, *Guest Center* (Plan C in the case), is at the cutting edge of online restaurant reservation systems as it is cloud-based. Guest Center is replacing the original PC-based reservation system, *Electronic Reservation Book* (Plan A in the case). OpenTable offers restaurants standard plans and will negotiate plan options with different costs and benefits for restaurants as reflected by the four plans presented above in the case. It is interesting to note that OpenTable modified *Connect* (Plan B) to exclude the \$50 monthly fee (OpenTable 2016b), presumably to make it more competitive. *Connect* is now similar to customized Plan D but with a variable cost of \$2.50 per seated diner when the reservation is made using OpenTable's Internet site or its mobile app, it is 50 cents per seated diner more expensive than Plan D. Restaurants can select or negotiate plans that use OpenTable's resources in cost-beneficial ways for the restaurant. Of course, restaurant management may choose not to use OpenTable or any of its competitors based on cost-benefit considerations.

NOTES

Faculty interested in using this case can send a request for a copy of the teaching notes to the following e-mail address: jmacarth@unf.edu.

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¹ More recently, Plan B (*Connect*) has been modified to exclude a monthly fee. Source: <https://restaurant.opentable.com/products/>.

² In the absence of publicly available information, the \$0.25 variable cost per seated diner when booked using the restaurant's Internet site using software provided by OpenTable is assumed to be the same as for Plan A.

³ 2011 OpenTable Restaurant Survey.

(Source: [http://files.shareholder.com/downloads/ABEA-2TKK09/0x0x750629/09e2ff42-91ea-4b5f-845e-350faecc8fd0/OpenTable%20Corporate%20Presentation%20\(Q1%202014\)%20FINAL.pdf](http://files.shareholder.com/downloads/ABEA-2TKK09/0x0x750629/09e2ff42-91ea-4b5f-845e-350faecc8fd0/OpenTable%20Corporate%20Presentation%20(Q1%202014)%20FINAL.pdf), page 13.)

⁴ National Restaurant Association and Deloitte & Touche, “Restaurant Industry Operations Report: 2010 Edition.”

(Source: [http://files.shareholder.com/downloads/ABEA-2TKK09/0x0x750629/09e2ff42-91ea-4b5f-845e-350faecc8fd0/OpenTable%20Corporate%20Presentation%20\(Q1%202014\)%20FINAL.pdf](http://files.shareholder.com/downloads/ABEA-2TKK09/0x0x750629/09e2ff42-91ea-4b5f-845e-350faecc8fd0/OpenTable%20Corporate%20Presentation%20(Q1%202014)%20FINAL.pdf), page 13.

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⁶ The Appendix and its references can be omitted from the case material made available to students if faculty adopting the teaching case decide that it discloses too much additional information that students should find on their own in researching for their case analysis.

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GOING CONCERN: DECISION USEFULNESS OR HARBINGER OF DOOM?

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ABSTRACT: Financial statement readers consider financial statement note disclosures as an affirmation of the entity's sustainability. The financial statement reader is uncomfortable when a going concern disclosure is included in the auditor's opinion. This study investigates prior studies' going concern findings reported in the literature. Prior study findings are used to identify the advantages, disadvantages, and impact of annual financial report going concern disclosures. Of particular concern is the accuracy and usefulness of the disclosures on the firm's future performance. Also investigated is the going concern reporting guidance issued by U.S. standard setters including the FASB, GASB, and PCAOB. This guidance together with advantages and disadvantages for management, auditors, investors and analysts are discussed.

Keywords: Going Concern, note disclosure, audit opinion, bankruptcy

BACKGROUND

The Public Company Accounting Oversight Board's (PCAOB) (2002) *AU Section 341* addresses auditors' duties regarding the going concern assumption used in auditing publicly traded firms. Based on American Institute of Certified Public Accountants (AICPA) standards that became effective January 1989, going concern disclosures are included in U.S. law by the Private Securities Litigation Reform Act of 1995. Normally firms are presumed to be able to carry on functioning as a going concern until it is proven otherwise (PCAOB, 2002; Geiger & Rama, 2006). An entity is not presumed to be a going concern, only if it will have trouble paying its debts "without substantial disposition of assets outside the ordinary course of business, restructuring of debt, externally forced revisions of its operations, or similar actions" (PCAOB, 2002, para 01.). When considering "whether there is substantial doubt about the entity's ability to continue as a going concern for a reasonable period of time," the "reasonable period of time" is a maximum of one year from the statements' date (PCAOB, 2002, para. .02). In sum, the PCAOB (2002) and AICPA require auditors to look into a company's chances of surviving for at most a year.

AU Section 341 spells out the process of evaluating a company as a going concern. An auditor begins the consideration of going concern appropriateness based on evidence accumulated in the normal course of the audit. Sometimes more evidence is needed. For the identification of troubling circumstances, however, the PCAOB (2002) guidance is based upon the audit process being sufficient to determine potential problem areas. If the evidence suggests the company will have trouble in the near future, the auditor considers plans by management to counteract the problems and determine the probability that those plans can be executed. If this indicates there is substantial doubt as to whether the company can continue operating for a year, the auditor must write a paragraph after the opinion paragraph stating as much. The PCAOB (2002) explicitly states that an auditor's not writing such a paragraph is no guarantee that the company will continue to function for another year (PCAOB, 2002). Going concern evaluations are careful but not expected to be infallible.

There are other considerations an auditor must make in evaluating and reporting on the going concern assumption. In cases where prospective information is important to management's intentions, the auditor must evaluate the assumptions upon which that information is based. Auditors should compare earlier prospective data with what really occurred and "prospective information for the current period with results achieved to date" (PCAOB, 2002). If the prospective information does not take into account all relevant conditions, the auditor should ask management to change it. If management's plans convince the auditor there is not a problem with the entity's going concern assumption, he or she might still disclose "the principal conditions and events" that caused the alarm (PCAOB, 2002, paras. .09, .11). If the financial report disclosure does not sufficiently explain the problems with the going concern assumption, the auditor might issue a qualified or adverse opinion. When the auditor expresses doubt about a company's being a going concern in an earlier report, the subsequent reports do not include the disclosure in the comparative financial statements if the company is no longer at risk (PCAOB, 2002). Auditors are expected to treat going concern disclosures very seriously but not to be unfair to the company.

GOING CONCERN DISCLOSURE ADVANTAGE

Going concern disclosures have great informative value for investors and analysts. A majority of annual financial reports receive an unqualified audit confirmation in the U.S., so going concern disclosures are important in distinguishing healthy companies from unhealthy ones. In a mass of unqualified audit reports, the going concern disclosure might be the sole part of the report to affect the value of a company and its cost of capital. Carcello and Neal (2003) find companies usually do not succeed when they attempt to go opinion shopping to escape a going concern disclosure. Most importantly, investors can benefit from

an auditor's warnings about a company's viability, particularly in times of economic trouble (Chen et al., 2013; Carcello & Neal, 2003, p. 113; PCAOB Standing Advisory Group, 2009, p. 1-2). Going concern disclosures have the potential to be decision useful for investors and analysts.

GOING CONCERN DISCLOSURE DISADVANTAGE

Going concern disclosures affect comparability between firms in different countries, though the Big 4 audit firms do provide a degree of consistency among countries (Sormunen, Jeppesen, Sundgren, & Svanström, 2013). Another comparability issue arises between large accounting firms and other auditors. Big 4 firms issue fewer going concern disclosures to companies that actually survive and have fewer companies filing for bankruptcy protection without a going concern disclosure than smaller firms. The difference between national firms and local firms in this respect is not significant. Big 4 firms possibly perform better because they put more time and money into preparing their auditors and equipping them with technology (Geiger & Rama, 2006). The difference in error rates makes it harder to compare Big-4 audited firms with non-Big 4-audited firms.

Carcello and Neal (2003) indicate a deficiency of independence in audit committees affects going concern disclosure rates. When more audit committee members are affiliated, have higher ownership interests in the company, or have less governance knowledge and experience, they are less able to counter management's desire to replace an auditor who issues a going concern disclosure. Carcello and Neal (2003) also find in firms that received a going concern disclosure and then replaced their auditor, "49% of the audit committee [were] affiliated directors, whereas for going concern clients that did not dismiss their auditor, only 24 percent of the audit committee are affiliated directors" (96-97, 103). The average number of directorships held outside of the firm in question was 0.84 for firms that replaced their auditors, but the average for those retaining their audit firm was 1.83. The average stock ownership for firms that replaced their auditors was 9% while only 3% for those that did not replace them (Carcello & Neal, 2003, 103). These independent audit committees can translate into fewer auditor dismissals.

The threats of auditor replacement can have bad consequences. The action could discourage auditors from making a going concern disclosure, or result in additional costs should the firm elect to switch audit firm. Management could switch auditors to get a more favorable opinion, to retaliate against the auditor for the going concern disclosure, or to find an auditor with whom to start a new relationship after the old one becomes difficult. Carcello and Neal (2003) look at firms before Sarbanes-Oxley and report new stock-exchange rules result in fewer affiliated directors serving on audit committees. The rules did not completely

eliminate the potential for affiliated directors serving on audit committees; however, audit committee problems seem to get worse as time passed (Carcello & Neal, 2003). Dependent audit committees still make going concern disclosures less likely.

Researchers find factors that lessen the risk of auditor dismissal after a going concern disclosure. Large firms do not switch auditors as much, probably because of the leverage they enjoy from larger fees to the auditors or because they do not want to attract negative press from analysts and the media, who give them more attention than smaller firms. If the auditor has specialized in a company's industry, the company has a lower probability of dismissing him or her (Williams, 1988). The longer an auditor works with a client, the less likely the client is to replace the auditor (Carcello & Neal, 2003). These factors mitigate to some extent the difficulties of a dependent audit committee.

Anderson (2010) reports hindsight bias results in overconfident auditors who think they know how to evaluate companies as going concerns when in reality they have faulty evaluation processes. This error results from learning the results of other going concern decisions and concluding they could make the prediction had they been the ones making the decision. No matter how much experience an auditor has, the same amount of hindsight bias is displayed (Anderson, 2010).

The PCAOB's Investor Sub Advisory Group (2012) reports several concerns about the going concern requirement. One is the time commitment making the assessment takes. Another is the one-year maximum that is too restrictive; events occurring just after one year are not taken into account. The group also states the lack of an auditor's requirement to perform specifically going concern-oriented tests causes them to miss the kind of liquidity problems experienced by Worldcom and Enron. Another concern is auditors do not have to consult publicly available information that could contradict management's assertions (PCAOB Investor Sub Advisory Group, 2012, pp. 1, 8). These concerns suggest areas for improvement to current standards.

Taffler, Lu, and Kausar's (2004) study, based on British data, find going concern disclosures do not have the desired effect, at least not immediately. Investors "underreact" to the news that their companies had been questioned regarding a going concern status (265, 293-294). In the year studied, institutional investors' percent ownership of going concern-reported firms declined from 30.8% to 29.8%, which is not significant considering the dire warning intended by the going concern disclosure. Taffler et al. (2004) did not provide an explanation for this seemingly irrational result. On the other hand, Ogneva and Subramanyam's (2007) study of U.S. and Australian firms did not report a similar effect in those

markets, contradicting Taffler et al.'s (2004) earlier finding that going concern disclosures have a long-term effect.

Going concern disclosures involve a lot of subjectivity and judgment calls by auditors, and can be vulnerable to bias. Basioudis, Papakonstantinou, and Geiger's (2008) find firms that pay more non-audit fees to accounting firms are significantly less likely to receive going concern disclosures, indicating financial motives might undermine auditors' judgment. An alternative explanation is firms that work more with their clients giving them help mitigates the effects of the threatening circumstances that otherwise would require a going concern disclosure. The non-audit-fee effect is supported by studies of Australian and British firms (Basioudis et al., 2008; Sharma & Sidhu, 2001), but it is contradicted by American data. The Anglo-American contrast may be because British "audit fee structures" are not comparable to U.S. audit fees which reinforce going concern disclosures are not entirely comparable across countries (Basioudis et al., 2008). Basioudis et al. (2008) also find going concern-reporting companies pay higher audit fees because a going concern disclosure involves more work. The evidence remains mixed regarding how susceptible to bias going concern disclosures are.

One of the larger problems with the going concern disclosure is its potential to become a self-fulfilling prophecy. Studies (Tucker, Matsumura, & Subramanyam, 2003; Carson et al., 2013) find empirical evidence that self-fulfilling prophecies can have a significant impact on the results of a going concern disclosure. Warnings that a firm is about to go bankrupt can have consequences for the firm such as employees might seek work elsewhere; vendors might no longer allow the company credit; customers might cease their dealings with the firm; and creditors might require more interest or make more stringent conditions for loans. All this happens at a time when the company is already in a serious condition. Tucker, et al. (2003) find the self-fulfilling prophecy effect causes their subjects to issue "fewer going concern opinions," but the impact was not as marked as they had predicted (only 28% of going concern disclosures were not issued) (Tucker et al., 2003; Ehrhardt & Brigham, 2011). Once the going concern is issued, auditors are slow to remove it in subsequent audits prolonging the damage to the firm (Geiger & Rama, 2006). This serious effect makes a strong case against going concern disclosures.

Most tellingly, however, research indicates the going concern disclosures are not particularly accurate. According to Carson et al. (2011), the rate of bankruptcies where the companies exhibited signs of problems for some time before filing without receiving going concern disclosures ranged from 30% to 60% between 1970 and 2009. Enron and Sarbanes-Oxley led to a drop in bankruptcies that did not have going concern warnings to 28% for the years 2002 and 2003, but the number increased to 41% in 2004 and 2005 and 49% in 2006 and 2007. A

majority of companies that declare bankruptcy do so without auditors' warnings to investors (Carson et al., 2011; Geiger et al., 2014).

More distressing is the overwhelming majority of going concern disclosures are unwarranted. Carson et al. (2011) find approximately 90% of firms with their first going concern disclosure are still functioning a year later. Geiger and Rama (2006) find the rate of companies surviving their first going concern disclosures to be 87.7%. Over the longer term the going concern disclosure is more accurate as only 75% to 80% of firms with their first going concern disclosure are still operating after two or three years (Carson et al., 2011). Some 33% of firms find a way out not envisaged by the going concern disclosure and are acquired or merge over the five years following their going concern disclosure (Carson et al., 2011; Geiger & Rama, 2006). Such figures cause one to wonder just how useful a going concern report really is. Ruiz-Barbadillo et al. (2004, 598) find "that financial-based bankruptcy prediction models" work better than auditors' efforts to forecast bankruptcy. Geiger and Rama's (2006) work contradicts prediction models working better in forecasting bankruptcy. Whether financial models work better or not, it is clear that going concern disclosures are wildly inaccurate.

GOING CONCERN DISCLOSURES STATUS

Carson et al. (2011) report going concern disclosures are more accurate over the long term, though they are still accurate less than half the time. Given the potential damage to companies from the self-fulfilling prophecy effect and the inaccuracy of going concern disclosure, is the disclosure a good idea? The disclosure is, however, decision useful for investors and analysts. An improvement to the PCAOB's (2002) one-year requirement would be changing the one-year criteria to a minimum, rather than a maximum. This would enable auditors to look farther into the future where going concern disclosures are significantly more accurate. Establishing a minimum allows auditors to include unforeseen significant events.

Auditor reporting responsibility with respect to going concern is receiving renewed attention from U.S. standard setters. In addition to the PCAOB focus (PCAOB 2002; 2009; 2010; 2011), the Financial Accounting Standards Board (FASB), added going concern to their agenda (2008; 2010). The FASB added going concern to its deliberation by issuing an exposure draft (ED) to assign the responsibility of monitoring going concern issues to management (FASB, 2008) and away from auditors. Two years later after receiving only 29 comment letters in response to the ED, FASB tabled its work on moving responsibility for monitoring to concentrate its efforts on uncertainties and the liquidation basis of accounting (FASB, 2010).

In 2013, the FASB reopened its going concern deliberations and issued a new ED. The draft defined going concern as the entity's ability to continue as an entity when the entity could not meet its obligations within 24 months after the financial statement considering aspects of the management's plan (FASB 2013). Within the year, ASU 2014-15 was issued that retained the ED guidance and expanded the management role to evaluate and develop a plan considering both quantitative and qualitative information (FASB, 2014).

While the FASB and the PCAOB issued reporting guidance, the AICPA also considered the going concern issue. Statement on Accounting Standard (SAS) No 59 (AICPA 1988) requires when the auditor concludes there is substantial doubt about the ability of an entity to continue as a going concern, and such doubt remains after considering management's plan and other mitigating factors, the auditor must modify the audit opinion to indicate such doubt. This language allows for a broad interpretation i.e., substantial doubt and the effective implementation of the management's plan (Blay & Geiger, 2013). As a consequence of this broad interpretation, the Auditing Standards Board (ASB) of the AICPA issued SAS No. 126 (AICPA, 2012) to supersede SAS No. 59 as part of its clarity project. SAS No. 126 states that it does not change or expand SAS No. 59 rather it ensures consistent language with other clarified SASs to diminish the room for interpreting auditor application.

State and local governments also are affected by going concern considerations. The Governmental Accounting Standards Board (GASB) (2009) issued Statement No. 56 *Codification of Accounting and Financial Reporting Guidance Contained in the AICPA Statements on Auditing Standards*. GASB Statement 56 addresses management's duties regarding going concern assumptions and disclosures. Neely and Fang (2016) find more governments disclose going concern assumptions in the notes rather than Management Discussion and Analysis presentation.

CONCLUSION

The requirements of the standard setters i.e., PCAOB, FASB, GASB and AICPA concerning going concern disclosure have their proponents and their detractors. Presently, standard setters have auditors looking one year into the future. Going concern disclosures are inaccurate at best but a one-year minimum would be better than the current maximum as such disclosures are more accurate in the longer run.

Thanks to recently issued going concern guidance with the responsibility shifting from auditor determination to the management's plans and expectations, going concern opinions can be definitive and more useful to investors and analyst.

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CY 2016 HOME HEALTH PROSPECTIVE PAYMENT SYSTEM RATE UPDATE FOR MEDICARE PROGRAMS

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ABSTRACT

The Balanced Budget Act of 1997(BBA) mandated the change and development of a new method of payment for Medicare covered home health services. This new method of payment was created and called HHPPS (Home Health Prospective Payment System). Under HHPPS, all home health costs for Medicare covered services including medical supplies are paid using a basic unit of payment known as the 60-Day Episode. The BBA also required annual updates to the HHPPS payments. The BBA applied to all Medicare home health services beginning October 1, 2000. The purpose of this paper is to discuss an overview of the new updated Medicare HHPPS rates for CY 2016. For Medicare covered home health services beginning January 1, 2016, this proposed rule titled “Medicare and Medicaid Programs: CY 2016 Home Health Prospective Payment System Rate Update” discusses the new changes for the HHPPS payment rates. This proposed CY 2016 rule includes the current changes to the 60-day episode payment rates, the national per-visit rates, the non-routine medical supplies (NRS) conversion factor, case-mix weights, and changes to wage-index costs. This proposed rule further discusses the new national per-visit rate, the low-utilization payment adjustments, and the non-routine medical supplies conversion factor.

Key Words: Health; Regulation; Governmental Policy Regulation: Public Health.

HH PPS STANDARDIZED NATIONAL 60-DAY EPISODE RATE

Beginning October 1, 2000, as required by the Balanced Budget Act (BBA) of 1997 and its related amendments, BBA changed the way it reimbursed home health agencies for Medicare covered home health services using a new reimbursement method called the Home Health Prospective Payment System (HH PPS). Under HHPPS, all home health costs for Medicare covered services including medical supplies are paid using a basic unit of payment known as the 60-Day Episode. This HHPPS 60-day payment rate included the six home health service disciplines (skilled nursing, physical therapy, occupational therapy, speech therapy, home health aide, and medical social services). For home health services beginning October 1, 2000, Medicare computed the first HHPPS standardized national 60-

day episode rate of \$ 2,115.30 as presented by the following table (1) (HHPPS 1999).

FY 2000 Standardized National 60-Day Episode Payment Calculation (Table1)

HHA discipline Type / Non-Routine Supplies (NRS)	Average cost per visit from PPS audit sample / Average cost per episode (NRS...)	Average number of visits for episodes with >4 visits from CY 98 episode file	HHA prospective payment rate
Skilled Nursing	\$94.96	14.08	\$1,337.00
Home Health Aide	\$41.75	13.4	\$559.45
Physical Therapy	\$104.05	3.05	\$317.35
Occupational Therapy	\$104.76	.53	\$55.52
Medical Social Service	\$153.59	.32	\$49.15
Speech Therapy	\$113.26	.18	\$20.39
NRS - cost report	\$43.54		\$43.54
NRS – Part B	\$6.08		\$6.08
Part B Therapies	\$17.67		\$17.67
Initial OASIS cost	\$5.50		\$5.50
Cont'd OASIS cost	\$4.32		\$4.32
			\$2,416.01

Total non-standardized payment	Standardized factor - wage index & case-mix	Budget neutrality factor	Outlier adjustment factor	Final standardized 60-day episode rate Oct. 2000
\$2,416.01	/ .96184	* .88423	/ 1.05	\$2,115.30

The standardized 60-day episode payment rate was further updated for the 2002 and 2003 periods (HHPPS 2001; HHPPS 2002).

MEDICARE PRESCRIPTION DRUG, IMPROVEMENT AND MODERNIZATION ACT OF 2003

The Medicare Prescription Drug, Improvement and Modernization Act of 2003(DIMA) updated the national home health standard prospective payment system (HHPPS) rates for 60-day episodes ending October 1, 2003-December 31, 2004 and the bill required updated payment increases to be computed on a calendar year basis beginning January 1, 2005. The standardized 60-day episode rates were further updated for the 2004-2007 periods (Medicare Prescription 2003); (HHPPS 2004; 2005; 2006).

HHPPS NATIONAL 60-DAY EPISODE PAYMENT RATE FOR EPISODES BEGINNING IN CY 2008

For 60-day episodes beginning in 2008, the Medicare HHPPS national standardized rate was updated by a new 153 case mix grouping called home health resource groups (HHRGs) and a new wage index value was determined by the site of the home health services. The August 29, 2008 (72 FR 49792) and November 30, 2008 (72 FR 67656) Federal Registers discussed the new changes under the “Home Health Prospective Payment System Refinement and Rate Update For Calendar Year 2008” rule which included the adjustments to the rebasing and revising of the home health market basket, resulting in new labor portion percentage of 77.082 and non-labor portion percentage of 22.918; this rule updated the LUPA (Low Utilization Payment Adjustments) per-visit payment rate, and the inclusion of an new additional payment for NRS (Non-Routine Supplies) (HHPPS 2008).

WEIGHTS FOR NON-ROUTINE MEDICAL SUPPLIES (NRS)—SIX- GROUP APPROACH EFFECTIVE CY 2008

The Home Health Prospective Payment System Refinement and Rate Update for Calendar Year 2008 included an additional payment for Non-Routine Supplies (NRS). The NRS payment amounts were computed by multiplying the relative weight for a particular severity level by the NRS conversion factor. The NRS conversion factor was updated by the home health market basket update of 2.9 percent and reduced by the 2.75 percent reduction. The CY 2008 NRS conversion factor for was \$52.35. The additional payment amount was based on the severity level of the patient care (HHPPS 2008).

HOME HEALTH PROSPECTIVE PAYMENT SYSTEM UPDATES TO THE NATIONALIZED STANDARDIZED 60-DAY PAYMENT RATES

The following reflects the HHPPS updates to the nationalized 60-day episode payment rates for each of the following years (excluding NRS): (HHPPS 2009; 2010; 2011; 2012; 2013; 2014; 2015).

National 60-Day Episode Amounts Updated for Calendar Years 2009-2014

MSA (Metropolitan Service Area) Episodes Ending Between	MSA National standardized 60-day episode rate
January 1, 2009 - December 31, 2009	\$ 2,271.92
January 1, 2010 - December 31, 2010	\$ 2,312.94
January 1, 2011 – December 31, 2011	\$ 2,192.07
January 1, 2012 – December 31, 2012	\$ 2,112.37
January 1, 2013 - December 31, 2013	\$ 2,138.52
January 1, 2014 – December 31, 2014	\$ 2,869.27
January 1, 2015 – December 31, 2015	\$ 2,961.38

**CY 2016 HOME HEALTH PROSPECTIVE PAYMENT SYSTEM
RATE UPDATE FOR MEDICARE SERVICES**

For home health services beginning January 1, 2016, the proposed rule titled “Medicare and Medicaid Programs; CY 2016 Home Health Prospective Payment System Rate Update” includes the new proposed national standardized 60-day episode payment rates, the national per-visit rates, and the NRS (non-routine medical supply) payment rates (HH PPS 2016). As required under the Affordable Care Act, (Pub. L. 111-152), the proposed rule for CY 2016 includes the third year of rebasing the national standardized 60-day episode payment amount. To calculate the CY 2016 60-day national standardized payment rate, the following adjustments were applied to the CY 2015 national standardized payment rate: a wage index factor of 1.0011; a case-mix budget neutrality factor of 1.0187; a reduction of 0.9903 percent for nominal growth; a rebasing adjustment of -\$80.95; and a home health market basket update factor of 1.019.

The following table (2) reflects the HHPPS national standardized 60-day episode payment rate for CY 2016 (HHPPS 2016).

**CY 2016 60-Day Episode National Standardized Payment Amount
(Table 2)**

CY 2015 60-day Episode National Standard Payment	Neutrality Factor Wage Index Budget	Neutrality Factor Case- Mix Index Budget	Case Mix Growth Adjust- ment	Rebasin g Adjust- ment CY 2016	Home Health Payment Update % CY 2016	60-day Episode National Standard Payment CY 2016
\$2,961.38	x .0011	x 1.0187	x 0.9903	-\$80.95	x 1.019	\$2,965.12

National Per-Visit Payment Amounts Used To Pay LUPAs For CY 2016

The HHPPS 2016 proposed rule updates the national per-visit rate. This national per-visit rate is used in paying low- utilization payment adjustments (LUPAs). LUPAs are defined as 60-day episodes with four or fewer visits. The payment per-visit amount is based on the type of home health visit or home health service discipline.

CY 2016 National Per-Visit Home Health Discipline Type Payment (Table 3)

Home Health Discipline Type	Per-Visit Payment CY 2015	Neutrality Factor Wage Index	Rebasing Adjustment CY 2016	HH Payment Update CY 2016	Per-Visit Payment Amount CY 2016
Home Health Aide	\$57.89	x 1.0010	+ \$1.79	x 1.019	\$60.87
Medical Social Services	\$204.91	x 1.0010	+ \$6.34	x 1.019	\$215.47
Occupational Therapy	\$140.70	x 1.0010	+ \$4.35	x 1.019	\$147.95
Physical Therapy	\$139.75	x 1.0010	+ \$4.32	x 1.019	\$146.95
Skilled Nursing	\$127.83	x 1.0010	+ \$3.96	x 1.019	\$134.42
Speech Pathology	\$157.88	x 1.0010	+ \$4.70	x 1.019	\$159.71

There are six home health (HH) disciplines as noted on Table 8 below. In determining the CY 2016 national per-visit amounts used for LUPA episodes, the CY 2015 per-visit amounts was calculated for each home health service discipline by the following adjustments: a wage index neutrality factor of 1.0010; a rebasing adjustment of +\$1.79; and an updated 2016 HH market basket factor of 1.019. The CY 2016 national per-visit rates for each HH discipline is shown below in Table 3 (HHPPS 2016).

Low Utilization Payment Adjustment (LUPA) Add-On Factors CY 2016

The Table 8 per-visit rates computed above are before an additional payment is added to the LUPA payment. Beginning in CY 2016, home health agencies with LUPAs payments for episodes billed as the only episode or the initial episode are to be paid an additional amount (Add-on Factor). For CY 2016, the additional amount paid to LUPAs billed as initial episodes in a sequence of adjacent episodes or as the only episode is based on the following three factors: SN 1.8451; PT 1.6700; and SLP 1.6266 (HHPPS 2016).

Non-Routine Supplies (NRS) Payments CY 2016

Beginning in CY 2008, a new system was implemented to pay for non-routine supplies (NRS) based on 6 severity groups (HHPPS 2008). NRS payment amounts are computed by multiplying the relative weight for a particular severity level by the NRS conversion factor. The NRS conversion factor is to be updated each year. The CY 2016 NRS conversion factor is \$52.92. The proposed payment amounts for NRS in the various severity levels are presented below in Table 4 (HHPPS 2016).

CY 2016 National Standardized Payment Amounts for the 6-Severity NRS System (Table 4)

Severity Level	Scoring (Points)	Relative Weight	Conversion Factor	Payment Amount NRS
1	0	0.2698	\$52.71	\$14.22
2	1 – 14	0.9742	\$52.71	51.35
3	15 – 27	2.6712	\$52.71	140.80
4	28 – 48	3.9686	\$52.71	209.18
5	49 – 98	6.1198	\$52.71	322.57
6	99+	10.5254	\$52.71	554.79

COMPUTING THE CY 2016 HHPPS 60-DAY EPISODE PAYMENT RATE FOR A HOME HEALTH AGENCY

As stated in the Medicare HHPPS rules effective October 1, 2000, the basic unit of payment is a 60-day episode national, standardized rate. This standardized rate

is adjusted for by a case-mix weight and a wage index value based on the site of service. To help account for geographical wage differences, a part of the wage index value is applied to a labor related portion and non-labor related portion. The example below demonstrates a sample computation using the national home health standardized prospective payment system (HHPPS) rates for the 60-day episodes beginning CY 2016

	Corpus Christi, Texas
1. CBSA Number Site of Service	18580
2. HHRG C1F1S1 Case Mix Weight	0.5969
3. Non-Routine Severity Level	1
4. 2016 National 60 Day PPS Rate (See Table 2)	\$2,965.12
5. HHRG Weight C1F1S1	0.5969
6. Case Mix Adjusted PPS (Line 4 * Line 5)	\$1,769.88
7. Labor Rate Percentage	0.78535
8. CBSA Labor Wage Index – 18580	0.8569
9. CBSA Labor Wage Adjusted Rate PPS (Line 6 * Line 7 * Line 8)	\$1,191.06
10. National PPS Rate -Non Labor %	0.21465
11. Case Mix PPS Rate - Non Labor Rate% (Line 6 * Line 10)	\$379.90
12. Adjusted PPS Rate (Line 9 + Line 11)	\$1,570.96
Non-Routine Supply Add On	
13. NRS Conversion Rate (See Table 4)	\$52.71
14. Severity Level Weighted Adjustment	0.2698
15. Computed NRS Supply Payment (Line 13 * Line 14)	\$14.22
16. HHPPS Rate with NRS payment (Line 12 + Line 15)	\$1,585.18

. The example computation includes the CY 2016 case-mix weights for a city with the Core Based Statistical Area (CBSA) codes for labor wage indexes. The wage

index is adjusted with the labor portion of 78.535 percent and the non-labor portion of 21.465 percent. The NRS payment is included in the final computation (HHPPS 2016). The total 2016 HHPPS payment a home health agency receives for providing Medicare covered services in Corpus Christi, Texas based on the information below amounts to \$ 1,585.18.

CONCLUSION

Home health agency administrators, supervisors, and financial officers need to calculate and evaluate the Medicare HHPPS payment amounts expected to be received for each of their patients admitted for home health services. These financial administrators should prepare standardized payment tables for each of their sites of services. These tables should reflect the current HHPPS payment amount for a patient assigned a particular payment group within each of the 60-day episode based on the site of service. Under the proposed CY 2016 HHPPS rule, home health agencies are to be reimbursed one total for all home health services, including routine and non-routine medical supplies, provided to their patients within each 60-day episode. Home health agencies need to calculate their per-patient costs for each type of home health service. By obtaining the per-patient cost for each of the different home health services, an agency will be able to determine the total number of visits financially feasible within the 60-day episode.

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ABLE ACCOUNTS: A NEW TAX PROVISION FOR DISABLED AMERICANS

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ABSTRACT

At the end of 2014, Congress enacted a new tax deferred savings device for individuals with disabilities. Known as ABLE accounts ("Stephen Beck, Jr., Achieving a *Better Life Experience* Act"), this new tax provision allows families with a disabled individual to set aside and accumulate monies to pay for future eligible costs related to the disability of the beneficiary. ABLE accounts (I.R.C. §529A) are similar to college savings plans in that investments accumulate tax deferred. Eligibility rules for ABLE accounts have been established by state legislatures in forty-five states, plus the District of Columbia, as of this writing. These accounts are protected from bankruptcy proceedings and contributions will not count against an individual's eligibility for SSI, Medicaid or other public benefits. The purpose of this paper is to provide tax practitioners and taxpayers an understanding of ABLE accounts, their eligibility requirements, and tax effects as a tax deferred savings account for disabled Americans. This article also examines recently issued proposed regulations and interim guidance of I.R.C. §529A.

Keywords: ABLE Accounts, Section 529A Plans, 529A Plans

INTRODUCTION

According to the most recent U.S. Census, as of 2013, approximately 12.6% of the population has a severe mental or physical disability (Employment and Disability Institute, 2013 Disability Status Report, Cornell University, 2015, p. 5). Disabled individuals and their families are faced with several costly challenges in their efforts to live a free and dignified life. While the United States has made very positive steps to insure disabled Americans have opportunities and access to participate through the Americans with Disabilities Act of 1990 (P.L. 101-336), dollar limitations placed on the amount of assets and earnings by disabled individuals when determining Social Security and Medicaid eligibility, can economically constrain families. Moreover, families of disabled children must consider needs that are decades away as well as those needs that are immediately imminent, as such costs often continue into the individual's adulthood. Estate planning to care of disabled heirs can be very complex and costly, negatively

impacting many families. In December 2014, federal legislation created ABLE accounts in an attempt to provide assistance to disabled individuals and their families.

The Steven Beck, Jr., Achieving a Better Life Experience Act of 2014 (the ABLE Act) is a new tax savings account enabling individuals with disabilities and their families a financial vehicle that allows the account beneficiary to save for future costs, providing tax-free growth similar to existing I.R.C. §529 college savings plans. ABLE accounts were enacted on December 19, 2014 as part of the *Tax Increase Prevention Act of 2014* (P.L. 113-295). A complete overview of the eligibility requirements, rules, and tax effects of ABLE accounts is examined in this article.

Pre-ABLE law. Prior to the enactment of ABLE accounts, there existed limited tax provisions for adult individuals with disabilities. Moreover, tax advantaged savings accounts similar to ABLE accounts did not exist. Families were allowed to set up a qualified disability trust, which may be used to provide financial assistance to a disabled person (the trust beneficiary) without disqualifying the beneficiary for certain governmental benefits (Special Report: Tax Increase Prevention Act of 2014, www.tax.thomsonreuters.com, p. 21). In addition, amounts distributed from qualified disability trusts are considered earned income to the beneficiary and taxed at the parents' tax rates (applying the "kiddie" tax rules of I.R.C. §1(g)) (Special Report, p. 21).

Other tax provisions that specifically apply to and benefit disabled individuals or their families include: a medical expense deduction for medical and dental expenses (I.R.C. §213); expenses for capital improvements to a home used by a disabled individual, including installation of entrance ramps, a lift, widening of doorways, building handrails, modifying kitchen and bathroom cabinets (Treas. Reg. §1.213-1(e)(1)(iii)); the credit for the elderly and the permanently and totally disabled (I.R.C. §22); and, the suspension of the age requirement for the eligibility of a "qualifying child" for dependents who are permanently and totally disabled (I.R.C. §152 (c)(3)(B)). In addition, taxpayers who become permanently and totally disabled and who take distributions from an IRA or other qualified retirement plan (401(k), etc.) can avoid paying an early withdrawal tax under I.R.C. §72(t)(2)(A)(iii).

Needs Based Tests for Individuals with a Disability. Prior to the ABLE Act, in general, individuals with a disability could easily be disqualified from government benefits like Supplemental Security Income (SSI), and Medicaid, if they have assets over a legal limit. Under Social Security rules for 2016, any disabled individual who works and earns more than \$1,090 per month (\$1,800 if blind), can immediately lose their Social Security benefits (see the 2016 Social Security Changes at: <https://www.ssa.gov/news/press/factsheets/colafacts2016.html>). In addition, SSI imposes a strict asset limitation rule on SSI recipients, requiring disabled individuals to report: cash, savings bonds, stocks, or bank accounts, vehicles, land, houses, life insurance policies with a cash value, personal property, or any

other asset that could be easily converted to cash for food or shelter; there are exemptions for one vehicle (of any value), the land and home a disabled individual lives in, etc. (see SSI Resources rules at: <http://www.ssa.gov/ssi/text-resources-ussi.htm>). In addition, the asset limitation also creates an obstacle for others to give money or assets as a gift or leave money or assets as an inheritance directly to a disabled individual. This asset limitation rule has made it nearly impossible for disabled individuals to set aside money for their own care or for any discretionary spending in trying to participate fully as a member of society.

The ABLE Act allows a disabled individual to have funds *in excess of* the indicated legal limit deposited in an ABLE account without disqualifying them from receiving valuable government benefits. The earnings and distributions from the ABLE account are to be used for the individual's qualified disability expenses, which will not count against the SSI asset limitation. In addition, the earnings and distributions do not count as taxable income. Exhibit 1 below highlights some of the key characteristics to the new §529A accounts.

Exhibit 1: ABLE Accounts At A Glance
Purpose: A new tax-favored account for individuals with disabilities to set aside and accumulate funds to pay for current and future costs related to the disability, without disqualifying other governmental benefits.
· Similar to §529 college savings plans, ABLE accounts are established and operated by the states
· Any person may contribute to an ABLE account for an eligible beneficiary; such funds can be used for qualified disability expenses
· The annual contribution may not exceed \$14,000 for 2016
· Eligibility: the individual receives SSI benefits due to blindness or disability or the individual submits disability certification
· Qualified Disability Expenses include housing, education, transportation, employment training, etc.
· Tax Treatment: Any earnings in an ABLE account are tax-free to the contributor or the beneficiary; any distributions (or portion) that are not used for qualified expenses are included in the beneficiary's taxable income and subject to a 10% additional tax
· The use of an ABLE account will not disqualify them from receiving SSI or other government benefits.
Source: I.R.C. §529A

ABLE Participation Eligibility. ABLE accounts are allowed for any “eligible individual” who during such a taxable year is either (a) entitled to

benefits based on blindness or disability under title II or XVI of the Social Security Act, which occurred prior to the individual attaining age 26, or (b) a disability certification for such individual is filed with the Secretary for the tax year (I.R.C. §529A(e)(1)). An eligible individual who has a disability certification means that such individual (or their parent or guardian) certifies that the individual has a medically determinable physical or mental impairment, which results in marked and severe functional limitations, and can result in death or which has lasted or can be expected to last for a continuous period of not less than 12 months, or is blind, and such blindness or disability occurred before the date on which the individual attained age 26, and includes a copy of the individual's diagnosis relating to the relevant impairment, signed by a physician meeting the criteria of §1861(r)(1) of the Social Security Act (I.R.C. §529A(e)(2)(A)). According to Proposed Regulations issued June 22, 2015, "marked and severe functional limitations" is a phrase that refers to a level of severity of an impairment that meets, medically equals, or functionally equals the listings in the Listing of impairments (Fed. Reg. p. 35605). Moreover, the proposed regulations indicate that there are certain conditions, specifically those listed in the Compassionate Allowances Conditions list maintained by the Social Security Administration, at www.socialsecurity.gov/compassionateallowances/conditions.htm. Any condition indicated on the list does not require a physician's diagnosis, provided the condition was present prior to the individual turning age 26 (Fed. Reg. p. 35603). Lastly, if the eligible individual cannot establish an ABLÉ account due to their disability, then it may be established by a designated power of attorney (if no power of attorney is available, a parent or legal guardian can establish the account). *Note to reader:* As of this writing, bipartisan legislation (S.2702), known as the ABLÉ to Work Act of 2016, has been introduced in Congress. The bill would allow rollovers to and from §529 college savings plans into ABLÉ accounts as well as raise the age for eligibility from 26 to 46. The raising of the age eligibility is meant to recognize debilitating diseases and conditions that can impact individuals later in life, including Lou Gehrig's disease, multiple sclerosis, and other debilitating illnesses.

Proposed Regulations provide that a qualified ABLÉ program must indicate the documentation that an individual must furnish, both at the time the ABLÉ account is established for the designated beneficiary, and thereafter, to insure the designated beneficiary of the account is, and continues to be, and eligible individual. The proposed regulations indicate a disability certification can be filed with the Secretary of the Treasury. A disability certification is defined as a certification to the satisfaction of the Secretary by the individual or the parents or guardian of the individual that (i) certified that the individual meets the disability standard and (ii) includes a copy of the individual's diagnosis signed by a licensed physician. Such disability certification, as indicated in the proposed regulations, must include the required certifications and a copy of the signed diagnosis, but also provide for certain conditions to be deemed to meet the requirements of filing a disability certification. The reporting of such highly confidential medical

information of the account beneficiary, as indicated in the proposed regulations, raised some significant concerns through the proposed regulation comments.

Specifically, ABLE program administrators expressed concerns about potential liabilities for receiving and safeguarding medical information contained in a signed diagnosis, particularly in cases where they do not have any expertise or ability to evaluate that medical information. After considering these concerns, the IRS and Treasury Department concluded that a certification under penalties of perjury that the individual (or the individual's power of attorney or a parent or legal guardian of the individual) has the signed physician's diagnosis, and that such signed diagnosis will be retained and provided to the ABLE program or the IRS upon request. Further details are expected to be provided in the final regulations. However, the concerns over handing over sensitive private medical information to the government in the certification process were significant, and the IRS and Treasury Department seem to have reached a reasonable outcome.

How Do ABLE Accounts Operate? ABLE accounts operate very similar to college savings plans (§529 plans), where contributions made to such plans are on an after-tax basis at the federal level; there is no deduction for any contribution. The amount in the account grows tax-free, and distributions from college savings plans are also tax-free if used for qualified expenses (see I.R.C. §529). Contributions to a qualified ABLE account under I.R.C. Section 529A can be made on behalf of a designated beneficiary and are treated as a gift to such an individual, which is not considered a future interest in property and not treated as a qualified transfer under I.R.C. § 2503(e). A designated beneficiary is limited to only one ABLE account at a time, except in a period when there is a program-to-program transfer or a rollover. Moreover, the designated beneficiary is deemed the owner of the account. The overall aggregate contribution limit is determined by each state.

The annual amount that can be contributed to an ABLE account equals the annual amount of a non-taxable gift by a donor, which is currently \$14,000 for 2016 (*see* I.R.C. §2503(b)); this amount periodically adjusts for inflation. There are no federal taxes on amounts that accumulate in the ABLE accounts; assets invested in such accounts can be invested, accumulate, and any distributions are tax-free if used for qualified disability expenses (I.R.C. §529A(e)(2)(5)). With the exception of program-to-program transfers, contributions to ABLE accounts must be made in cash (Fed. Reg. p. 35614). Cash includes checks, money order, credit card, electronic transfer, payroll deductions, etc. Unlike a special needs trust, ABLE accounts do not require a trustee, as the account owner is the disabled individual. Also, contributions to ABLE accounts are made on an after-tax basis are not tax deductible for federal income tax purposes. Some states may allow contributions to be deducted on state tax returns, but this is being sorted out by state legislative bodies throughout the country as of this writing. A brief examination of the states that have enacted ABLE legislation will be discussed later.

Qualified Disability Expenses. Funds distributed from ABLE accounts are tax-free if used for the following *qualified* disability expenses are

incurred that relate to the blindness or disability of the designated beneficiary of the ABLÉ account and are for the benefit of that designated beneficiary in maintaining for improving his or her health, independence, or quality of life (Fed. Reg. p. 35614). Specifically, such expenses include, but are not limited to: education, housing, transportation, employment training and support, assistive technology and personal support services, health, prevention and wellness, financial management and administrative services, legal fees, expenses for oversight and monitoring, and funeral and burial expenses (I.R.C. §529A(e)(5)). The proposed regulations also provide for basic living expenses and are not limited to items for which there is a medical necessity or which solely benefit a disabled individual (Fed. Reg. p. 35308). An example of how an expense would allow the individual to maintain his/her independence and to improve his/her quality of life, is provided below:

Example 1. B, an individual, has a medically determined mental impairment that causes marked and severe limitations on her ability to navigate and communicate. A smart phone would enable B to navigate and communicate more safely and effectively, thereby helping her to maintain her independence and to improve her quality of life. Therefore, the expense of buying, using, and maintaining a smart phone that is used by B would be considered a qualified disability expense (Fed. Reg. p. 35615).

More specifically, the proposed regulations indicate that safeguards must be established to distinguish between distributions used for payments of qualified disability expenses and other distributions, including payments for housing expenses. In general, any *non-qualified* distribution (that is not used for qualified expenses) shall be included in gross income along with a 10 percent penalty on such non-qualified distribution (I.R.C. §529A(c)(3)(A)). Non-qualified distributions are discussed more below. The IRS issued interim guidance on implementation of the ABLÉ program in November 2015, specifically in the area of “qualified expenses,” in reaction to comments received from the previously issued Proposed Regulations (June 2015).

According to the preamble to the proposed regulations, the term qualified disability expenses, the IRS and Treasury Department recognize the term to be broadly construed to permit inclusion of basic living expenses and should not be limited to expenses for items for which there is a medical necessity or which provide no benefit to others in addition to the benefit to the eligible individual. Proposed Regulations indicate that a qualified ABLÉ program must establish safeguards to permit the program to distinguish between distributions used to pay for qualified disability expenses and other distributions, and to permit the identification of amounts distributed for housing expenses as defined for purposes of SSI (Fed. Reg. p. 35608). Therefore, the IRS interim guidance provides that any reference to classifying distributions as housing expenses should be *eliminated* from the regulations (the IRS and Treasury Department agreed to this change to be reflected in the forthcoming final regulations).

Secondly, commenters indicated that the Proposed Regulation requirement that safeguards need to be established to distinguish between distributions for qualified disability expenses and other distributions was unduly burdensome since the particular *use of* a distribution might not be known at the *time of* distribution. Therefore, IRS interim guidance provides that the final regulations will not require, for federal income tax purposes, a qualified ABLE program to establish safeguards to distinguish between distributions used for payment of qualified disability expenses and other distributions; the designated beneficiary will have to categorize distributions in order to properly determine if they have any federal income tax obligation (the IRS and Treasury Department agreed to this change in the forthcoming final regulations).

TAX TREATMENT OF DISTRIBUTIONS FROM ABLE ACCOUNTS

Distributions from ABLE accounts consist of amounts invested in the account along with earnings. Any amount distributed from an account that is for the benefit of the designated beneficiary of that ABLE account during a taxable year that does not exceed the qualified disability expenses is not included in gross income of the designated beneficiary. Any distribution amount that *exceeds the qualified disability expenses* (with a few exceptions to be discussed), is included in the gross income of the designated beneficiary (Fed. Reg. p. 35615). If any part of a distribution is included in gross income, the earnings portion included is equal to the earnings portion of the distribution, reduced by an amount that bears the same ratio to the earnings portion as the amount of qualified disability expenses during the year bears to the total distributions during the year (Fed. Reg. p. 35615). The following examples illustrate this tax treatment:

Example 2. B, who is a designated beneficiary of an ABLE account, had disability expenses totaling \$10,000, but took a \$10,000 distribution in the same calendar year. There is no excess distribution. Therefore, the entire distribution is excluded from the designated beneficiary's gross income, per I.R.C. §529A(c)(1)(A).

Example 3. B, who is a designated beneficiary of an ABLE account, had disability expenses totaling \$10,000, but took a \$15,000 distribution in the same calendar year. The earnings portion of the distribution was \$400. Therefore, the excess distribution of \$5,000 must be reduced by \$267 ($\$10,000/\$15,000 \times \400). Therefore, \$4,733 is included in the designated beneficiary's gross income, per Fed. Reg. p. 35615.

Additional Tax. In addition to calculating the includible portion of an excess distribution to be taxed as ordinary income, an additional tax is imposed equaling 10 percent of the amount includible in income. Therefore, in Example 3

above, the taxpayer would be subject to an additional tax of \$473 (Fed. Reg. p. 35615). The ABLE provisions do allow exceptions to the additional tax rule. The additional tax is not added if such distributions are made *on or after* the death of the designated beneficiary, provided such amounts are made to the estate, an heir, or a legatee of the designated beneficiary, or to a creditor (Fed. Reg. p. 35616). In addition, if excess distributions are returned in the same calendar year, then such amounts are not subject to the additional tax.

Tax on Excess Contributions. Contributions in excess of the annual gift limit, currently \$14,000, per I.R.C. §2503(b), are subject to an excise tax equal to 6 percent of such excess contribution (unless the amount is returned) (Fed. Reg. p. 35616). Income earned on excess contributions or excess aggregate contributions (if any) is taxed to the contributor, and proposed regulations require a qualified ABLE program to request the TIN (Taxpayer Identification Number) for each contributor at the time a contribution is made if the program does not already have a record of the person's TIN. Commenters to the proposed regulations gave a variety of reasons of the costly and complicated challenges in collecting the TIN, particularly since many contributions can be made in a variety of ways (debit, payroll deductions, transfers, etc.). Therefore, the interim guidance provides that the IRS and Treasury Department will modify by "anticipating" that the final regulations will eliminate the requirement to request the TINs of each contributor at the time a contribution is made (if the program does not already have a record of that person's correct TIN) if the qualified ABLE program has a system in place to identify and reject any excess contributions and excess aggregate contributions before they are deposited into an ABLE account. In the event an excess contribution or excess aggregate contribution is deposited into an ABLE account, the program will be required to request the TIN of the contributor making such excess contribution or excess aggregate contribution.

Status of ABLE in the States. The federal ABLE Act (I.R.C. §529A) requires states to enact laws on how to administer and establish such accounts. As of this writing, approximately 45 states + DC have enacted ABLE legislation, or 92.2 percent of the United States. Two states are awaiting their governor's signature on the legislation (AK and OK), one state has yet to introduce the legislation (ID), and two states where the ABLE legislation failed or the session adjourned (MS and WY).

Forms 1099-QA and 5498-QA. The IRS recently issued two new forms that will be used to report ABLE transactions: Form 1099-QA is used to report distributions from an ABLE account; Form 5498-QA reports contributions to an ABLE account. Briefly, in reporting distributions on the 1099-QA, a variety of information will be required to be reported, including the payer's information (street address, federal tax identification), the recipient's information (street address, Social Security number, and ABLE account number), as well as the amount of the gross distribution, the earnings portion of the distribution, and the basis. Other information is required, including whether the ABLE account is terminated in the year the 1099-QA is issued, if the distribution is a program-to-

program transfer, or if the recipient is not the designated beneficiary (www.irs.gov/form1099qa).

Form 5498-QA requires the issuer's information (name, street address, and federal tax ID), the beneficiary's information (street address, Social Security number, and ABLE account number), as well as the amount of the ABLE contributions, any rollover contributions, the cumulative contributions, fair market value of the contributions, and the code that establishes the basis for eligibility. The three codes include: **A**—eligibility established under §529A(e)(1)(A), SSDI, Title II SSA; **B**—eligibility established under §529A(e)(1)(A), SSI, Title XVI SSA; or **C**—eligibility established by disability certification under §529(e)(1)(B) (www.irs.gov/form5498qa).

CONCLUSION

ABLE accounts are expected to assist millions of disabled individuals and their families with a new financial vehicle that allows an account beneficiary the ability to save and accumulate funds, as well as spend monies for qualified disability expenses, without harming their Social Security or Medicaid benefits. Given the financial constraints often impacting disabled individuals, these new accounts will assist in allowing them to live their lives with greater financial freedom, independence, and dignity. The proposed regulations and recent IRS interim guidance have added some clarity and improvements in understanding this valuable new tax provision. Final regulations are expected to be issued sometime in 2016. ABLE accounts are available, as of this writing, in 45 states + the District of Columbia, and will hopefully be a useful device for disabled Americans to save and make independent financial choices for themselves.

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McCarthy, Pilato and Silliman

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THE IMPACT OF DODD-FRANK ON THE ECONOMY AND FINANCIAL INSTITUTIONS FIVE YEARS LATER

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ABSTRACT

This study focused on the five year period prior to inception of Dodd-Frank, (2001-2005) and compared this time frame to years subsequent to passage of Dodd-Frank, (2011-2015). An assessment was made of any significant differences in credit risk assignment, and information content of earnings conveyed to investors during these periods. When assessing the impact of credit rating percentage changes and subsequent risk, findings indicate that when comparing all pre-Act firms to all post-Act firms, percentage change in credit rating is positive, on average, for pre-Act firms while the percentage change, on average, is negative for firms in post-Act periods. Also, overall risk is increased significantly for firms after passage of Dodd-Frank. When comparing pre-Act firms of $\leq \$10$ billion in assets to firms $\geq \$50$ billion in assets, there is no significant difference between the average change in credit rating. Both sub-samples exhibit an increase in credit rating. Risk is also relatively small and insignificantly different between these pre-Act sub-samples. When attention turns to post-Act time periods, both sub-samples reflect a decrease in credit rating. In addition, risk increases significantly for both sub-samples.

Keywords: Dodd-Frank, financial crisis, credit rating

INTRODUCTION

On July 21, 2010, President Barack Obama signed the Wall Street Reform and Customer Protection Act into law. This Act is commonly known as the Dodd-Frank Act, bearing the name of its sponsors. The Act was instituted in response to the 2008 financial crisis which some claimed to be the result of excessive risk speculation promoted by financial institutions' exploitation of a deregulated market.

This Act precipitated a general decrease in lending activities by financial institutions (Ives, 2012). The additional regulation for banks helped to shift a portion of the lending mechanisms from the traditional banking system to private equity secondary markets, in many cases, off-shore (Malhotra and Margalit, 2010). It increased the effective tax rates on banks resulting in a cumulative burden of roughly \$14.8 billion annually (Borah, 2011). It resulted in a meaningful decline in trading volume, wider spreads, and requires managers to be more thoughtful about liquidity provisions in their portfolios (Mathieu, 2011). The overall consequences of the Act are significant. In its current state, it is estimated to cost

a reduction in GDP of \$895 billion over the period 2016-2025, or a total of \$3,346 per working person per year. Impact would be the biggest in the following states; New York, California, Illinois, and Massachusetts (Eakin, 2015).

Proponents of Dodd-Frank claim that the U.S. could plunge back into a financial crisis if it is abolished. Others say that the financial crisis was not caused by a lack of regulation, but by the U.S. government's housing policy, which brought about a deterioration in residential mortgage underwriting standards, such as NINJA (No Income No Job Approvals). These lower standards created a massive housing bubble that exploded when many homeowners, who had gotten approval on mortgages, couldn't make payments when the bubble finally burst. This led to the financial crisis of 2008 and the subsequent recession.

Regardless of which position may or may not be correct, the purpose of this paper is to assess the impact that the Dodd-Frank Act has had on financial institutions since its inception. This is important to the investors in these institutions along with other stakeholders, such as employees, borrowers, regulatory agencies, and, ultimately, taxpayers. This paper will analyze earnings and security price performance of financial institutions during a five year period prior to inception of Dodd-Frank in comparison to the same metrics during a five year period after its passage.

LITERATURE REVIEW

One of the more significant provisions of Dodd-Frank is the one that increases the Credit Rating Agency's (CRA) liability for issuing incorrect or biased rating (Coffee 2011). Traditionally, CRAs have been successful in claiming that credit ratings constitute opinions protected as free speech under the First Amendment. This defense required plaintiffs to prove that CRAs issued ratings with knowledge that they were false with reckless regard of facts or accuracy. Section 933 of the Act lessens this requirement to the point that plaintiffs only have to show that the CRAs failed to conduct a reasonable investigation of the security being rated. This change has resulted in more lawsuits with significant monetary implications.

Another significant provision of Dodd-Frank deals with the expanded role of the Securities and Exchange Commission (SEC). Section 933 of the Act states that penalty and enforcement provisions of federal securities laws now apply to CRAs to the same extent that these provisions apply to registered accounting firms or security analysts. Prior to this, CRA statements were considered forward-looking and were protected under the safe harbor provisions of the SEC Act of 1934. This change makes it easier for the SEC to bring claims against CRAs. These prior two changes have caused an increase in CRA liability accrual and costs, which have in turn been passed on to individual institutions (Becker and Milbourn, 2011).

Holthausen and Leftwich (1986), Hand, Holthausen, and Leftwich (1992), and Dichev and Piotroski (2001) show that investors react to credit rating announcements, and that the reaction is greater for credit rating downgrades than

for upgrades. Ederington and Goh (1998) and Kao and Wu (1990) show that ratings are informative about subsequent operating performance and about credit risk, respectively. Kliger and Sarig (2000) study finer rating partitions instituted by Moody's and show that both bond prices and stock prices react to Moody's rating refinement.

Prior work shows that the properties of credit ratings change over time Blume, Lim, and MacKinlay (1998). Alp (2013) finds a structural shift towards more stringent ratings in 2002, possibly as a response to the increased regulatory scrutiny and investor criticism following the collapse of Enron and WorldCom. Jorion, Liu, and Shi (2005) find that the information content of both credit rating downgrades and upgrades is greater following the passage of Regulation Fair Disclosure (FD) in 2000. Similarly, Cheng and Neamtiu (2009) find that CRAs issue more timely downgrades, increase rating accuracy, and reduce rating volatility following the passage of the Sarbanes-Oxley Act in 2002.

HYPOTHESES DEVELOPMENT

Hypothesis concerning credit risk (H1)

Goel and Thakor (2014) find that the Act has the potential of creating a reduction in credit ratings, therefore increasing regulatory risk. Morris (2012) also finds the potential for increased regulatory risk through credit rating downgrades, but assess only one year in a post Dodd-Frank environment, which may or may not be truly indicative of the regulatory changes instituted by the Act.

This leads to the first hypothesis which revolves around the existence of credit downgrades and therefore higher regulatory risk. It is important to first establish whether or not the Act has caused a structural change in the manner which credit ratings are assessed. Stated in the null form, the first hypothesis is presented as follows:

H1: There are no significant differences in percentage change of credit ratings of financial institutions in post Dodd-Frank versus pre Dodd-Frank time periods.

Hypothesis concerning information content (H2)

Although Morris (2012) provides an assessment of the change in credit risk due to the Dodd-Frank Act, minimal analysis is made in relating that change to investor reaction in subsequent security price movement.

This leads to the second hypothesis which revolves around the notion that credit rating changes possess information content. Stated in the null form, the second hypothesis is presented as follows:

H2: There are no significant differences in information content of earnings for financial institutions in post Dodd-Frank versus pre Dodd-Frank time periods.

Methodology

Study sample

Wallison (2015) identifies two distinct groups of financial institutions that have the potential to feel the systemic regulation effects of Dodd-Frank: 1. Institutions with \$50 billion or more in assets, which as a group might incur additional costs of up to \$20 billion over a five year period as a result of the Act. A research question as it pertains to Dodd-Frank is, are smaller financial institutions affected differently from larger ones when it comes to the change in regulation?

The study periods selected for analysis are the periods 2001-2005, or pre-Act period, and 2011-2015, or post-Act period. The intervening years of 2006-2010 were eliminated from the study so as to not confound results due to the explosion of the housing market and subsequent mortgage debacle and recession.

Financial institutions are segmented into two groups: 1. Those with assets of \$10 billion or less. 2. Those with assets of \$50 billion or more. Table 1 presents the sample summary.

Table 1: Study Samples by Sample Period

Pre-Act Firms		
Year	Assets of \$10 billion or less	Assets of \$50 billion or more
2001	135	27
2002	137	28
2003	140	31
2004	138	30
2005	<u>151</u>	<u>29</u>
Total	701	145
Post-Act Firms		
Year	Assets of \$10 billion or less	Assets of \$50 billion or more
2011	118	21
2012	117	19
2013	121	23
2014	127	22
2015	<u>132</u>	<u>24</u>
Total	615	109

Table samples reflect firms that contain financial data reported on Compustat with security price detail reported on Center for Research on Security Prices (CRSP) and issued credit ratings announcements.

Test of credit risk (H1)

The purpose of this test is to assess the findings, on a broader scale, of Goel and Thakor (2014) who argue that implementation of new regulatory standards impact credit ratings, and therefore regulatory risk. This will be assessed in three different tests. First, all firms in the pre-Act time periods (846) will be compared to all firms in the post-Act time periods (724). Second, pre-Act firms with assets of \$10 billion or less (701) will be compared to pre-Act firms with assets of \$50 billion or more (145). Third, post-Act firms with assets of \$10 billion or less (615) will be compared to post-Act firms with assets of \$50 billion or more (109). This will provide for assessment both within and between sub-samples.

Credit rating announcements during the study periods are obtained from Mergent's Fixed Investment Securities Database (FISD). An average percentage change in credit rating is then computed for each sample group. The one-way ANOVA is a common statistical technique for determining if differences exist between groups. The F test and associated probability level help in determining if it is appropriate to accept or reject the null hypothesis that there are no differences among the groups. In addition, Levene's test (Levene 1960), is used to test if the samples have equal variances.

Test of information content (H2)

A premise set forth by Ball and Brown (1968) and others, is that earnings, more specifically, "unexpected earnings" was causing the stock price to move. Therefore, this extant theory is used to replicate the model first used by Ball and Brown in 1968 in order to establish that there is a correlation between earnings and security prices, that model is shown below. The Dow Jones News Retrieval Service (DJNRS) was used to identify the date that each firm released quarterly financial data for the study periods. This date of data release is correlated to the nearest credit rating announcement per FISD, this is known as the event date. The following model is established for determining information content:

$$CAR_{it} = a + b_1 Pre_1 UE_{it} + b_2 Pre_2 UE_{it} + b_3 Post_1 UE_{it} + b_4 Post_2 UE_{it} + e_{it} \quad (1)$$

Where: CAR_{it} = Cumulative abnormal return firm i, time t

a = Intercept term

$Pre_1 UE_{it}$ = Unexpected earnings for Pre-Act \leq \$10 billion assets firm i, time t

$Pre_2 UE_{it}$ = Unexpected earnings for Pre-Act \geq \$50 billion assets firm i, time t

$Post_1 UE_{it}$ = Unexpected earnings for Post-Act \leq \$10 billion assets firm i, time t

$Post_2 UE_{it}$ = Unexpected earnings for Post-Act \geq \$50 billion assets firm i, time t

e_{it} = error term for firm i, time t

The coefficient "a" measures the intercept. The coefficients b_1 , b_2 , b_3 , and b_4 are the traditional earnings response coefficient (ERC), found to have correlation with security prices in traditional market based studies, periods under study. Unexpected earnings (UE_i) is measured as the difference between the

management earnings forecast (MFi) and security market participants' expectations for earnings proxied by consensus analyst following as per Investment Brokers Estimate Service (IBES) (EXi). The unexpected earnings are scaled by the firm's stock price (Pi) 180 days prior to the forecast:

$$UE_i = \frac{(MFi) - (EX_i)}{P_i} \quad (2)$$

Unexpected earnings are measured for each of the firms during each study period. This is done in order to assess any differences in information content of security prices to earnings releases in each of the study periods.

For each firm sample, an abnormal return (AR_{it}) is generated around the event dates of -1, 0, +1 (day 0 representing the day that the firm's financials were available per DJNRS). The market model is utilized along with the CRSP equally-weighted market index and regression parameters are established between -290 and -91. Abnormal returns are then summed to calculate a cross-sectional cumulative abnormal return (CAR_{it}).

RESULTS

Hypothesis H1-Pre-Act versus Post-Act comparison

As indicated in Table 2, the two groups analyzed using the one-way ANOVA included all firms in the pre-Act sample (846) and all firms in the post-Act sample (724), for a total sample of 1,570 $df(1, 1,568)$. The one-way ANOVA test indicates an F-ratio of 24.168 with an associated p-value of .0000. When the Levene test was performed to assess for homogeneity of variance, a Levene statistic of 6.2875 was obtained with a significance level of .001. This test indicates significance difference in the variances of the groups. These results lead to the rejection of the null hypothesis that there is no difference in the percentage change of credit rating between pre-Act and post-Act firms.

Table 2- Test of Hypothesis 1

One Way ANOVA						
Summary						
Groups	Count	Sum	Average	Variance		
Pre-Act	846	2074.5	2.452	1.89721		
Post-Act	724	-2843.9	-3.930	7.92314		
Source of Variation	SS	df	MS	F-ratio	P-value	
Between Groups	1589.305	1	389.623	24.168	.0000	
Within Groups	918.259	1568	3.209			
Total	2507.564	1569				
Levene Statistic	df1	df2	Two-tail Significance			
6.2875	1	1568	.001			

Pre-Act comparison

As indicated in Table 3, the two groups analyzed using the one-way ANOVA included all firms in the pre-Act sample with less than or equal to \$10 billion in assets (701) and all firms in the pre-Act sample with greater than or equal to \$50 billion in assets (145), for a total sample of 846 $df(1, 844)$. The one-way ANOVA test indicates an F-ratio of 23.619 with an associated p-value of .0000. When the Levene test was performed to assess for homogeneity of variance, a Levene statistic of 1.4930 was obtained with a significance level of .257. This test indicates the non-presence of significance differences in the variances of the groups. As a result, the null hypothesis that there is no difference in the percentage change of credit rating between the two pre-Act samples cannot be rejected.

Table 3- Test of Hypothesis 1

One Way ANOVA					
Summary					
Groups	Count	Sum	Average	Variance	
Pre-Act \leq \$10 B	701	2384.1	3.401	1.45219	
Pre-Act \geq \$50 B	145	288.1	1.987	1.99872	
Source of Variation	SS	df	MS	F-ratio	P-value
Between Groups	2099.421	1	397.113	23.619	.0000
Within Groups	612.552	844	3.112		
Total	2711.973	845			
Levene Statistic	df1	df2	Two-tail Significance		
1.4930	1	844	.257		

Post-Act comparison

As indicated in Table 4, the two groups analyzed using the one-way ANOVA included firms in the post-Act sample with less than or equal to \$10 billion in assets (615) and firms in the post-Act sample with greater than or equal to \$50 billion in assets (109), for a total sample of 724 $df(1, 722)$. The one-way ANOVA test indicates an F-ratio of 22.996 with an associated p-value of .0000. When the Levene test was performed to assess for homogeneity of variance, a Levene statistic of 1.5981 was obtained with a significance level of .309. This test indicates the non-presence of significance differences in the variances of the groups. As a result, the null hypothesis that there is no difference in the percentage change of credit rating between the two pre-Act samples cannot be rejected.

Table 4- Test of Hypothesis 1

One Way ANOVA					
Summary					
Groups	Count	Sum	Average	Variance	
Post-Act \leq \$10 B	615	-2606.9	- 4.239	5.82190	
Post-Act \geq \$50 B	109	-424.1	-3.891	6.01192	
Source of Variation	SS	df	MS	F-ratio	P-value
Between Groups	1879.385	1	391.428	22.996	.0000
Within Groups	717.921	722	3.044		
Total	2597.306	723			
Levene Statistic	df1	df2	Two-tail Significance		
1.5981	1	722	.309		

Hypothesis H2-Test of information content

As indicated in table 5, the b_1 coefficient representing Pre-Act samples of firms with less than or equal to \$10 billion in assets (701) and the b_2 coefficient representing Pre-Act samples of firms with greater than or equal to \$50 billion in assets (145), are both positive (.10 and .15 respectively) and significant at the .01 level of significance. These results indicate that investors, during pre Dodd-Frank Act periods, find earnings to contain information enhancing signals. The b_3 coefficient representing Post-Act samples of firms with less than or equal to \$10 billion in assets (615), and the b_4 coefficient representing Post-Act samples of firms with greater than or equal to \$50 billion in assets (109), are both negative (-.03 and -.09 respectively) and significant at the .01 level of significance. These results indicate that investors, during post Dodd-Frank Act periods, find earnings information content to be much more noisy and less informative. Due to these findings, the hypothesis that there is no significant difference in information content of earnings between the two sample periods must be rejected.

Table 5-Test of Hypothesis 2

Model: $CAR_{it} = a + b_1Pre_1UE_{it} + b_2Pre_2UE_{it} + b_3Post_1UE_{it} + b_4Post_2UE_{it} + e_{it}$						
	a	b ₁	b ₂	b ₃	b ₄	Adj. R ²
	.25 (.90)	.10 (1.67) ^a	.15 (1.73) ^a	-.03 (1.69) ^a	-.09 (1.61) ^a	.223
^a Significant at the .01 level						
CAR _{it} = Cumulative abnormal return firm i, time t a = Intercept term Pre ₁ UE _{it} = Unexpected earnings for Pre-Act ≤ \$10 billion assets firm i, time t Pre ₂ UE _{it} = Unexpected earnings for Pre-Act ≥ \$50 billion assets firm i, time t Post ₁ UE _{it} = Unexpected earnings for Post-Act ≤ \$10 billion assets firm i, time t Post ₂ UE _{it} = Unexpected earnings for Post-Act ≥ \$50 billion assets firm i, time t e _{it} = error term for firm i, time t						

CONCLUSIONS

This study focused on the five year period prior to inception of Dodd-Frank, (2001-2005) and compared this time frame to years subsequent to passage of Dodd-Frank, (2011-2015). Financial institutions, consistent of two sub-samples, institutions of ≤ \$10 billion in assets and institutions of ≥ \$50 billion in assets, were analyzed during these two sample periods.

When assessing the impact of credit rating percentage changes and subsequent risk, findings indicate that when comparing all pre-Act firms to all post-Act firms, percentage change in credit rating is positive, on average, for pre-Act firms while the percentage change, on average, is negative for firms in post-Act periods. Also, overall risk is increased significantly for firms after passage of Dodd- Frank. When comparing pre-Act firms of ≤ \$10 billion in assets to firms ≥ \$50 billion in assets, there is no significant difference between the average change in credit rating. Both sub-samples exhibit an increase in credit rating. Risk is also relatively small and insignificantly different between these pre-Act sub-samples. When attention turns to post-Act time periods, both sub-samples of firms with ≤ \$10 billion in assets and firms with ≥ \$50 billion in assets reflect a decrease in credit rating. In addition, risk increases significantly for both sub-samples.

When assessing the impact of information content of earnings on firms between sample periods and among sub-samples, findings indicate that the Earnings Response Coefficient (ERC) is significantly positive in pre-Act periods

for both sub-samples, while the ERC is significantly negative in post-Act periods for both sub-samples. The implication is that during pre Dodd-Frank periods, investors found the earnings relative to the sample firms to be more informative, on average, whereas in post Dodd-Frank periods investors found earnings in the sample firms to be more noisy and less informative. The later result may be directly correlated to the increased risk that the firms now face, which in turn is passed on to the investor.

Regardless of one's position on Dodd-Frank, this study shows that the Act itself has indeed had profound impact on financial institutions and also on the investors who trade in those firms. In light of this, it can be substantiated that for better or worse, the Act has indeed produced results different from periods prior to its passing.

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