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Discussant's Response to "A Behavioral-Economics Approach to Auditors' Risk Assessments"

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Introduction

Let me begin by thanking Raj Srivastava for inviting me to act as practitioner discussant for Professor Waller's paper. Many of you know already that I am in the course of making a transition from practitioner to academic. Let me express the hope, then, that Raj's asking me to act as practitioner discussant is a reflection of his appreciation of my previous work, and not a comment on his perceptions of my progress in this transition.

I propose to discuss this paper by regarding it as an onion. By this I do not mean, of course, that it has a strong smell, that it leaves a bad taste in the mouth, or that it will make our eyes water. Rather, I mean that I intend to examine it in a number of layers, beginning with the outside.

The abstract tells us that real agents are rationally bounded, and that the audit risk model and auditors' risk assessments are inconsistent with a Bayesian rational choice model. I do not find the practitioner within me resisting these views at this level: I find this an acceptable onion.

However, as we peel off this outer skin in order to examine the onion within, we might note that it is a somewhat thin skin. I have not generally found that auditors as individuals are more rational than others, although they may be more analytical, and perhaps more professionally skeptical. Professional standards nowhere assert that the audit risk model is, or should be, consistent with a Bayesian rational choice model. The many potential causes of suicide, despair and divorce among audit partners do not, in my experience, include a deep-rooted concern that our risk assessments might fail to obey the normative canons of Bayesian thought. So it is fair (and may be reasonable) to ask whether these are important and interesting findings. Let us proceed to do so.

Economizing with the truth?

At the second layer of examination we find that Professor Waller is not content simply to identify the non-Bayesian nature of auditor decision-making regarding risk assessments, but is concerned to offer an alternative model: the behavioral-economic model. This model differs from strict rational choice models insofar as it recognizes that:

- Agent errors are possible.
- Choice processes can be improved.
- Convergence with a strict rational choice model may not be worth the agent's incremental costs.
- Divergence from a strict rational choice model need not be presumed to be error.

I like this inner onion too: indeed, I shall be happy to admit the possibility of auditor error, especially if Professor Waller can help us reduce our errors in the future. In this sense, I share with great enthusiasm his search for a model that is both descriptive and prescriptive. In common with a number of other practitioners, however, I should be happy to forgo a great deal of descriptive power in return for a prescription for improvement. This is a particularly salient issue, of course, in the development by auditors of decision aids: the objective is not to build models that emulate current decision making skills, but to provide tools to improve them.

Who among audit practitioners would argue with the view that neither audit decision making, nor the acquisition of information on which decisions might be based, are costless? Not I, certainly. What practitioners might hope is that effective decision aids can play a role in reducing the incremental costs of improved decision making (whether or not that turns out to be a closer approximation to the rational choice model).

As we remove this second layer, and proceed to consider some of the more detailed aspects of this paper, we might note that it, too, wears a little thin in places. For example, why should anyone suppose that any kind of rational choice model is appropriate for the audit context that Professor Waller has chosen to study? Scriptures do not require human activities to be rational: as Professor Waller makes clear, professional standards do not explicitly (and apparently not even implicitly) require rationality. Moreover, rational choice models are models of choice, and the account given in this paper is based upon revision of beliefs. The auditor's task, on the other hand, is to render an opinion, and there are questions of an epistemological and metaphysical nature that can be asked regarding the expression of an opinion:

- Can opinion formation properly be equated with the formulation (and possible revision) of a belief?
- Is opinion formation an act of choice?
- Ought opinion formation be rational?

I take an opinion, in the context of an audit, to be a professionally considered view, a professional judgment. If we find that certain models of belief revision do not correspond to processes used in reaching audit opinions, is this evidence that the opinion formation process is in some sense deficient? Or is it, rather, evidence that opinions are not exactly like beliefs, and that the canons for the formation of professional opinions are not necessarily those normatively prescribed by Bayesians? Auditors, clients, legislators and social scientists all recognize that audit information and audit decision making are not costless. Since society is not willing to wait an infinite time for an audit opinion, nor clients willing to pay infinite amounts, there is no reason to expect that audit decision making will be fully rational, in the sense of using all available information, in an optimal manner. Which of us can be surprised, then, at the idea that auditors might trade off the incremental value of additional information or analysis with their additional costs? Which of us thinks that auditors have infinite computational and processing abilities? Professional standards explicitly recognize the limited nature of the auditing process.

Although I do not propose to develop the point in detail today, we should also note that many auditor assessments (e.g., the assessment of internal control risk as maximum) explicitly do not represent auditor beliefs. They represent economic decisions not to incur the (audit) costs of developing a belief. See, for example, Waller (1993).

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Auditors' Risk Assessments: Inconsistencies with Rational Choice

My argument is that auditors, clients, legislators and social scientists do not expect auditing to follow a strict rational choice model. When we examine the third level of our onion, to study the claimed inconsistencies between auditors' risk assessments and the rational choice model, we may do so with interest to see what inconsistencies are found. That there are such inconsistencies, of course, is not in the least remarkable.

"The audit risk model...decomposes risk in a muddled way that is inconsistent with the Bayesian postulates of coherence and total evidence," Professor Waller writes. What shall we say to this? *If you prick us do we not bleed?* Three questions spring at once to my mind:

- Is it muddled *because* it is inconsistent (with the Bayesian model), or is it muddled anyway *and* inconsistent?
- What does "muddled" actually mean in this context? Confused? Or merely not unboundedly rational?
- Can we not equally express this finding as: "The Bayesian rational choice model fails adequately to represent the decomposition of audit risk which professional standards urge upon auditors?"

This is not the place, and these are not the times, for a *rational* defense of the audit risk model. It has been subject to much criticism for over a decade (see, for example, Kinney 1983; Cushing & Loebbecke 1983; Jiambalvo & Waller 1984; Kinney 1989), and yet is still used by practitioners as a guide for planning decisions regarding alternate sources of audit reliance.

Professional standards themselves do not prescribe the functional form of the model. For example, "The model is not intended to be a mathematical formula including all factors that may influence the determination of individual risk components (AICPA 1981)." Similarly, "The way the auditor considers these component risks and combines them involves professional judgment and depends on his audit approach (AICPA 1983)." Nevertheless, the simple multiplicative approach described by Professor Waller has been widely used to operationalize the model, and appears *prima facie* to be vulnerable to the criticisms found in this paper.

Decomposition

Let us consider the criticism relating to decomposition. AICPA (1983) defines Inherent Risk in terms of the susceptibility to material misstatement, assuming there are no related controls. Control risk is defined in terms of whether material misstatements would be prevented or detected by controls. Professor Waller's comments regarding the difference in timing of preventive and detective controls (*vis-a-vis* occurrence of a material misstatement) are well made and to the point. They are not, however, new (see, e.g., Leslie 1985). The professional waters were further muddied (or should we say, "muddled") by the issuance of SAS 55 (AICPA 1989), which introduced the additional concept of the control environment.

Taking at face value the invitation in SAS 47 cited earlier: "The way the auditor considers these component risks and combines them involves professional judgment and depends on his audit approach (AICPA 1983)", a number of firms have elected to combine their assessments of Inherent Risk (as defined), the implications of the control environment, and preventive controls, so that what they actually assess (in a process sometimes called Environmental Assessment) is the overall susceptibility to material misstatement (see, for example, Grant Thornton 1990). Continuing with

Professor Waller's notation, let us call this *IR**. In like manner, the Control Risk assessment (often based on attribute sampling to test the effectiveness of detective controls) may be referred to as *CR**.

Now, while *IR* and *CR* do capture the concepts defined in professional standards, *IR** and *CR** capture the assessments operationalized by auditors; this recombination is intended to be legitimated by the flexibility incorporated in the standards. Of course, this is essentially what Professor Waller offers as an alternative simplification to reduce analysis costs. Contrary to his position in the present paper, however:

- This is a current operationalization rather than an alternative.
- *IR** may be taken as a primitive, rather than as a simplification – indeed, a strict interpretation of the coherence postulate as set out in this paper *requires* susceptibility to be assessed in the light of everything the auditor actually knows, and does not provide for counterfactual hypothetical assessments; however, if such hypotheticals were permitted, they could be constructed consistently with the three postulates.
- This approach does not, therefore, readily demonstrate the value of a behavioral-economics approach.

Belief Revision

Let us peel another layer off our onion. There still remains the question of how *IR** and *CR** might be assessed and combined, and here we can see behavioral-economics compromises at work in the use of a multiplicative model. The incremental cost of the Bayesian approach is relatively minor, and it is frustrating that, on the whole, auditors have not taken the next step to a discrete Bayesian model (see, for example, Leslie 1985). A little algebra and a few minutes work with a spreadsheet show that we can easily adapt Professor Waller's example to a Bayesian revision model. What is the auditor interested in? Presumably, using Professor Waller's notation it is $P_K'((M) = P_K(M|\text{-}D)$. In other words, audit risk is the risk that there is a material misstatement, given that we did not find one. (In common with Leslie and others, I presume that the auditor knows what to do if a material misstatement is discovered!)

$$P_K(M|\text{-}D) = P_K(M \ \& \ \text{-}D) \ / \ P_K(\text{-}D) = P_K(\text{-}D|M) \ \text{x} \ P_K(M) \ / \ P_K(\text{-}D)$$

where
$$P_K(\text{-}D|M) = P_K(\text{-}D|M \ \& \ \text{-}C) \ \text{x} \ P_K(\text{-}C|M)$$

and
$$P_K(\text{-}D) = P_K(\text{-}D|M) \ \text{x} \ P_K(M) + P_K(\text{-}D|\text{-}M) \ \text{x} \ P_K(\text{-}M) = \\ P_K(\text{-}D|M) \ \text{x} \ P_K(M) + (1 - P_K(M))$$

Letting
$$P_K(M) = IR^*, \ P_K(\text{-}C|M) = CR^*, \text{ and} \\ P_K(\text{-}D|M \ \& \ \text{-}C) = \text{Detection Risk } DR$$

gives
$$P_K(M|\text{-}D) = (IR^* \ \text{x} \ CR^* \ \text{x} \ DR) \ / \ (1 - IR^* + IR^* \ \text{x} \ CR^* \ \text{x} \ DR).$$

Naturally, this gives different results from the usual multiplicative formula. However, assuming that given the changed semantics auditors would assign different values to the risks, it is easy to show that identical results for the required detection risk *DR* can be achieved by taking

$$P_K(M) = IR^* \ / \ (IR^* + 1 - P_K(M|\text{-}D)).$$

Figure 1 shows what values would need to be assigned to *IR** in the case of Professor Waller's example (page 118), in order for the Bayesian model to require the

same detection risk for an audit risk of 5% as the multiplicative model in the example did.

Figure 1

Figure 1a: Multiplicative Model. Detection Risks to give an Audit Risk of: 5%.

		Internal Control Risk		
		Low 0.18	Moderate 0.44	High 1.00
Inherent Risk				
Low	0.36	0.77	0.32	0.14
Moderate	0.67	0.41	0.17	0.07
High	1.00	0.28	0.11	0.05

Figure 1b: Bayesian Revision Model. Detection Risks to give an Audit Risk of: 5%.

		Internal Control Risk		
		Low 0.18	Moderate 0.44	High 1.00
Inherent Risk				
Low	0.27	0.77	0.32	0.14
Moderate	0.41	0.41	0.17	0.07
High	0.51	0.28	0.11	0.05

The data in the example, of course, is somewhat speculative, and Figure 2 shows a similar comparison for the published "definitions" of another firm (Grant Thornton 1990).

Figure 2

Figure 2a: Multiplicative Model. Detection Risks to give an Audit Risk of: 5%.

		Internal Control Risk			
		Limited 0.13	Moderate 0.24	Significant 0.56	Maximum 1.00
Inherent Risk					
Low	0.50	0.75	0.42	0.18	0.10
Moderate	0.71	0.53	0.30	0.13	0.07
High	1.00	0.38	0.21	0.09	0.05

Figure 2b: Bayesian Revision Model. Detection Risks to give an Audit Risk of: 5%.

		Internal Control Risk			
		Limited 0.13	Moderate 0.24	Significant 0.56	Maximum 1.00
Inherent Risk					
Low	0.34	0.75	0.42	0.18	0.10
Moderate	0.43	0.53	0.30	0.13	0.07
High	0.51	0.38	0.21	0.09	0.05

I am not claiming that either firm would, in fact, select these values in a Bayesian model. We can note, however, that the results for the two firms are comparable, and we can ask what meaning could be given to such values in the Bayesian interpretation.

It is interesting to note that even in this Bayesian model, behavioral-economics is still at work:

- As Leslie (1985) notes, this approach uses discrete approximations to continuous distributions.
- The analysis assumes that misstatements detected and corrected by controls are known to the auditor (as part of K); if it is assumed that controls detect and correct without auditor knowledge, the resulting formulae are more complex; if detected and corrected misstatements may or may not be known to the auditor, even more sophistication will be necessary.

Professor Waller further argues that extra-conditional information introduces additional inconsistencies with the rational choice model, and I see no reason to disagree.

Second-Order Uncertainty

We are now ready to peel away the last layer of our onion, and study the little piece in the middle. The coherence postulate of the rational choice model requires that beliefs be representable as unique subjective probabilities. You may think, as many do, that this is a limitation in the model itself, but that is a story for another day. Ignorance is a feature of the auditor's environment, and other formulations seek to address this directly (see, for example, Shafer & Srivastava 1990).

It is true that professional standards implicitly recognize second-order uncertainty. In practice, it may be the case that second-order uncertainty is a consequence of behavioral-economics, rather than an argument for this approach. In my experience, few auditors actually believe that client environments can be partitioned into just three isomorphism classes, or that the values for inherent risk used in their firms' approaches are representative of long-run frequencies. Behavioral-economics has caused auditors to develop methods that incorporate second-order uncertainties. It may well be, of course, that such uncertainties would have existed without current approaches to risk assessment - but Professor Waller does not show evidence for this, and nor shall I. The question remains, however: if my beliefs about client circumstances cannot be represented by unique subjective probabilities, does that fact exhibit shortcomings in me, in my beliefs, or in the applicability of the rational choice model that requires this representation?

Conclusions

Now that we have reduced this paper to a pile of onion rings, it may be time to take stock of what we have achieved via this tangential approach, before we break out the condiments of congratulations. Let me begin by noting that the paper presumes throughout that risk assessments are individual choices - and this is by no means the whole story. Professor Waller argues that auditors are (at best) boundedly rational. I believed this before I read this paper, and I believe it still.

He argues that professional standards and practices are inconsistent with Bayesian postulates for a rational choice model. It is not clear that professional standards are inconsistent with such postulates, although they neither mandate nor even encourage a Bayesian approach. However, I find my profession guilty as charged regarding common practices.

He argues that a behavioral-economics approach will help us to better describe and prescribe auditor performance and divergence from a rational choice model. As to description, I accept his point. As to prescription, I believe that in many places the profession is already making use of such an approach - although there are no doubt

further opportunities to be seized. Perhaps it would be equally valid to say that such an approach will assist researchers to better describe and prescribe the work of auditors.

It would be presumptuous indeed to suggest that the work of researchers is inherently more noble or important than that of auditors, and this is not my intention. I see the laying down of normative approaches without regard for practical feasibilities as somewhat sterile, and the documentary description of auditor shortcomings as a sorry and sordid affair. Researchers have the opportunity, through carefully considered prescription, to add value to the auditing profession and to society. In this sense, at least, Professor Waller clearly knows his onions! I congratulate him on an interesting and thought-provoking paper.

References

American Institute of Certified Public Accountants. 1981. *Audit Sampling: Statement on Auditing Standards* No. 39 (Section 350).

_____. 1983. *Audit Risk and Materiality in Conducting an Audit: Statement on Auditing Standards* No. 47 (Section 312).

_____. 1989. *Consideration of the Internal Control Structure in a Financial Statement Audit: Statement on Auditing Standards* No. 55 (Section 319).

Cushing, B. E. and J. K. Loebbecke. 1983. Analytical Approaches to Audit Risk: A Survey and Analysis. *Auditing: A Journal of Practice and Theory* (Fall): 23-41.

Grant Thornton. 1990. *Audit Manual.* London: Longman.

Jiambalvo, J. and W. S. Waller. 1984. Decomposition and Assessments of Audit Risk. *Auditing: A Journal of Practice and Theory* (Spring): 80-88.

Kinney, W. R. 1983. A Note on Compounding Probabilities in Auditing. *Auditing: A Journal of Practice and Theory* (Spring): 13-22.

_____. 1989. Achieved Audit Risk and the Audit Outcome Space. *Auditing: A Journal of Practice and Theory* (Supplement): 67-84.

Leslie, D. 1985. *Materiality: The Concept and its Application to Auditing.* CICA. Appendix A.

Shafer, G. & R. P. Srivastava. 1990. The Bayesian and Belief-Function Formalisms - a General Perspective for Auditing. Auditing: A Journal of Practice and Theory (Supplement): 110-137.

Shakespeare, W. 1596. *The Merchant of Venice.* London. Act III Scene 1.

Waller, W. S. 1993. Auditors' Assessments of Inherent and Control Risk in Field Settings. *The Accounting Review* (October): 783-803.