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Discussant’s Response to “An Exploratory Analysis of the Determinants of Audit Engagement Resource Allocations”

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Introduction

The authors provide a thought-provoking analysis of the determinants of labor hour allocations on audit engagements and I thank Raj for asking me to serve as a discussant. I view my role as one of providing a critical analysis of the research. Thus, although I do believe the research is interesting and important, my comments center on ways in which the research could be made even more interesting and useful. I begin by focussing on the lack of motivation for the research question and on the relation between this research and the O’Keefe, Simunic and Stein (OSS; 1992) work. Finally, I provide detailed comments on the research design and data analysis.

Importance of the Question

This paper is an extension of earlier work by O’Keefe, Simunic and Stein. In the OSS work, the authors provide four reasons why research investigating the determinants of the allocation of audit hours is important.

1. To validate previous work on the determinants of audit fees,
2. To increase the power of tests for “learning effects” and “knowledge spillovers,”
3. To aid in understanding the supply side of the market for audit services, and
4. To fuel the interest of those who want to analyze the audit production process.

In the paper being reviewed, there is no discussion of the importance of the question. One of the reasons I enjoy auditing research is that it has the potential to have real-world effects. As I was reading this paper, I kept asking myself, what effect will this have on practice? This paper describes characteristics of resource allocation decisions. Is the purpose an academic exercise or is there potential for audit firm impact? Is the question interesting in and of itself? Is the question interesting as a test of economic theory? Is this theory-building research? Will the results allow as to set standards for the most efficient and/or effective allocation of labor resources? Would one expect differences across firms? The auditing firm that provided the data did so at a cost. What were they expecting from the analysis?

Whatever the case, in making attempts to bridge the research-practice gap, the research should be motivated by discussing its direct or indirect effects on practice.

Relation With Previous Research

There are three basic differences between this paper and the OSS paper. First the authors focus on total domestic hours while OSS combine foreign and domestic hours. Second, this paper investigates different functional forms of the client size relationship

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1 Oss used the same sample and focused on similar issues.
while OSS used only the log transformation, and third, the focus in this paper is on total hours aggregated across the personnel levels while OSS estimate separate equations for each personnel level. There are also other differences in the two papers such as the use of residual analyses by Bell, Knechel and Willingham, but I want to focus this part of my discussion on the three differences that are most likely to affect the results.

**Domestic versus foreign hours**

Although the reasons given by the authors for deleting foreign hours are reasonable, I find it very difficult to accept. The purpose of the study is to analyze the determinants of audit engagement resource allocations. For this particular sample, foreign hours were part of the resource allocation and should not be omitted. At this early stage of research on the audit production process, it would perhaps be best to begin the analysis with a sample of clients for whom only domestic hours were used. After the basic framework is developed, more complex situations using a sample of clients, such as used in this paper, with both domestic and foreign hours, could be investigated.

Nonetheless, as this paper stands, I would like to see a better link between the OSS paper and this work. Some descriptive statistics on the amount of foreign hours across the categories would have been useful information as well as some specific tests and discussion of what differences were forced by the removal of foreign hours.

**Differential form of the size relation**

I have no problem with exploring different functional forms of the size/audit hours relation but I would like to discuss the use of the two equation model. The two equations distinguish between small and large clients with the cutpoint at $25,000,000, determined by examining various plots of the relation between hours and size. OSS do not distinguish between small and large clients but did examine the relation between size and hours. They found that partner and manager hours remained relatively constant over client size categories while senior and staff hours varied with the intersection of the two curves occurring at about $12,000,000. Why the difference in cutpoints? Is it due to the removal of foreign hours?

Regardless of the cutpoint used, I would like to see some sensitivity analysis. How much does the cutpoint influence the results? How much different is a company with $24,000,000 in assets from a company with $26,000,000? In this research, the former would be considered small and the latter, large. In the end I believe much power is lost by categorizing the observations as small and large and believe that it should not be done.

**Total versus disaggregated hours**

OSS develop an *a priori* model and test it on each personnel level. They then test for differences of regression coefficients across labor categories and conclude:

The fact that different grades of labor are not used in fixed proportions as certain client characteristics vary implies that it is inappropriate to use a simple sum of labor hours as the dependent variable in the type of tests performed.

In this research, the multivariate model is developed by testing many combinations of variables. The R²'s are then compared across total hours and the separate levels of labor and no differences are noted. First, I do not understand why the OSS results were ignored and second, I believe no differences were found in this work simply
because of the design. Again, I would like to see a better link between this paper and the OSS paper and some careful analysis of the differences between the two papers.

**Research Design and Analysis**

I would like to turn my attention now to some questions I have on the research design and analysis including issues related to variable choice and measurement and data analysis.

**Variable choice and measurement**

There is no theory which guides the choice of variables for testing the determinants of audit engagement resource allocations and thus we must rely, for the most part, on intuition and expertise. Although I acknowledge that many of the variables are obvious choices, I do believe that time should be spent on motivating and justifying the variable choices. In addition, I believe there are some alternative variables and measurements which should have been considered.

**Hours:** Although it is not made clear, hours appear to be actual hours *charged* to an engagement rather than budgeted. It would seem that hours budgeted would be more reflective of basic labor resource allocation decisions. Any variance would then be reflective of unanticipated problems encountered in the course of the audit or anticipated problems not encountered. A separate analysis of the budgeted and actual would give more insight into factors affecting labor resource allocation decisions and responses of the firm to unanticipated labor allocations.

**Industry:** Companies from the high tech, manufacturing and merchandising industries are included in the sample. I see no reason to believe that total audit hours for a standard audit would necessarily be the same across these industries. Industry differences will surely affect the results and evidence should be provided on industry effects or the lack thereof. OSS did test for industry differences and found that high tech companies were weakly significantly different than manufacturing and merchandising firms. They do not clarify what they mean by weakly significant, but nonetheless, evidence should be provided in this paper on industry effects.

**Client Size:** Although both OSS and this paper use assets as a client size measure, I am wondering if sales might not provide a better measure of the effect of size on labor resource allocation decisions. Some justification should be provided for the use of assets rather than sales and a sensitivity analysis should be conducted indicating that it does or does not make a difference.

**Learning Effects:** This paper uses the tenure of an individual on the audit to measure learning effects while OSS used audit firm tenure. It seems to me that learning effects would be related to tenure within a given industry and not within a given company. Just as a rose is a rose is a rose, a standard audit in a given industry is a standard audit in a given industry is a standard audit in a given industry! If a firm concentrates and is an expert in the merchandising industry, for example, there is no reason to expect significant learning effects if they take on a new merchandising client.

**Opinion Variable:** A variable is used to indicate when the opinion is other than unqualified and is found to be insignificant in the multivariate analysis. Surely an audit which results in a nonstandard opinion will result in more total labor hours, *ceteris paribus*, than the standard audit resulting in an unqualified opinion. I believe that an analysis which is designed to help us better understand the audit production process should initially be confined to the standard audit which results in the standard unqualified opinion. After learning about labor resource allocation decisions on stan-
standard audits the analysis can then be expanded to determine effects of an nonstandard audit. A sample of companies receiving nonstandard opinions could be then compared to similar companies receiving standard unqualified opinions. This design would help not only to determine the specific effects of a nonstandard audit but also would ensure that a sufficient sample of nonstandard audits would be available for analysis.

**Years:** In the paper by OSS they note that the data are from audit firm engagements in 1989. The same data are used in this research and are described as being from engagements spanning the period from 1986 to 1989. That obviously needs to be clarified. If, however, the data span the 1986 to 1989 time period, then I wonder if there may be time period effects. As we move into 1989 there are increasing competitive pressures to cut costs and changes in audit technologies. These changes could affect resource allocation decisions across the years.

**Inherent Risk:** Although clearly the assessed level of inherent risk for a given client will affect the labor resource allocation decision, I hesitate to consider the inherent risk measurement used in this research to be informative. I understand the problems but I find it difficult to accept the assumption that a client with inherent risk just below average is similar to a client with little if any inherent risk or that a client with inherent risk that is just above average is similar to a client with inherent risk significantly above average. We must find a way to develop a continuous measure of inherent risk and to use it not only in academic research but also in audit planning.

**Data analysis**

The part of the data analysis I find very troublesome is the data mining in the multivariate analysis. I believe it is inappropriate to use the sample to determine the variables of importance and then to use the same sample for the multivariate analysis. Such an approach clearly inflates the $R^2$s and they should not be relied upon as a valid measure of the explanatory power of the model. A holdout sample technique should be used where one sample can be used to investigate variables and the other can be used to test the validity of the resulting model.

**Conclusions**

In conclusion, I return to my initial comment that the authors provide a thought-provoking analysis of the labor resource allocation decisions. I do believe, however, that a more careful and rigorous approach to the design and analysis will lead to important and useful insights into the audit production process.

Finally, I would like to return to comments made by Richard Kreutzfeldt (1992) when he was discussing a paper on time pressures encountered in an audit during the 1992 Deloitte & Touch/University of Kansas Audit Symposium. In discussing strategic choices such as staffing decisions made by auditing firms he suggested that the research agenda should be expanded to investigate strategic choices.

It would seem appropriate to begin with descriptive studies of the strategic choices. For example, there are many rich variables considered in staffing decisions. An interesting research project would be to interview staffing directors at various firms to learn about the considerations that go into staffing decisions—considerations such as the risk level of the engagement, industry experience of the individuals, auditing experience, continuity on the engagement, availability of personnel, leveling of schedules between individuals and over the year, etc. Once this descriptive information is obtained, it could be used in further studies of time pressure (Kreutzfeldt 1992, 94).

Kreutzfeldt also comments that audit firms know a tremendous amount about strategic choices. I do not have access to a copy of the questionnaire used to gather data for the Bell, Knechel and Willingham research nor do I have information on how
the questionnaire was developed. OSS do comment, however, that the objective of the original questionnaire was to develop a database on audit engagements for internal purposes, independent of their research. It would seem to me that the first step in gathering information on the audit production process should be indepth interviews prior to the collection of client data. Researchers should rely on the “tremendous knowledge” of practitioners to formulate research questions, to develop research programs and to help us all better understand the audit process and to investigate ways of improving both its effectiveness and efficiency.

References
