Journal of Accounting Literature 32 (2013) 88–113

Contents lists available at ScienceDirect

Journal of Accounting Literature

journal homepage: www.elsevier.com/locate/acclit

Review of choice-based, matched, and other stratified sample studies in auditing research

Iris Stuart [a,*], Yong-Chul Shin [b], Donald P. Cram [c], Vijay Karan [d]

[a] Norwegian School of Economics NHH, Norway
[b] University of Massachusetts Boston, United States
[c] State University of New York at Oswego, United States
[d] California State University, Fullerton, United States

ARTICLE INFO

Keywords:
Matched samples
Audit quality
Auditor switches
Audit litigation
Audit fees
Auditor reporting
Bankruptcy prediction
Going-concern qualification

ABSTRACT

The use of choice-based, matched, and other stratified sample designs is common in auditing research. However, it is not widely appreciated that the data analysis for these studies has to take into account the non-random nature of sample selection in these designs. A choice-based, matched or otherwise stratified sample is a *nonrandom* sample that must be analyzed using *conditional* analysis techniques. We review five research streams in the auditing area. These streams include work on determinants of audit litigation, audit fees, auditor reporting in financially distressed firms, audit quality and auditor switches. Cram, Karan, and Stuart (CKS) (2009) demonstrated the accuracy of conditional analysis, compared to unconditional analysis, of nonrandom samples through the use of simulations, replications, and mathematical proofs. Papers since published have continued to rely upon questionable research, however, and it is hard for researchers to identify what is the reliability of a given work. We complement and extend CKS (2009) by identifying audit papers in selected research streams whose results will likely differ if the data gathered are analyzed using conditional analysis techniques. Thus research can be advanced either by replication and reanalysis, or by refocus of new research upon issues that should no longer be viewed as settled.

* Corresponding author.
E-mail address: Iris.Stuart@nhh.no (I. Stuart).

0737-4607/$ – see front matter © 2013 University of Florida, Fisher School of Accounting. Published by Elsevier Ltd. All rights reserved.
http://dx.doi.org/10.1016/j.acclit.2013.10.004

1. Introduction

Audit researchers have used choice-based, matched, and other stratified sample research designs frequently in research studies. They do so primarily for their power to reveal statistically significant findings following collection of relatively small data sets. Choice based and matched samples are frequently used to economize when data collection is costly, especially when outcomes of one sort are rare and few would be obtained under random selection. The research design of these non-random samples provides for efficient collection of fewer data points. For example, all firms experiencing auditor litigation during a period may be identified and compared to a control sample of matched firms (e.g., matching to each litigation firm by industry and firm size) rather than gathering data for all non-litigation firms. This is appropriate if a factor such as industry or firm size is likely to have a large effect on the likelihood of auditor litigation but not itself be of primary research interest. In such a case, the use of a matched sample design allows the researcher to focus power on estimating parameters for variables of interest while applying control for those "nuisance" variables. Or, if nuisance variables are likely to have a nonlinear effect, it suffices to match on those variables without modeling and estimating their effects explicitly. These justifications for use of non-random samples, stratified by choice and/or matching sets, have been explored by Cram, Karan, and Stuart (CKS) (2009). These types of studies, plus some additional studies in auditing which use stratified samples, require analyses taking the stratifications into account, which has often not been done.

Specifically, CKS (2009) identify six distinct research design categories of studies using choice-based and matching techniques in accounting research. They identify three general errors which can apply to analysis of choice-based and matched samples. This paper complements and extends that work by providing specific details on the use of choice-based and matched sample designs in five research streams within published auditing research from 1980 to 2003. This paper also adds a discussion of auditing papers in an additional nonrandom research design category—a stratified sample—whose analysis can suffer one of the same possible errors. Because current research often builds on prior research, the contribution of this paper will allow new researchers to identify past research whose results may change if analyzed using conditional techniques.

CKS (2009) replications show that the use of conditional techniques sometimes: reverses a research conclusion, identifies variables as significant that are not significant, identifies a factor as having a positive (negative) influence when it has a negative (positive) influence on the dependent variable, and renders significant variables insignificant. Given that new auditing research projects draw on the results from past research to motivate new research questions, this paper contributes to the literature by drawing attention to potential problems that might be present in these past research streams.

CKS (2009) provided summary reporting on their analysis of 83 studies using choice-based or matched samples in auditing research during 1980–2003. We focus upon works in just five research streams that illustrate the problems and include the main areas of concern for auditing research. We tabulate 70 papers from the time period reviewed and discuss the potential errors of model specification therein, plus discuss selected recent studies, in the context of research streams. For each tabulated paper, we provide summary information and state which of the three errors in CKS (2009) apply, and for many we provide specific discussion of what would be the preferred analysis. Thus we provide numerous examples that should be helpful for researchers seeking to extend research in these fields. We suggest how these studies might be re-examined, and provide guidance on how and when to apply the conditional analysis in each of seven distinct research designs.

Auditing researchers often reason persuasively that industry or size or other factors have large effects that must be controlled for, use those factors in selecting their sample, but continue to perform analysis that does not account for the matching. Matching on an effect does not accomplish the desired control if an unmatched method is then used to analyze the sample. Therefore, the researchers have created a strong possibility that their discussion of the relative importance of other factors of research interest is not justified. Briefly, their analyses are limited by the omission of multiple correlated variables, which leads to an unpredictable bias in the estimated coefficients and standard errors. This paper shows the effect of this bias in five audit research streams.

CKS (2009) classified the use of unconditional analysis in place of analysis conditioned on the results of the matching or choice-based selection as *Error 1*. Error 1 is a fundamental, logical error, one of internal validity: the results asserted do not follow from the data analyzed. Statistical analysis generally requires modest assumptions which might not be strictly true (such as assumptions of normality in error distributions), so the validity of the conclusions depends upon the validity of those assumptions. But there is no set of statistical assumptions that fits the application of unconditional analysis to data that has been selected non-randomly; the estimates reached are simply not the same as the conditional analysis results that are justified by statistical assumptions. Although Koetse, Florax, and de Groot (2005, 2010) suggest an adjustment for addressing primary study misspecification in meta-analysis, the adjusted analysis requires further problematic assumptions and might not be practical to apply. Thus, the negative effects of Error 1 in the primary studies may continue to be propagated even in meta-analysis.

A related complication in the analysis arises if the matching has not been perfect (e.g., if matching is done on a continuous variable such as assets or sales, and "closest" rather than exact matches are accepted). In such cases, the remaining gap in size between treatment and control observations could have a substantial effect, and a variable measuring that difference in size needs to be included in the analysis of differences to "soak up" its effect. Equivalently, that effect could be controlled for by including the size variable itself in an analysis where matching is otherwise controlled for by including pairwise dummy variables (CKS, 2009). Audit researchers often do not employ this refinement of matched analysis when it is needed. CKS (2009) classify this as *Error 2*. In essence, however, this error is just an omission of sensitivity analysis to corroborate findings. If the remaining gap in size does not have a significant effect on the outcome, then the results would be entirely valid.

Choice-based, matched, and other stratified samples are not randomly selected. For results, based on such samples, to be generalizable, it usually would be necessary to adjust analyses to take into account the differing sampling rates in strata of the collected data. This can be done by reweighting each observation according to its stratum's representativeness of the general population and the analysis does not then need to further account for matching CKS (2009). Analyses employing logit regression are exempt from the need for reweighting, except for inferences involving the intercept terms. Also exempt are within-subject designs, such as studies of audit fees paid by individual firms before and after a given event, where the sample can be viewed as representative of the sample of all firms existing in both time periods. CKS (2009) refer to the omission of necessary reweighting as *Error 3*. For ordinary regressions, for univariate *t*-tests, and for other non-logit analyses that do take matching into account, the omission of reweighting undermines external validity.

The remainder of the paper is organized as follows. In the next section, we discuss the research designs used in choice-based and matched sample studies in auditing research and categorize them into seven distinct groups. Research design groups vary in terms of the errors that may occur during analysis and accordingly their remedies for avoiding the errors vary according to the research design. In Section 3, we discuss and tabulate errors in five major audit research streams where research may have been most affected. Finally, we summarize and conclude.

2. Research designs in audit research and errors in analyzing nonrandom samples

A *choice-based research* design is one where a subsample consisting of cases having one outcome (e.g., firm-year observations where a bankruptcy or a going concern qualified audit opinion occurs) is collected, and then a comparison sample of control observations is selected from available data having different outcomes, and then the analysis to follow uses the outcome as the dependent variable to be explained by other variables (CKS, 2009). Choice-based sampling is useful when data collection is costly and one category of the outcome to be explained is rare, so random sampling from the population would not yield very many observations of the rare type unless very costly, large samples were collected.

A matched sample research design is one which incorporates non-proportional sampling by its selection of pairs, triples, or other clusters of observations that are similar in certain respects. Matched clusters may consist of "within-subject" data (e.g., the pair of before-treatment and after-treatment

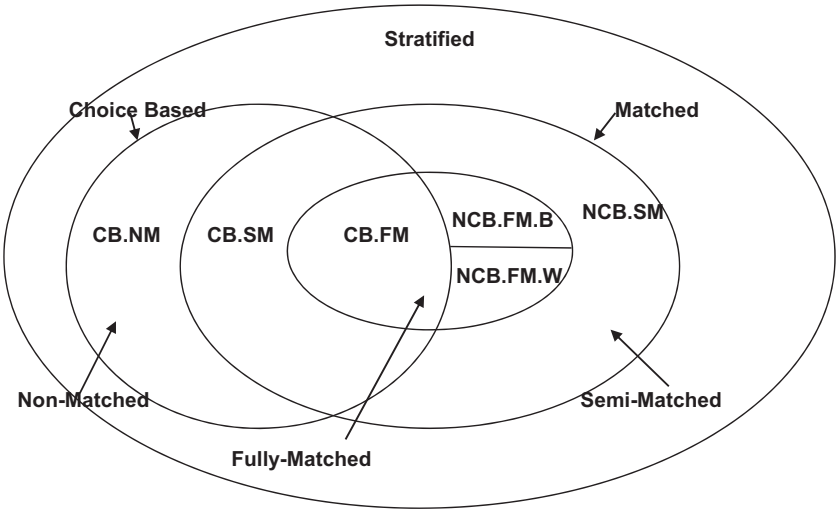

Fig. 1. Research design categories for choice based and matched samples.
Modified from Fig. 1 in CKS (2009).

observations of the same firm or other subject).[1] In a cross-sectional study, clusters may consist of pairs of firm-year observations that a researcher assesses are similar on observable and available characteristics such as year, industry, and size. These are "between-subject" studies and, as will be documented, have often been misanalyzed.

Within the choice based research design, the control sample is often chosen based not only upon the outcome but also by matching on other variables. Thus a choice-based sample may or may not also be a matched sample; to be both, the control sample must be selected on the outcome variable to be explained in analysis as well as matched to the case sample on other variables. A sample of litigated firms paired to non-litigated firms, with the pair-matching by industry and closest size, is both. If the comparison firms were chosen randomly from the stratum of non-litigated firms, this would be just choice based. We distinguish between "fully-matched" samples in which each case observation is uniquely associated with one or more controls, and "semi-matched" samples. The latter are samples that have pairings of case and controls that are nominally but not meaningfully unique. For example, if several case observations in one industry are each matched to a different randomly selected control from that industry, what is achieved is what we term "semi-matching"; the pairs can just as well be combined into matched many-to-many clusters. Each industry-case cluster and each industry-control cluster are strata.

A different kind of nonrandom design is one that is merely stratified, meaning that samples from different subpopulations are selected at varying sampling rates. Choice-based and matched samples involve disproportionate sampling in that way, and are special cases of stratified sampling. Models estimated on a stratified sample are not generalizable to the larger population, unless the data is reweighted in the analysis so that the true subpopulation sizes are proportionally represented.

These approaches to research design lead to seven distinct categories (see Fig. 1), here described as (1) Choice Based Non Matched (CB.NM), (2) Choice Based Semi Matched (CB.SM), (3) Choice Based Fully Matched (CB.FM), (4) Non Choice Based Semi Matched (NCB.SM), and (5) Non Choice Based Fully Matched within-subjects (NCB.FM.W), (6) Non Choice Based Fully Matched between-subjects

[1] Within-subject, before-and-after studies are not usually self-described as being matched samples in accounting research; we found relatively few in our review of audit research. Unlike between-subject studies, accounting researchers have usually analyzed these taking into account the matching of subject with itself at a later time. Many within-subject studies appear in experimental work and are appropriately analyzed: in analysis the term "blocking" refers to the control for matching that is accounted for.

(NCB.FM.B), and (7) Stratified but neither choice-based nor matched. All seven categories are nonrandom samples and require different forms of analysis.

Table 1 summarizes research designs, the potential for error in each design, and the correct analysis. The Table reveals that Error 1 can apply to all the matched sample categories, but not to choice-based samples that do not involve matching. Error 2 can apply to the same matched sample categories as Error 1 except NCB.FM.W (where matching is exact). In our review of individual papers for this error we will indicate N/A when closest matching is not used, so correction for it is not needed. Lastly, Error 3 can apply to all research categories but NCB.FM.W. Stratified samples are only subject to Error 3. A "logit exemption" to the need for reweighting applies to logit regression models in CB.NM, CB.SM, and CB.FM categories, as long as fully saturated models are used. In auditing research, we note there are just a few studies employing reweighting to attempt to correct for such problems. In our review of individual papers for this error we will indicate N/A when reweighting is not needed. The vast majority of auditing studies using choice-based and matched samples do not, however, employ reweighting.[2]

2.1. Errors in audit research using nonrandom samples from 1980 to 2003

Nonrandom sampling methods have been used in auditing research, appearing in at least 83 articles published from 1980 to 2003 (CKS, 2009). We sought to review every such paper published prior to 2004 that we found through extensive searching, in order to avoid the appearance of providing selective criticism and to provide maximum benefit to continuing audit researchers, but then for brevity limit our discussion to those that can be considered within five research streams.[3] We end our search in 2003 because the CKS (2009) paper became widely available in 2004.

We find that the vast majority of the papers reviewed suffer from one or more of the CKS (2009) errors; many are nonetheless cited and relied upon in continuing research without qualification, perhaps as determination of error requires interpretation with authority that many researchers might not be granted. As reported in Table 2, 52 of the matched sample papers do not explicitly control for matching in their analysis, thus committing Error 1. In the pair-matched papers among these 52, the researchers should have evaluated pair-wise differences rather than pooling all the data. The correct analysis also could have been implemented, simply by including dummy variables for each matched set. We find that 29 of the papers suffer from lack of explicit control for imperfection in matching (CKS Error 2) as reported in Table 2. As shown in Table 2, we found 61 having CKS Error 3. Numerous papers would be exempt for their use of a choice-based logit regression, at least with respect to inferences based on non-intercept coefficients, as long as the choice-based logit model was fully saturated. All but one of the matched sample papers using logit, however, are not fully saturated, hence suffer from Error 1. These also suffer Error 3, because if matching is not accounted for in the logit regression, then reweighting is needed to ensure valid results. A reweighted model, however, would not need to account otherwise for the matching.

[2] Many, instead, rely upon a special result which we term the "logit exemption". The logit exemption, at least as it applies to simple choice-based sampling, has been known in accounting research since Palepu (1986). Notably, Maddala (1991) who described the simple version of the exemption in an invited paper in *The Accounting Review*, has been oft-cited and is at times paraphrased, imprecisely, to represent that as long as logit regression is used, coefficients other than the intercept will not be biased. Zmijewski (1984) also has been cited on this point. It has not been understood that if matching is used within choice-based samples, however, it is then necessary for the analysis to be fully saturated, i.e. for an intercept to be estimated for each matched set. Then each of those intercepts are likewise biased, although coefficient estimates on included variables of research interest will be consistent. Accounting researchers have also applied unweighted estimation to probit, OLS, discriminant, and univariate analyses where the logit exemption obviously does not apply. These analyses do not yield valid estimates. An extended version of the logit exemption is proven in CKS (2009). The logit exemption allows the use of unweightedlogit regressions to analyze samples that are choice-based, whether matched or not, data, delivering asymptotically unbiased coefficient estimates and standard errors on non-intercept variables, *providing* that the model is "fully saturated", i.e. that an intercept is included for every level of each matching variable. The typical choice-based application in accounting research, however, involves matching, and erroneously estimates an unweighted and unsaturated model, which does not control for the matching variables' effects and does not enjoy the logit exemption from need to weight data to reflect population proportions.

[3] Our search has not included auditor experimental studies, where within-subject matching is routinely used and usually is analyzed correctly.

Table 1
Description of research designs and corresponding potential errors.[a]

Research design group	Treatment group	Control group	Error 1	Error 2	Error 3	Selected guidance
CB.NM	Selected on basis of outcome	Randomly selected from firms having opposite outcome.	N/A	N/A	✓	If logit, run regular logit, and only the intercept is biased (which may be corrected). If not logit, apply reweighting (e.g., WESML).
CB.SM	Selected on basis of outcome	Randomly selected from firms having opposite outcome, with matching by industry, year, size and/or group level.	✓	✓	✓	If logit, run conditional logit with groups identified as strata, to avoid Error 1 and by logit exemption, to avoid Error 3. If OLS, include dummy variables for every matched set (although lesser Error 3 still present) or apply reweighting for each matched set (avoiding both Errors 1 and 3).
CB.FM	Selected on basis of outcome	Unique firm having opposite outcome selected as match for each firm in treatment group, with matching on "closest" value in last matching variable.	✓	✓	✓	If logit, run conditional logit with pairs identified as strata. If OLS, include dummy variables for pairs (although lesser Error 3 still present), or reweight each observation differently by its own sampling rate.
NCB.FM.W	Random selection	Same subject, usually before and after.	✓	N/A	N/A	If OLS, include pair identifier dummies or analyze as differences-on-differences. If MANOVA, block on subject. Univariate comparisons okay. Reweighting not required.
NCB.FM.B	Random selection	Unique firm selected as match for each firm in treatment group from matching firms by similarity or opposite-matching, typically with final match selection on "closest" value of last variable.	✓	✓	✓	If OLS, include pair-identifier dummies and linear (and perhaps more) terms for imperfectly matched variables, or analyze as differences-on-differences including differences of imperfectly matched variables. Reweighting required. If opposite-matching is employed, there may be further issues not developed in this paper.
NCB.SM	Random selection	Randomly selected from firms with similarity- or opposite- matching.	✓	✓	✓	If OLS, include group dummies. If MANOVA, block on groups. Reweighting (e.g. WESML) required. If opposite-matching is employed, there may be further issues not developed in this paper.
STRATIF	Stratified only	Select at different sampling rates, but within every group of the population.	N/A	N/A	✓	Apply reweighting according to sampling rate in each stratum.

(✓) Indicates that the error can potentially occur in this research design. N/A indicates that it cannot occur for this research design.
CB.NM, CB.SM, CB.FM: choice-based non-matched, semi-matched, and fully matched. NCB.FM.W, NCB.FM.B, NCB.SM: non-choice-based fully matched within, between, and semi-matched.
STRATIF: stratified sample, not also involving matching or choice-based selection.
Error 1: Unconditional analysis, when analysis conditional upon effects of matching variables is needed.
Error 2: Failure to control for effect of imperfectly matched variables when those are present.
Error 3: Failure to reweight observations according to appropriate sampling rates when reweighting is needed.
[a]This table adapted from CKS (2009, Table 4), and extended.

Table 2
By Research stream.

Research stream	Paper count	Design							Error types		
		CB.NM	CB.SM	CB. FM	NCB. FM.W	NCB. FM.B	NCB. SM	STRATIF	Has Error 1	Has Error 2	Has Error 3
1. Determinants of audit litigation	5	0	4	1	0	0	0	0	5	0	5
2. Audit fees	8	0	0	1	3	2	1	1	4	1	5
3. Auditor reporting in financially distressed firms	32	6	7	15	0	2	1	1	23	14	31
4. Audit quality	11	1	0	2	0	6	2	0	10	6	8
5. Auditor switches	18	0	5	5	0	7	1	0	14	9	16
Subtotal	74	7	16	24	3	17	5	2	56	30	65
(Duplications)[a]	(4)	0	(2)	(2)	0	0	0	0	(4)	(1)	(4)
Total	70	7	14	22	3	17	5	2	52	29	61

CB.NM, CB.SM, CB.FM: choice-based non-matched, semi-matched, and fully matched. NCB.FM.W, NCB.FM.B, NCB.SM: non-choice-based fully matched within, between, and semi-matched.
STRATIF: stratified sample, not also involving matching or choice-based selection.
Error 1: cell reports count of audit papers that use unconditional analysis, when analysis conditional upon effects of matching variables is needed.
Error 2: count of audit papers that fail to control for effect of imperfectly matched variables when those are present.
Error 3: count of audit paper that fail to reweight observations according to appropriate sampling rates when reweighting is needed.
[a] Duplicates are: Geiger and Rama (2003) in 2 and 3; Krishnan and Krishnan (1997) in 1 and 5; Schwartz and Soo (1995) in 3 and 5; and Shu (2000) in 1 and 5.

3. Discussion of audit research studies by research stream

We summarize the occurrence of the three types of errors in five research streams in the audit literature in Table 3. Details on all papers in each research stream appear in separate tables referenced in each section. In each research stream, we discuss several papers in the stream to illustrate the analysis of a nonrandom sample. While insights do not differ greatly across streams, these specific discussions contribute to provide, hopefully, sufficient authority to researchers interested in addressing the issues within each stream.

3.1. Research stream 1: determinants of auditor litigation

Table 3, Panel; A provides details of five papers that investigate determinants of auditor litigation using choice-based samples. All five papers commit Error 1 by omitting required dummy variables. The authors argue convincingly that industry and/or year are important but the analyses do not control for them. The papers are relatively free of Error 2 but all suffer Error 3, the need for reweighting to population portions. Since saturated models are not employed in the logit analyses, they do not enjoy the logit exemption for reweighting. Error 2 does not apply to 4 of the 5 papers because the control sample is matched to the choice-based sample by industry and year, not by size, so control for closest match is not needed. Only one paper arguably suffers from Error 2, the failure to control for differences in size when matching is not exact. Lys and Watts (1994), who selected their control sample using the closest match in terms of total assets. The remaining gap in logsize between their treatment and control observations could have a substantial effect, and a variable measuring that difference in logsize ought to be included in the analysis of differences to "soak up" its effect. Lys and Watts include, instead, size (unadjusted) as a variable in their analysis. Including logsize(and perhaps logsize squared) would be more internally consistent and would more fully ensure that differences in logsize are not driving results.

The impact of erroneous analysis in these papers carries through many other papers that rely upon them for their measurement of audit litigation risk. As one example, Krishnan and Krishnan (1997),

itself a CB.SM paper, relies upon Stice (1991)'s reported coefficients for a Z-score-type index of auditor litigation likelihood. This application is inappropriate. If Stice's sample had been choice-based but not matched (CB.NM), then the coefficients other than the intercept would have been accurate and higher index values would have represented higher auditor litigation likelihood. However, use of an unconditional index based on the conditional estimates from a matched sample does not work. The index omits year-industry-specific intercepts that cannot be estimated in a matched sample and that would likely be important (as Lys and Watts (1994), Stice (1991), Shu (2000), and Heninger (2001) argue). As another more recent example, Krishnan and Zhang (2005) use a *Z*-score-like measure of audit litigation risk, but one based on the coefficients from Shu (2000). This unconditional index has the same problem as the Stice index.

It seems that the impact of misanalysis of choice based samples significantly affects the estimation of audit litigation risk, which then continues to influence research in corporate governance and other areas.

3.2. Research stream 2: audit fees

A literature on pricing audit services has shed light on the process of fee negotiation between audit firms and their clients. Eight papers from our sample contribute to this literature.[4] Table 3, Panel B summarizes the details for each paper. Four of the papers in this research stream suffer from Error 1, one suffers from Error 2 and five papers suffer from Error 3. We discuss several of the papers to illustrate how conditional analysis could lead to potential improvement in the analysis.

Simunic (1980) develops a model for determinants of audit fees and empirically tests it by OLS regressions. He collected a stratified sample by surveying financial officers at some of the 8077 U.S. public companies within four categories (Big n vs. non-Big n auditor crossed with auditee size greater or lesser than $125 million), selecting at random within each category. The OLS regression included intercepts for Big n vs. non-Big n (literally a dummy for Big n, and an overall intercept). However to account explicitly for the stratification, the OLS regression should have included dummy variables for each category, so three dummies plus the overall intercept were required. For his results to be generalizable to the universe of public companies, the regression would have to be reweighted: each observation should be given weight equal to the inverse of the sampling rate for its category. While Simunic (1980) finds evidence of a Big n discount, attributable to scale economies, subsequent studies, such as Francis (1984), Craswell, Francis, and Taylor (1995), and Palmrose (1986), detect a Big n price premium, plausibly attributable to a higher quality of assurance offered by these firms (see Menon & Williams, 1999, p. 117). Perhaps a re-estimation of Simunic's data could reconcile the reported results to those reported by other researchers who used entirely random samples.

Two studies that use low-balling to explain audit fees also suffer from Error 1: Turpen (1990) employed a stratified sample similar to Simunic's sample. Turpen's OLS analysis omitted the dummy variable for the over the counter (OTC) versus exchange traded securities. Walker and Casterella (2000) collected a sample of 80 pairs matching by size and by industry code. Their analysis in effect omitted 80 indicator variables necessary to account for matching. In addition, for their results to be generalizable, the OLS regressions in each needed to be reweighted using inverse sampling rates as described above.

Three studies exploring changes in audit fees do not suffer from any of the three errors. Maher, Tiessen, Colson, and Broman (1992), Sanders, Allen, and Korte (1995), and Iyer and Iyer (1996) each employ matching only in the sense that they are within-subject studies. They collect data for 78 firms, 159 cities, and 270 U.K. firms at two dates: each firm-year observation is "matched" to a later year's observation for the same firm. They take pairwise differences, and regress changes in fees on variables that are each changes in some other measure. This accounts properly for the matching. In the OLS regression setting, this is equivalent to including 78, 159, and 270 pair-indicator variables, respectively, in a regression on the data for both years pooled together. These regressions are weighted

[4] This is the only research stream which has been studied by a meta-analysis: Hay, Knechel, and Wong (2006) provide a review of 100 or so papers including the earliest seven of these eight. Their conclusions may be affected by the analysis problems herein discussed.

Table 3

Author, journal, title, design	Sample	Control sample	Analyses	Error 1	Error 2	Error 3
Panel A: Determinants of auditor litigation (research stream 1)						
Lys and Watts (1994). *Journal of Accounting Research*, "Lawsuits against auditors." CB.FM	153 firms whose auditors were and were not sued from 1955 to 1994	Fully matched 153 firm-year observations, by year, industry (SIC3), and closest size	OLS and logit regressions of litigation or not (logit results not reported)	Yes	No	Yes
Stice (1991). *The Accounting Review*, "Using financial and market information to identify pre-engagement factors associated with lawsuits against auditors." CB.SM	Identified 49 cases of auditor litigation during 1960–1985	Created 2 semi-matched samples from Compustat firms; one is matched on year only and then random selection, the other is matched on year and industry (SIC3)	Probit regression of auditor litigation or not	Yes	N/A	Yes
Krishnan and Krishnan (1997). *The Accounting Review*, "Litigation risk and auditor resignations." CB.SM	141 firms whose auditors resigned during 1989–1995	Following Stice (1991), created 2 semi-matchedsamples of firms who dismissed auditors (auditors did not resign): industry-year matched dismissals and year only matched dismissals.	Logit regression - resignation versus dismissal	Yes	N/A	Yes
Shu (2000). *Journal of Accounting and Economics*, "Auditor resignations: clientele effects and legal liability." CB.SM	269 auditor resignations from 1985 to 1996.	Two control groups: (1) for each auditor resignation firm ten firms are randomly drawn from Compustat for the same year, (2) 433 firms are selected from 1263 randomly selected client-initiated auditor changes between 1987 and 1995	Logit regression – resignation on litigation risk, clientele mismatch, and others	Yes	N/A	Yes
Heninger (2001). *The Accounting Review*, "The association between auditor litigation and abnormal accruals." CB.SM	67 firms with auditor lawsuits from 1969 to 1998	Semi-matched 67 firm-year observations; matched on year and industry (SIC4 and SIC3)	Logit regression – litigation or not	Yes	N/A	Yes
Author, journal, title, design	Sample	Control sample	Analyses	Error 1	Error 2	Error 3
Panel B: Determinants of audit fees (research stream 2)						
Simunic (1980). *Journal of Accounting Research*, "The pricing of audit services: theory and evidence." STRATIF.	Survey firms in 4 strata: Big 8 vs. Non-Big 8 Auditor, small (auditees with sales $\leq$ \$125 m) vs. large (sales $>$ \$125 m)		OLS model explaining audit fees (deflated by size)	N/A	N/A	Yes

Turpen (1990). *Auditing: A Journal of Practice & Theory*, "Differential pricing on auditors' initial engagements: further evidence." NCB.SM	57 survey responses from 327 public companies that changed auditors during 1982–1984	Semi-match 89 firm-year observations from firms that did not change auditors between 1980 and 1984	OLS regression of log of audit fees	Yes	N/A	Yes
Maher et al. (1992). *The Accounting Review*, "Competition and audit fees." NCB.FM.W	78 nonrandom firms reporting external audit fees during 1977–1981.	Fully-match, prospectively: Each auditee firm is its own control before and after change events	OLS regression of change in audit fees between 1977 and 1981 on other changes.	No	N/A	N/A
Sanders et al. (1995). *Auditing: A Journal of Practice & Theory*, "Municipal audit fees: has increased competition made a difference?" NCB.FM.W	159 cities responding to survey requests in 1985 and in 1989.	Each 159 firm is its own control for year 1989 with predicted audit fees.	OLS regression of change in audit fees between 1985 and 1989.	No	N/A	N/A
Iyer and Iyer (1996). *Auditing: A Journal of Practice & Theory*, "Effect of big 8 mergers on audit fees: evidence from the United Kingdom." NCB.FM.W	270 UK firms audited by Big 8 auditors for both 1987 and 1991	Fully-match, prospectively: Each auditee is regarded as its own control	OLS of change in audit fees	No	N/A	N/A
Clatworthy, Mellett, and Peel (2000). *Public Money & Management*, "External audit fee levels in NHS trusts." NCB.FM.B	46 publicly held National Health Service trusts in 1997	46 private medical firms, matched by year and size (revenues), with revenues within 5% (59% of firms matched within 1%)	Unmatched *t*-tests of audit fees	Yes	Yes	Yes
Walker and Casterella (2000). *Auditing: A Journal of Practice & Theory*, "The role of auditee profitability in pricing new audit engagements." NCB.FM.B	80 firms with auditor tenure of 1 to 3 years	Match to 80 firms that have auditor tenure of other than 1 to 3 years, based on total assets and SIC	OLS regression explaining audit fees	Yes	No	Yes
Geiger and Rama (2003). *Auditing: A Journal of Practice & Theory*, "Audit fees, nonaudit fees, and auditor reporting on stressed companies." CB.FM	66 firms receiving a first-time GCM (going concern modified) audit opinion	Fully-match 66 non-GCM but financially stressed firms by a financial stress measure, size (in net sales), and industry (SIC2).	Logit regression explaining going concern report	Yes	No	Yes

Table 3 (*Continued*)

Author, journal, title, design	Sample	Control sample	Analyses	Error 1	Error 2	Error 3
Panel C: Audit reporting in financially distressed firms (research stream 3)						
Kida (1980). *Journal of Accounting Research*. "An investigation into auditors' continuity and related qualification judgments." CB.FM	20 Manufacturing firms with going concern indicators	20 non-problem firms matched by year, industry, and asset size.	Discriminant analysis of problem and non problem firms	Yes	Yes	Yes
Banks and Kinney (1982). *Journal of Accounting Research*. "Loss contingency reports and stock prices: an empirical study." NCB.SM	92 firms with a new loss contingency footnote in 1969–1975	Semi-match 278 controls by time period, industry, and same sign of unexpected earnings	*T*-tests of differences between CAR for a contingency firm and the average CAR for its matched control portfolio	No	N/A	Yes
Elliott (1982). *Journal of Accounting Research*, "Subject to' audit opinions and abnormal security returns-outcomes and ambiguities." NCB.FM.B	145 firms having a "Subject to" audit qualification in 1973–1978.	Fully-match 145 firms not having audit qualifications by year, industry, and the magnitude and sign of unexpected earnings (ESIT)	Matched *T*-tests of cumulative pair-wise returns	No	Yes	Yes
Levitan and Knoblett (1985). *Auditing: A Journal of Practice & Theory*, "Indicators of exceptions to the going concern assumption." CB.FM	35 firms filing Chapter 11 bankruptcy in 1980–1981	Fully-match 35 non-bankrupt firms by year, SIC code, and closest size (assets)	Discriminant analysis explaining bankruptcy	Yes	Yes	Yes
Mutchler (1985). *Journal of Accounting Research*. "A multivariate analysis of the auditor's going-concern opinion decision." CB.NM	119 manufacturing firms having a going concern qualification in 1981–1982	Identify 119 firms having distress but not going concern qualification	Discriminant analysis of going concern opinion	N/A	N/A	Yes
Dopuch et al. (1987). *The Accounting Review*, "Predicting audit qualifications with financial and market variables." CB.SM	218 firm-years having an auditor qualification for the first time in 1973–1980	Semi-match to 346 firm-year observations with clean opinions	Probit regression with WESML	Yes	N/A	Yes
Wilkerson (1987). *Journal of Accounting Research*, "Selecting experimental and comparison samples for use in studies of auditor reporting decisions." CB.SM	16 firms investigated by the SEC for price fixing and receiving audit qualifications in 1972 to 1981.	Semi-match to 33 firms also investigated by the SEC but not receiving audit qualifications.	Logit regression explaining audit qualification or not	Yes	N/A	Yes

Frost (1991). *Journal of Accounting Research*, "Loss contingency reports and stock prices: a replication and extension of banks and kinney." CB.FM	72 firms in which a new loss contingency was reported during 1976–1984.	Select two matched samples:(1) 270 semi-matched firms by industry and sign of unexpected earnings, and (2) 71 fully-matched by industry and client size (one firm lost due to no matching).	Unmatched ordered logit explaining new loss contingency	Yes	No	Yes
Koh (1991). *Accounting and Business Research*, "Model predictions and auditor assessments of going concern status." CB.FM	165 non-financial bankrupt firms in 1978–1985.	Fully-match to 165 non-bankrupt firms by industry, size (assets) and year.	Probit regression with WESML explaining bankruptcy/going concern	Yes	Yes	Yes
Ponemon and Schick (1991): *Auditing: A Journal of Practice & Theory*, "Financially distressed companies and auditor perceptions of the twelve characteristics of decline." CB.FM	43 distressed firms.	43 healthy firms matched by size (revenues), type of control (public vs. privately held), and industry (SIC).	ANOVA and MANOVA on 12 organizational decline constructs	Yes	Yes	Yes
Chen and Church (1992). *Auditing: A Journal of Practice & Theory*, "Default on debt obligations and the issuance of going-concern opinions." CB.SM	127 public industrial firms receiving aging-concern opinion for the first time in 1982–1986.	Semi-match 127 firm-year observations randomly matched on year, from 1015 "problem firms" receiving a clean opinion.	Logit regression of going concern opinion	Yes	N/A	Yes
Citron and Taffler (1992). *Accounting and Business Research*, "The auditor report under going concern uncertainties: an empirical analysis." CB.FM	61 non-failed qualified companies (for hypothesis 4) and 86 all (both failed and non-failed) qualified companies (for hypothesis 5) in 1979–1986.	Fully-match non-failed non-qualified companies (for hypothesis 4) and all non-qualified companies (for hypothesis 5) by year, industry, size, and financial distress status.	2×2 tabulations of going concern qualifications with auditor switch and likelihood of failure	Yes	Yes	Yes
Fleak and Wilson (1994). *Journal of Accounting, Auditing, & Finance*. "The incremental information content of the going-concern audit opinion." STRATIF	153 firms having going-concernqualifications in 1979–1986.	325 selected controls from firms distressed, but not GC.	OLS of CAR's around audit report release date	N/A	N/A	Yes

Table 3 (*Continued*)

Author, journal, title, design	Sample	Control sample	Analyses	Error 1	Error 2	Error 3
Cormier et al. (1995). *Journal of Accounting, Auditing, & Finance*, "The auditor's consideration of the going concern assumption: a diagnostic model." CB.NM	138 nonfinancial Canadian firms that potentially face financial problems	112 firms not facing financial difficulties	Logit, discriminant analysis, financial difficulty	N/A	N/A	Yes
Lenard et al. (1995). *Decision Sciences*. "The application of neural networks and a qualitative response model to the auditor's going concern uncertainty decision." CB.NM	40 firms having going concern audit qualification in 1982–1987.	40 firms with unqualified audit opinions.	Logit and Neural network models explaining GC opinions	N/A	N/A	Yes
Schwartz and Soo (1995). *Auditing: A Journal of Practice & Theory*. "An analysis of form 8-K disclosures of auditor changes by firms approaching bankruptcy." CB.FM	59 firms voluntarily changing auditors within 3 years prior to bankruptcy in 1987–1992.	Fully-match to 59 firms changing auditors that did not go bankrupt, matched by industry, size (assets), and auditor change year	(a) Chi-squared (b) Logit regression (c) *T*-test	Yes	Yes	(a) Yes (b) N/A (c) Yes
Buchman and Collins (1998). *Journal of Business Research*, "Uncertainty about litigation losses and auditors' Modified Audit Reports." CB.SM	60 firms having audit opinions qualified due to litigation uncertainty in 1977.	Semi-match firm-year observations from firms disclosing litigation uncertainty but unqualified, matched by industry (SIC3).	Univariate and logit regression of material loss or not	Yes	N/A	Yes
Carlson, Glezen, and Benefield (1998). *Quarterly Journal of Business and Economics*. "An investigation of investor reaction to the information content of a going concern audit report while controlling for concurrent financial statement disclosures." NCB.FM.B	88 firms that received Going Concern Audit Reports (GCAR) in 1981–1988.	Fully-match to 88 non-GCAR firm-year observations by fiscal year, industry, and a Z-score measure of financial distress.	ANCOVA explaining market returns around report dates	Yes	No	Yes

Foster et al. (1998). *Journal of Accounting, Auditing & Finance*. "An analysis of the usefulness of debt defaults and going concern opinions in bankruptcy risk assessment." CB.NM	82 bankrupt firms during 1988–1991 for a developmental sample and 44 bankrupt firms during 1992–1993 for a holdout sample.	Identify 55 distressed but not bankrupt firms during first period, and 40 during second period.	Logit regression of bankruptcy as a function of audit opinion	N/A	N/A	N/A
Lenard et al. (1998). *The Journal of Management Information Systems*, "The design and validation of a hybrid information system for the auditor's going concern decision." CB.NM	32 bankrupt firms from 1989 and 26 bankrupt firms from 1990.	32 firms randomly selected from nonbankrupt firms in 1989 and 26 firms randomly selected for 1990.	A hybrid model combining a statistical model with a rule-based expert system for audit opinion decision	N/A	N/A	Yes
Kleinman and Anandarajan (1999). *Managerial Auditing Journal*. "The usefulness of off-balance sheet variables as predictors of auditors' going concern opinions: an empirical analysis." CB.SM	61 firms receiving a Going Concern audit report (GCAR) in 1990–1992.	From non GCAR Big 6 audited firms, 173 firms matched to GCAR firms on size	Discriminant analysis- going concern audit report	Yes	Yes	Yes
Koh and Tan (1999). *Accounting and Business Research*, "A neural network approach to the prediction of going concern status." CB.FM	Use sample of Koh (1991)	Use sample of Koh (1991) 165 matched.	Neural network predicting going concern	Yes	Yes	Yes
Morris and Strawser (1999). *Auditing: A Journal of Practice & Theory*, "An examination of the effect of CPA firm type on bank regulators' closure decisions." CB.SM	116 Texas banks closed during 1990–1991.	Semi-match to 116 firm-year observations of non-closed Texas banks	Logit regression of bankruptcy or not	Yes	N/A	Yes
Lenard et al. (2000). *Decision Sciences*. "An analysis of fuzzy clustering and a hybrid model for the auditor's going concern assessment." CB.NM	Same sample as Lenard et al. (1998)	Same control sample as Lenard et al. (1998)	A fuzzy clustering and a hybrid model for going concern opinion	N/A	N/A	Yes
Seipel and Tunnell (2000). *American Business Review*. "A stochastic dominance analysis of the issuance of qualified opinions." CB.FM	3 case samples of firms having audit qualifications in 1983–1987: 75 going concern, 37 litigation, 23 asset valuations.	Fully-match firms on industry (SIC2), year, and financial condition for going concern qualification; firms with loss contingency footnotes but with clean opinions based on size (total assets), industry, and year for litigation or asset valuation.	Chi-square tests of Stochastic Dominances of CARs	Yes	Yes	Yes

Table 3 (*Continued*)

Author, journal, title, design	Sample	Control sample	Analyses	Error 1	Error 2	Error 3
Bartov, Gul, and Tsui (2001). *Journal of Accounting and Economics*, Discretionary-accruals models and audit qualifications." CB.FM	173 firms receiving qualified audit opinions	Fully-match 173 firm-year observations with clean audit reports by year, industry (SIC2), auditor type (Big 6 vs. non-Big 6), and size (total assets).	Logit regression explaining audit qualifications or not	Yes	Yes	Yes
Behn et al. (2001). *Auditing: A Journal of Practice & Theory*, "Further evidence on the auditor's going-concern report: the influence of management plans." CB.SM	148 publicly traded manufacturing firms receiving going concern paragraph in 1992–1995.	Semi-match 148 firm-year observations of manufacturing firms not receiving going concern report in financial distress, matched on year.	Logit regression explaining going concern report	Yes	N/A	Yes
Citron and Taffler (2001). *Journal of Business Ethics*. "Ethical behaviour in the U.K. Audit profession: the case of the self-fulfilling prophecy under going-concern uncertainties." CB.FM	99 firms receiving GC qualifications in 1987–1994.	Fully-match to 99 non-qualified firms based on year, exchange listing status, industry, size, and financial status.	Logit regression explaining bankruptcy	Yes	No	Yes
Vanstraelen (2002). *Accounting and Business Research*, "Auditor economic incentives and going-concern opinions in a limited litigious continental European business environment: empirical evidence from Belgium." CB.FM	(1) 392 bankrupt Belgian firms and (2) 392 financially stressed non-bankrupt Belgian firms in 1992–1996.	Fully-match 392 financially non-stressed non-bankrupt large Belgian firms by year, industry, and size (total assets)	Logit regression of going concern uncertainty disclosure	Yes	Yes	Yes

Gaeremynck and Willekens (2003). *Accounting and Business Research*, "The endogenous relationship between audit- report type and business termination: evidence on private firms in a non-litigious environment." CB.FM	114 Belgian firm bankruptcies in 1995–1996.	Fully-match 114 continuing firm-year observations by size, industry, and year.	Logit regression of type of audit report	Yes	Yes	Yes
Geiger and Rama (2003). *Auditing: A Journal of Practice & Theory*, "Audit fees, nonaudit fees, and auditor reporting on stressed companies." CB.FM	66 firms receiving a first-time GCM (going concern modified) audit opinion	Fully-match 66 non-GCM but financially stressed firms by a financial stress measure, size (in net sales), and industry (SIC2).	Logit regression explaining going concern report	Yes	No	Yes
Vanstraelen (2003). *Journal of Accounting, Auditing & Finance*, "Going-concern opinions, auditor switching, and the self-fulfilling prophecy effect examined in the regulatory context of Belgium." CB.FM	(1) 392 bankrupt Belgian firms and (2) 392 financially stressed non-bankrupt Belgian firms in 1992–1996.	Fully-match 392 financially non-stressed non-bankrupt large Belgian firms by year, industry, and size (total assets)	Logit regressions explaining bankruptcy and auditor switch	Yes	Yes	Yes

Author, journal, title, design	Sample	Control sample	Analyses	Error 1	Error 2	Error 3
Panel D: audit quality (research stream 4)						
Feltham, Hughes, and Simunic (1991). *Journal of Accounting and Economics*, "Empirical assessment of the impact of auditor quality on the valuation of new issues." NCB.FM.B	251 cases of firms employing high quality (Big 8) auditors and 141 firms employing low quality auditors (non-big 4)	Fully-matched pairs are chosen from within the sample, prospectively, by assets in place, proceeds of issue, or market value of equity	OLS explaining market value	Yes	Yes	Yes
Teoh and Wong (1993). *The Accounting Review*, "Perceived auditor quality and the earnings response coefficient." NCB.FM.B	1282 firms with non-Big 8 auditors and 15,480 firms with Big 8 auditors.	Fully-match non-Big 8 audited firm-year observations to Big 8 observations by year and industry	OLS regression of CARs on earnings surprise	Yes	Yes	Yes
Allen (1994). *Auditing: A Journal of Practice & Theory*, "The effect of large- firm audits on municipal bond rating decisions." NCB.FM.B	125 cities having a Moody's bond rating and audited by a Big 8 firm in 1978–1986.	Fully-match to non-Big 8 audited cities	Multinomial logit regression explaining bond ratings	Yes	Yes	Yes

Table 3 (*Continued*)

Author, journal, title, design	Sample	Control sample	Analyses	Error 1	Error 2	Error 3
Clarkson and Simunic (1994). *Journal of Accounting and Economics*. "The association between audit quality, retained ownership, and firm-specific risk in U.S. vs. Canadian IPO markets." CB.FM	174 IPOs in Canada in 1984–1987.	Compare 44 IPOs having high quality audit (top 8) to 44 firms having low quality audit	Logit regression of quality as a function of risk	Yes	Yes	Yes
Becker, DeFond, Jiambalvo, and Subramanyam (1998). *Contemporary Accounting Research*, "The effect of audit quality on earnings management." NCB.SM	9035 firm-year observations of non-financial firms having Big 6 auditors in 1989–1992. (Table 3)	Semi-match 1846 firm year observations of firms having non-Big 6 auditors by year, industry, and decile of operating cash flows.	OLS regression of discretionary accruals on Big 6 dummy.	Yes	N/A	N/A
Blackwell, Noland, and Winters (1998). *Journal of Accounting Research*, "The Value of auditor assurance: evidence from loan pricing." NCB.FM.B	35 audited firms from 212 revolving credit agreements with 6 commercial banks in 1988	Fully-match to 35 unaudited firms by size (assets)	OLS regression of interest rate premium on audit (Regression 4.2)	Yes	No	Yes
Colbert and Murray (1998). *Journal of Accounting, Auditing & Finance.* "The association between auditor quality and auditor size: an analysis of small CPA firms." CB.NM	97 audit firms that received a qualified or adverse report provided by PCPS.	325 audit firms not receiving qualified or adverse reports from PCPS peer review program in 1996.	Ordered logit regression explaining peer review outcomes	N/A	N/A	N/A
Peasnell, Pope, and Young (2001). *Accounting and Business Research*, "The Characteristics of firms subject to adverse rulings by the financial reporting review panel." CB.FM	47 adverse U.K. FRRP rulings in 1992–1998.	Fully-match to firm-year observations not receiving adverse FRRP rulings by year, size (assets), and industry.	Logit regression of FRRP censure	Yes	Yes	Yes
Bauwhede et al. (2003). *International Journal of Accounting*, "Audit firm size, public ownership, and firms' discretionary accruals management." NCB.FM.B	31 industrial and commercial firms listed on the Brussels Stock Exchange	Fully-match 31 nonlisted firms, to 136 firm-year observations, by industry and size (total assets)	OLS regression of discretionary accruals on audit size.	Yes	No	Yes

Chung, Firth, and Kim (2003). *Accounting and Business Research*, "Auditor conservatism and reported earnings." NCB.FM.B	All firms audited by Big 6 firms in 1988–1997.	Fully-match to non-Big 6 firms by year, industry (SIC2), and size	OLS regression of earnings/price ratio on Big 6 auditor	Yes	Yes	Yes
Krishnan (2003). *Auditing: A Journal of Practice & Theory*. "Audit quality and the pricing of discretionary accruals." NCB.SM	15,342 firm-year observations in Big 6 audited firms in 1989–1998.	Identify 3316 firm-year observations in Non-Big6 audited firms that correspond in year, industry, and cash flow decile.	Regression of stock returns on discretionary accruals, Big 6 auditors, and other measures.	Yes	No	N/A
Panel E: auditor switches (research stream 5)						
Fried and Schiff (1981). *The Accounting Review*, "CPA switches and associated market reactions." NCB.FM.B	48 firms switching auditors in 1971–1975.	Fully-match to 48 firms not switching auditors by risk (beta) and industry.	Univariate *t*-tests of pair-wise differences in cumulative market returns	No	Yes	Yes
Nichols and Smith (1983). *Journal of Accounting Research*, "Auditor credibility and auditor changes." NCB.FM.B	22 Big 8 to non-Big 8 auditor switches and 29 non-Big 8 to Big 8 switches in 1973–1979.	Select corresponding matched samples of 22 and 29 non-switching firms.	Matched pair *t*-tests of differences in returns	No	Yes	N/A
Schwartz and Menon (1985). *The Accounting Review*. "Auditor switches by failing firms." NCB.FM.B	132 public firms filing for bankruptcy in 1974–1982.	Fully-match 132 non-bankrupt firm-year observations by industry and size.	2×2 contingency tables, e.g., bankrupt or not versus auditor switch or not, with Chi-square tests.	Yes	Yes	Yes
Williams (1988). *Journal of Business Finance & Accounting*, "The potential determinants of auditor change." CB.FM	186 NYSE or AMEX listed firms that changed from one Big8 auditor to another Big8 auditor in 1977–82.	Fully match 186 NYSE or AMEX listed firms that did not change auditors between 1975–83 by industry, size, earnings, and leverage.	Stepwise logit regression explaining auditor change	Yes	Yes	Yes
Eichenseher and Shields (1989). *Advances in Accounting, Supplement*, "Corporate capital structure and auditor 'fit.'" NCB.FM.B	27 AMEX firms that changed auditors and did not go bankrupt or change auditors again in 1981–1982 (Test II)	Fully-match 27 firms not changing auditors by size (assets), industry, and big 8 vs. non-big 8	OLS regression with jackknife standard errors, explaining auditor change or not	Yes	No	Yes
DeBerg, Kaplan, and Pany (1991). *Accounting Horizons*, "An examination of some relationships between non-audit services and auditor change." NCB.FM.B	83 AMEX or NYSE listed non-bankrupt firms that changed auditors from one Big 8 auditor to another Big 8 auditor in 1978–1982.	Fully-match to AMEX or NYSE firms not changing auditors during 1978–1982 by industry, comparable size, comparable earnings, and comparable leverage.	Univariate Wilcoxon matched pair tests of Non-Audit Service Usage	No	Yes	Yes

Table 3 (*Continued*)

Author, journal, title, design	Sample	Control sample	Analyses	Error 1	Error 2	Error 3
Seabright, Levinthal, and Fichman (1992). *The Academy of Management Journal*. "Role of individual attachments in the dissolution of interorganizational relationships." CB.SM	170 cases of auditor changes within 32 industries (SIC2) having 20 or more companies.	Match to 170 non auditor switch companies by year and size	Logit models explaining auditor switch or not	Yes	N/A	Yes
DeFond and Jiambalvo (1993). *Contemporary Accounting Research*, "Factors related to auditor-client disagreements over income-increasing accounting methods." CB.FM	40 firms changing auditors who reported disagreements with auditor on income-increasing methods in 1982–1986.	40 firms changing auditors but did not have a disagreement matched by auditor switch year and industry.	Logit regression explaining disagreements	Yes	Yes	Yes
Dhaliwal et al. (1993). *Auditing: A Journal of Practice & Theory*, "An analysis of the economic factors related to auditor-client disagreements preceding auditor changes." NCB.SM	71 firms having an auditor change that issued a report of a disagreement with the auditor in 1973–1982.	Semi-match to 71 firms within Smith's sample having an auditor change but without a reported disagreement.	Univariate comparisons of Cumulative Abnormal Returns	Yes	N/A	Yes
Schwartz and Soo (1995). *Auditing: A Journal of Practice and Theory*, "An analysis of form 8-K disclosures of auditor changes by firms approaching bankruptcy." CB.FM	59 firms voluntarily making an auditor change within 3 years of bankruptcy in 1987–1992.	Fully-match to 59 firms changing auditors that did not go bankrupt, matched by industry, size (assets), and auditor change year	(a) Univariate Chi-squared (b) Logit regression of bankruptcy (choice-based sample), (c) *T*-test on CARs around events	Yes	Yes	(a) Yes (b) N/A (c) Yes
Krishnan and Krishnan (1997). *The Accounting Review*, "Litigation risk and auditor resignations." CB.SM	141 firms whose auditors resigned in 1989–1995	Created two semi-matched samples of firms who dismissed auditors (auditors did not resign): industry-year matched dismissals and year only matched dismissals.	Logistic regressions of resignation versus dismissal	Yes	N/A	Yes
Dunn, Hillier, and Marshall (1999). *Accounting and Business Research*, "The market reaction to auditor resignations." NCB.FM.B	88 firms listed on LSE having auditor resignations in 1988–1993.	Fully-match to firms not having auditor resignation by industry, size, and current status (live or extinct)	Event study of cumulative abnormal returns for test and control samples.	Yes	Yes	Yes

Menon and Williams (1999). *Journal of Accounting, Auditing & Finance*, "Error cost and auditors' termination decisions." CB.SM	217 firms whose Big 6 auditor resigned and 67 firms whose Big 6 auditor declined reappointment in 1990–1996.	Firms that retained the same Big 6 auditor for the time period.	Logit regression explaining resigned versus continuing auditor or declined versus continuing auditor decisions.	Yes	N/A	Yes
Shu (2000). *Journal of Accounting and Economics*. "Auditor resignations: clientele effects and legal liability." CB.SM	269 auditor resignations during 1985–1996.	(1) Ten firms are randomly drawn from Compustat for the year of auditor resignation, (2) 433 firms are selected from 1263 randomly selected client-initiated auditor changes between 1987 and 1995	Logit regression of auditor resignations with respect to litigation risk and clientele effects.	Yes	N/A	Yes
Archambeault and DeZoort (2001). *International Journal of Auditing*, "Auditor opinion shopping and the audit committee: An analysis of suspicious auditor switches." CB.FM	30 firms having suspicious auditor switches in 1994–1996.	Fully match 30 non-switches even though they had received an unclean opinion by size, industry, stock exchange, and time period.	Multivariate logit regression explaining suspicious auditor switches.	No	Yes	N/A
Woo and Koh (2001). *Accounting and Business Research*, "Factors associated with auditor changes: A Singapore study." CB.SM	54 SES (Stock Exchange of Singapore) firms that changed auditors in 1986–1995.	Semi-match to 54 SES firms randomly selected from all firms not changing auditors by year and country of incorporation.	Logit regression explaining auditor change	Yes	N/A	Yes
Johnson et al. (2002). *Contemporary Accounting Research*, "Audit-firm tenure and the quality of financial reports." NCB.FM.B	821 Big 6 audited firms having a "short-tenure" (2–3 years) Big 6 auditor relationship in 1986–1995.	Create two samples with full matching: identify 821 firms having a medium-tenure audit client relationship (4–8 years) and 821 firms having along-term audit relationship (9+ years) by year, industry and size.	OLS regression explaining unexpected accruals	Yes	No	Yes
Carcello and Neal (2003). *The Accounting Review*, "Audit committee characteristics and auditor dismissals following 'new' going-concern reports." CB.FM	First, 62 firms receiving a going concern report and dismissing a Big 6 auditor, but not doing bankrupt in 1988–1999. Second, randomly selected 125 clean opinion firms that dismissed Big 6 auditors in 1988–1999.	First, fully-match 62 firms with receiving a going concern report but that did not dismiss its auditor by year, industry, and size. Second, fully-match 125 clean opinion firms that did not dismiss auditors.	Logit regression of whether a client dismissed auditor or not, on variables including interactions with whether received a going concern or not	Yes	No	Yes

properly: the first firm-year observation for each pair can be viewed as randomly selected from a universe of firms that exist at both the earlier and later dates. The matching of corresponding later firm-years is collected at a 100% rate. If the pairs are themselves viewed as strata, the sampling rates within each one is the same, so no reweighting is needed. Survivorship bias is a form of selection bias that would apply in considering generalizing their results to all firms. However, the results can be generalized directly to the population of firms that existed at both dates.

3.3. Research stream 3: auditor reporting in financially distressed firms

We identified 32 audit research papers that predict levels of financial distress, measured by either going concern qualification (GCQ) or bankruptcy, in mainly choice-based studies. Some of these papers use GCQ as a predictor of bankruptcy. Table 3, Panel C provides detail for the papers in this research stream. 23 papers suffer from Error 1, 14 papers suffer from Error 2, and 31 papers suffer from Error 3.

Six of the 32 papers employ a CB.NM design (i.e., they have one subsample collected by random selection from financially distressed firms, another by random selection from non-distressed firms, with matching not employed). Obtaining the same number of observations in each subsample is not required. Mutchler (1985), Lenard Alam, and Madey (1995), Lenard, Madey, and Alam (1998) and Lenard, Alam, and Booth (2000) collect equal sized samples; Foster, Ward, and Woodroof (1998) and Cormier, Magnan, and Morard (1995) do not. Only Foster et al. (1998), uses a logit regression (and the logit regression is fully saturated because of the paper's CB-NM design) and hence does not need reweighting. The others do not apply the necessary reweighting in their statistical analyses. Lenard et al. (1998) and Cormier et al. (1995) compare the performance among logit regression, discriminant analysis, recursive partitioning, and/or neural network methods and advocate the use of the non-logit methods to achieve higher classification accuracy, based on the apparent performance of the models applied without reweighting. These models optimize on prediction performance and are "black box" in that they do not permit discussion of the contribution of specific variables, such as can be done for properly specified logit models that yield coefficient and *p*-value estimates for each variable. We suggest the comparisons should have been performed with each approach enforcing incorporation of matching variables and/or incorporating reweighting to address the different sampling rates in the two subsamples. While "black box" methods have proven to yield models that achieve higher prediction performance than logit models in many other areas of research, technically this point has arguably not been proven in these studies, as the studies include misspecified models.

As shown in Table 3, Panel C 15 papers employ a CB-FM design. The approach used in each paper is to identify a set of financially distressed firms and an equal-sized, pair-matched comparison sample of non-distressed firm-year observations, with pairing typically by industry, size, and year. The matching was not accounted for, in any of these papers, in the various statistical models they estimated (all suffer from Error 1).

The Table also shows that 7 of the auditor reporting papers employ a CB-SM design. An early CB-SM study in this area is Dopuch, Holthausen, and Leftwich (1987). They find 275 firms that experienced audit qualifications from 1969 to 1980, and semi-matched on year alone. They did not control for the matching in the analysis by including year dummies. Chen and Church (1992) use matching only by year to select an equal sized comparison sample for their 127 going concern qualification (GCQ) firm-year observations, thereby creating a matched set for each of five years. Morris and Strawser (1999) similarly use matching only by year to select an equal sized comparison sample for 116 Texas banks that went bankrupt in 1990 and 1991. Behn, Kaplan, and Krumwiede (2001) similarly create year-matched sets for 148 GCQ firms during four years. These three studies apply logit regression to explain GCQ and fail to account for the matching (Error 1): essentially they needed to include a dummy variable for each year's set. A recent review of determinants and consequences of going concern opinions show that the unconditional analysis persists in post-2003 papers (see Gissel, Robertson, & Stefaniak, 2010).[5]

[5] These include Nogler (2004), Knechel and Vanstraelen (2007), Basioudis, Papakonstantinou, and Geiger (2008), Carey et al. (2008), Herbohn and Ragunathan (2008), Gassen and Skaife (2009), and Blay, Geiger, and North (2011).

3.4. Research stream 4: audit quality

We identified 11 papers that discuss audit quality. Audit firm size has been considered a reasonable proxy for perceived audit quality since DeAngelo (1981). One of these papers directly tests that by comparing peer assessed audit quality to audit firm size measured by number of CPA's (Colbert and Murray (1998)). Eight papers assume that Big n audit firms are higher quality than non-Big n auditors. Of these one examines determinants of this proxy for audit quality, while seven test whether audit quality, so measured, is associated with some outcome. These latter papers implicitly test whether this proxy for audit quality has merit as a proxy, by jointly testing whether the proxy enters with the expected sign into their models. Table 3, Panel D provides detail on all the papers in this research stream.

Ten papers in the research stream suffer from Error 1, six suffer from Error 2 and eight suffer from Error 3.

Clarkson and Simunic (1994) use logit regression to explain firms' choices of auditor type over 44 matched pairs of data. The preferred analysis incorporating matching would be best conceptualized as running the pairwise difference in audit quality (always 1) as a no-intercept logit regression over 44 pairwise differences of independent variables. This would avoid Error 1 and is equivalent to running their logit regression modified to include 87 pair-indicator variables, over 88 observations.

Two papers use auditor quality, proxied by Big n or not, as an explanatory variable in explaining various outcomes. For example, Teoh and Wong (1993) use matching by year, industry, and closest in size to select 1,282 pairs, and then run an OLS regression explaining cumulative abnormal returns (CAR) over a window from earnings forecast to earnings announcement; their analysis does not incorporate matching. Teoh and Wong essentially omitted 1,282 dummy variables that would have implemented control for year, industry and size. Bauwhede, Willekens, and Gaeremynck (2003) matched companies listed on the Brussels Stock Exchange by industry and size with nonlisted firms in the same industry and size to determine if Belgian companies engage in earnings management. The analysis fails to incorporate matching. Reweighting is needed to generalize results to the population and is not done.

3.5. Research stream 5: auditor switches

The 18 papers we identify in this research stream can be grouped into three categories: (1) market reaction to auditor change; (2) causes of auditor change; and (3) consequences of auditor change. 14 of the 18 papers suffer from Error 1 (2 in the market reaction to auditor change area, 8 in causes of auditor change, and 4 in consequences of auditor change). 9 papers suffer from Error 2 and 16 papers suffer from Error 3. A number of researchers discuss areas where results were expected, but not found (e.g. Dhaliwal, Schatzberg, & Trombley, 1993; Schwartz & Soo, 1995). In these situations, the failure to find significant results may be a result of either misanalysing data (this biases the researcher against finding results) or in not controlling for other factors in the analysis. Several studies used univariate analysis only, without multivariate analysis that allows for control for other variables.

Four papers consider market reactions to auditor changes. Fried and Schiff (1981) and Nichols and Smith (1983) suffer from Error 1. Fried and Schiff (1981) use univariate pairwise *t*-tests of difference in market returns of firms that switch auditors vs. beta-and industry-matched firms that do not switch auditors. They report a negative market reaction to a change in auditors. Schwartz and Soo (1995) consider whether 8-K disclosures of auditor changes by firms approaching bankruptcy are systematically different from 8-K disclosures of non-bankrupt firms changing auditors. They report that disclosures of bankrupt firms differ from the disclosures of non-bankrupt firms. However, they did not find evidence that the market penalizes bankrupt companies that delay the filing of the 8-K report, contrary to expectations.

Nine papers examine causes for auditor changes. Eight papers in this area suffer from Error 1. For example, DeFond and Jiambalvo (1993) examined factors related to auditor-client disagreements. They identified 58 companies that reported auditor-client disagreements between 1982 and 1986 and

identified control firms that changed auditors but did not report a disagreement. The control firms were matched by industry code (2-digit, 3-digit or 4-digit). The analysis failed to incorporate matching in the analysis and also did not control for the "closest" match. Because the eight papers did not incorporate matching in the analysis, the variables identified as factors associated with auditor switches may change if reanalyzed.

Carcello and Neal (2003) examine auditor dismissals following a going concern opinion report issued by Big n auditors between 1988 and 1999. The researchers report a counter intuitive positive relationship between audit committee members' financial expertise and auditor switches following clean opinions. Because this study suffers from Error 1, the counter intuitive result may change when re-analyzed.

Five papers consider the consequences of changing auditors in terms of auditor-client fit, the level of non-audit services consumed, the level of performance of the company changing auditors, and the quality of financial statements of the company changing auditors. Four of the five papers suffer from Error 1 making it difficult for future researchers to build on their results. Dhaliwal et al. (1993) investigate the information content of disagreement disclosures surrounding auditor changes. They find that clients changing auditors after a disagreement have poorer earnings performance, more debt, lower levels of current assets, and poorer stock price performance than firms changing auditors without a disagreement and other firms in the same industry. Because the research suffers from Error 1, the variables identified and the relationships between the variables and auditor change may not be useful for future researchers. Johnson, Khurana, and Reynolds (2002) consider whether audit firm tenure is associated with financial reporting quality. Johnson, Khurana, and Reynolds selected a COMPUSTAT sample of companies audited by short-tenure firms (2–3 years), medium tenure firms (4–8 years), and long tenure firms (9 years or longer) with companies matched on industry and size. The analysis fails to incorporate matching so the results may not reflect the relationships between audit firm tenure and reporting quality.

Stefaniak, Robertson, and Houston (2009) provide a *Journal of Accounting Literature* review of auditor switching literature. We note that it accepts the conclusions of numerous papers whose results we question. Past the time period of our tabulation, it includes mention of five matched sample papers: Lee, Mande, and Ortman (2004), Krishnan and Visvanathan (2007), Carey, Geiger, and O'Connell (2008), Romanus, Maher, and Fleming (2008) and Cassell, Giroux, Myers and Omer (2012). We note further that all five recent papers suffer Error 1 and hence we would question whether their results hold when the samples are analyzed using conditional analyses techniques.[6]

4. Summary and concluding remarks

Current research builds on past research findings. As such, past results channel current research effort and can lead to inefficient allocation. This paper has the objective of reducing this inefficiency by describing areas where past research may not do a good job of predicting the future.

This article examined the use of choice-based, matched, and other stratified sample studies in published auditing research, identified model specification issues, and clarified the matched sample research design approach in order to promote its use as an effective tool. Researchers have often selected matched samples based on industry and size, and assumed this effectively controls for industry and size effects in their studies. But, as has been demonstrated with simulations, replications, and formal proofs (CKS, 2009), this approach can and does lead to incorrect conclusions. Perhaps more importantly, the power to detect statistically significant relationships may have been lost in numerous research studies that have gone unpublished, despite researchers having collected data that may have held important results. Our tabulation of errors in each of five research streams should be useful to researchers working in these areas.

[6] Carey et al. (2008) acknowledge disproportionate sampling rates are present and attempt to correct for it by reweighting observations in two groups. This is not adequate to avoid Error 1 in their CB.FM sample. To avoid Error 1, either reweighting would be needed in each of 134 strata of their sample of 68 matched pairs, or the matched sample logistic procedure described in CKS (2009) could be used.

References

Allen, A. C. (1994). The effect of large-firm audits on municipal bond rating decisions. *Auditing: A Journal of Practice & Theory, 13*(1), 115–125.

Archambeault, D., & DeZoort, F. T. (2001). Auditor opinion shopping and the audit committee: An analysis of suspicious auditor switches. *International Journal of Auditing, 5*, 33–52.

Banks, D. W., & Kinney, W. R., Jr. (1982). Loss contingency reports and stock prices: An empirical study. *Journal of Accounting Research, 20*(1), 240–254.

Bartov, E., Gul, F. A., & Tsui, J. S. L. (2001). Discretionary-accruals models and audit qualifications. *Journal of Accounting and Economics, 30*, 421–452.

Basioudis, I. G., Papakonstantinou, E., & Geiger, M. A. (2008). Audit fees, non-audit fees and auditor going-concern reporting decisions in the United Kingdom. *Abacus: A Journal of Accounting, Finance and Business Studies, 44*(3), 284–309.

Bauwhede, H. V., Willekens, M., & Gaeremynck, A. (2003). Audit firm size, public ownership, and firms' discretionary accruals management. *International Journal of Accounting, 38*, 1–22.

Becker, C. L., DeFond, M. L., Jiambalvo, J., & Subramanyam, K. R. (1998). The effect of audit quality on earnings management. *Contemporary Accounting Research, 15*(1), 1–24.

Behn, B. K., Kaplan, S. E., & Krumwiede, K. R. (2001). Further evidence on the auditor's going-concern report: The influence of management plans. *Auditing: A Journal of Practice & Theory, 20*(1), 13–28.

Blackwell, D. W., Noland, T. R., & Winters, D. B. (1998). The value of auditor assurance: Evidence from loan pricing. *Journal of Accounting Research, 36*(1), 57–70.

Blay, A. D., Geiger, M. A., & North, D. S. (2011). The auditor's going-concern opinion as a communication of risk. *Auditing: A Journal of Practice & Theory, 30*(2), 77–102.

Buchman, T. A., & Collins, D. (1998). Uncertainty about litigation losses and auditors' modified audit reports. *Journal of Business Research, 43*, 57–63.

Carcello, J. V., & Neal, T. L. (2003). Audit committee characteristics and auditor dismissals following 'new' going-concern reports. *The Accounting Review, 78*(1), 95–117.

Carey, P. J., Geiger, M. A., & O'Connell, B. T. (2008). Costs associated with going-concern-modified audit opinions: An analysis of the Australian audit market. *Abacus, 44*(1), 61–81.

Carlson, S. J., Glezen, G. W., & Benefield, M. E. (1998). An investigation of investor reaction to the information content of a going concern audit report while controlling for concurrent financial statement disclosures. *Quarterly Journal of Business and Economics, 37*(3), 25–39.

Cassell, C. A., Giroux, G. A., Myers, L. A., & Omer, T. C. (2012). The effect of corporate governance on auditor–client realignments. *Auditing: A Journal of Practice & Theory, 31*(2), 167–188.

Chen, K. C. W., & Church, B. K. (1992). Default on debt obligations and the issuance of going-concern opinions. *Auditing: A Journal of Practice & Theory, 11*(2), 30–49.

Chung, R., Firth, M., & Kim, J. B. (2003). Auditor conservatism and reported earnings. *Accounting and Business Research, 33*(1), 19–32.

Citron, D. B., & Taffler, R. J. (1992). The audit report under going concern uncertainties: An empirical analysis. *Accounting and Business Research, 22*(88), 337–345.

Citron, D. B., & Taffler, R. J. (2001). Ethical behaviour in the U.K. audit profession: The case of the self-fulfilling prophecy under going-concern uncertainties. *Journal of Business Ethics, 29*, 353–363.

Clarkson, P. M., & Simunic, D. A. (1994). The association between audit quality, retained ownership, and firm-specific risk in U.S. vs. Canadian IPO markets. *Journal of Accounting and Economics, 17*, 207–228.

Clatworthy, M., Mellett, H., & Peel, M. (2000). External audit fee levels in NHS trusts. *Public Money & Management*, January–March: 63–68.

Colbert, G., & Murray, D. (1998). The association between auditor quality and auditor size: An analysis of small CPA firms. *Journal of Accounting, Auditing & Finance, 13*(2), 135–150.

Cormier, D., Magnan, M., & Morard, B. (1995). The auditor's consideration of the going concern assumption: A diagnostic model. *Journal of Accounting, Auditing & Finance, 10*(2), 201–222.

Cram, D. P., Karan, V., & Stuart, I. (2009). Three threats to validity of choice-based and matched sample studies in accounting research. *Contemporary Accounting Research, 26*(2), 477–516.

Craswell, A., Francis, J., & Taylor, S. (1995). Auditor brand name reputations and industry specializations. *Journal of Accounting & Economics, 20*, 297–322.

DeAngelo, L. E. (1981). Auditor size and audit quality. *Journal of Accounting and Economics, 3*(3), 183–199.

DeBerg, C. L., Kaplan, S. E., & Pany, K. (1991). An examination of some relationships between non-audit services and auditor change. *Accounting Horizons*, March: 17–28.

DeFond, M. L., & Jiambalvo, J. (1993). Factors related to auditor–client disagreements over income-increasing accounting methods. *Contemporary Accounting Research, 9*(2), 415–431.

Dhaliwal, D. S., Schatzberg, J. W., & Trombley, M. A. (1993). An analysis of the economic factors related to auditor–client disagreements preceding auditor changes. *Auditing: A Journal of Practice & Theory, 12*(2), 22–38.

Dopuch, N., Holthausen, R. W., & Leftwich, R. W. (1987). Predicting audit qualifications with financial and market variables. *The Accounting Review, 62*(3), 431–454.

Dunn, J., Hillier, D., & Marshall, A. P. (1999). The market reaction to auditor resignations. *Accounting and Business Research, 29*(2), 95–108.

Eichenseher, J. W., & Shields, D. (1989). Corporate capital structure and auditor 'fit'. *Advances in Accounting*, Suppl. 1: 39–56.

Elliott, J. A. (1982). "Subject to" audit opinions and abnormal security returns—Outcomes and ambiguities. *Journal of Accounting Research, 20*(2), 617–638.

Feltham, G. A., Hughes, J. S., & Simunic, D. A. (1991). Empirical assessment of the impact of auditor quality on the valuation of new issues. *Journal of Accounting and Economics, 14*, 375–399.

Fleak, S. K., & Wilson, E. R. (1994). The incremental information content of the going-concern audit opinion. *Journal of Accounting, Auditing, and Finance, 9*(1), 149–166.

Foster, B. P., Ward, T. J., & Woodroof, J. (1998). An analysis of the usefulness of debt defaults and going concern opinions in bankruptcy risk assessment. *Journal of Accounting, Auditing & Finance, 13*(3), 351–371.
Francis, J. (1984). The effect of audit firm size on audit prices. *Journal of Accounting & Economics, 6*(2), 133–151.
Fried, D., & Schiff, A. (1981). CPA switches and associated market reactions. *The Accounting Review, 56*(2), 326–341.
Frost, C. A. (1991). Loss contingency reports and stock prices: A replication and extension of banks and Kinney. *Journal of Accounting Research, 29*(1), 157–169.
Gaeremynck, A., & Willekens, M. (2003). The endogenous relationship between audit-report type and business termination: Evidence on private firms in a non-litigious environment. *Accounting and Business Research, 33*(1), 65–79.
Gassen, J., & Skaife, H. A. (2009). Can audit reforms affect the information role of audits? Evidence from the German market. *Contemporary Accounting Research, 26*(3), 867–898.
Geiger, M. A., & Rama, D. V. (2003). Audit fees, nonaudit fees, and auditor reporting on stressed companies. *Auditing: A Journal of Practice & Theory, 22*(2), 53–69.
Gissel, J., Robertson, J. C., & Stefaniak, C. M. (2010). Formation and consequences of going concern opinions: A review of the literature. *Journal of Accounting Literature, 29*, 59–141.
Hay, D. C., Knechel, W. R., & Wong, N. (2006). Audit fees: A meta-analysis of the effect of supply and demand attributes. *Contemporary Accounting Research, 23*(1), 141–191.
Heninger, W. G. (2001). The association between auditor litigation and abnormal accruals. *The Accounting Review, 76*(1), 111–126.
Herbohn, K., & Ragunathan, V. (2008). Auditor reporting and earnings management: Some additional evidence. *Accounting and Finance, 48*, 575–601.
Iyer, V. M., & Iyer, G. S. (1996). Effect of big 8 mergers on audit fees: Evidence from the United Kingdom. *Auditing: A Journal of Practice & Theory, 15*(2), 123–132.
Johnson, V. E., Khurana, I. K., & Reynolds, J. K. (2002). Audit-firm tenure and the quality of financial reports. *Contemporary Accounting Research, 19*(4), 637–660.
Kida, T. (1980). An investigation into auditors' continuity and related qualification judgments. *Journal of Accounting Research, 18*(2), 506–523.
Kleinman, G., & Anandarajan, A. (1999). The usefulness of off-balance sheet variables as predictors of auditors' going concern opinions: An empirical analysis. *Managerial Auditing Journal, 14*(6), 273–285.
Knechel, W. R., & Vanstraelen, A. (2007). The relationship between auditor tenure and audit quality implied by going concern opinions. *Auditing: A Journal of Practice & Theory, 26*(1), 113–131.
Koetse, M. J., Florax, R. J. G. M. , & de Groot, H. L. F. (2005). *Correcting for primary study misspecifications in meta-analysis*. Tinbergen Institute. Discussion Paper TI 2005-029/3. Working paper (available at the Social Science Research Network at http://ssrn.com/abstract=687742).
Koetse, M. J., Florax, R. J. G. M. , & de Groot, H. L. F. (2010). Consequences of effect size heterogeneity for meta-analysis: A Monte Carlo study. *Statistical Methods and Applications, 19*, 217–236.
Koh, H. C. (1991). Model predictions and auditor assessments of going concern status. *Accounting and Business Research, 21*(84), 331–338.
Koh, H. C., & Tan, S. S. (1999). A neural network approach to the prediction of going concern status. *Accounting and Business Research, 29*(3), 211–216.
Krishnan, G. (2003). Audit quality and the pricing of discretionary accruals. *Auditing: A Journal of Practice & Theory, 22*(1), 109–126.
Krishnan, J., & Krishnan, J. (1997). Litigation risk and auditor resignations. *The Accounting Review, 72*(4), 539–560.
Krishnan, G. V., & Visvanathan, G. (2007). Reporting internal control deficiencies in the post-Sarbanes-Oxley Era: The role of auditors and corporate governance. *International Journal of Auditing, 11*(2), 73–90.
Krishnan, J., & Zhang, Y. (2005). Auditor litigation risk and corporate disclosure of quarterly review report. *Auditing: A Journal of Practice & Theory, 24*(Suppl.), 115–138.
Lee, H. Y., Mande, V., & Ortman, R. (2004). The effect of audit committee and board of director independence on auditor resignation. *Auditing: A Journal of Practice & Theory, 23*(2), 131–146.
Lenard, M. J., Alam, P., & Madey, G. R. (1995). The application of neural networks and a qualitative response model to the auditor's going concern uncertainty decision. *Decision Sciences, 26*(2), 209–227.
Lenard, M. J., Alam, P., & Booth, D. (2000). An analysis of fuzzy clustering and a hybrid model for the auditor's going concern assessment. *Decision Sciences, 31*(4), 861–884.
Lenard, M. J., Madey, G. R., & Alam, P. (1998). The design and validation of a hybrid information system for the auditor's going concern decision. *The Journal of Management Information Systems, 14*(4), 219–237.
Levitan, A. S., & Knoblett, J. A. (1985). Indicators of exceptions to the going concern assumption. *Auditing: A Journal of Practice & Theory, 5*(1), 26–39.
Lys, T., & Watts, R. (1994). Lawsuits against auditors. *Journal of Accounting Research, 32*(Suppl.), 65–93.
Maddala, G. S. (1991). A perspective on the use of limited-dependent and qualitative variables models in accounting research. *The Accounting Review, 66*, 788–807.
Maher, M., Tiessen, P., Colson, R., & Broman, A. (1992). Competition and audit fees. *The Accounting Review, 67*(1), 199–211.
Menon, K., & Williams, D. D. (1999). Error cost and auditors' termination decisions. *Journal of Accounting, Auditing & Finance*, 95–123.
Morris, R. E., & Strawser, J. R. (1999). An examination of the effect of CPA firm type on bank regulators' closure decisions. *Auditing: A Journal of Practice & Theory, 18*(2), 143–158.
Mutchler, J. F. (1985). A multivariate analysis of the auditor's going-concern opinion decision. *Journal of Accounting Research, 23*(2), 668–682.
Nichols, D. R., & Smith, D. B. (1983). Auditor credibility and auditor changes. *Journal of Accounting Research, 21*(2), 534–544.
Nogler, G. (2004). Long-term effects of the going concern opinion. *Managerial Auditing Journal, 19*(5), 681–688.
Palepu, K. G. (1986). Predicting takeover targets: A methodological and empirical analysis. *Journal of Accounting and Economics, 8*, 3–35.
Palmrose, Z. (1986). Audit fees and auditor size: Further evidence. *Journal of Accounting Research, 24*(1), 97–110.
Peasnell, K. V., Pope, P. F., & Young, S. (2001). The characteristics of firms subject to adverse rulings by the financial reporting review panel. *Accounting and Business Research, 31*(4), 291–311.

Ponemon, L. A., & Schick, A. G. (1991). Financially distressed companies and auditor perceptions of the twelve characteristics of decline. *Auditing: A Journal of Practice & Theory, 10*(2), 70–83.
Romanus, R. N., Maher, J. J., & Fleming, D. M. (2008). Auditor industry specialization, auditor changes, and accounting restatements. *Accounting Horizons, 22*(4), 389–413.
Sanders, G., Allen, A., & Korte, L. (1995). Municipal audit fees: Has increased competition made a difference? *Auditing: A Journal of Practice & Theory, 14*(1), 105–114.
Schwartz, K. B., & Menon, K. (1985). Auditor switches by failing firms. *The Accounting Review, 60*(2), 248–261.
Schwartz, K. B., & Soo, B. S. (1995). An analysis of form 8-K disclosures of auditor changes by firms approaching bankruptcy. *Auditing: A Journal of Practice & Theory, 14*(1), 125–136.
Seabright, M. A., Levinthal, D. A., & Fichman, M. (1992). Role of individual attachments in the dissolution of interorganizational relationships. *Academy of Management Journal, 35*(1), 122–160.
Seipel, C., & Tunnell, L. (2000). A stochastic dominance analysis of the issuance of qualified opinions. *American Business Review,* January: 32–39.
Shu, S. Z. (2000). Auditor resignations: Clientele effects and legal liability. *Journal of Accounting and Economics, 29*, 173–205.
Simunic, D. A. (1980). The pricing of audit services: Theory and evidence. *Journal of Accounting Research, 18*(1), 161–190.
Stefaniak, C. M., Robertson, J. C., & Houston, R. W. (2009). The causes and consequences of auditor switching: A review of the literature. *Journal of Accounting Literature, 28*, 47–121.
Stice, J. (1991). Using financial and market information to identify pre-engagement factors associated with lawsuits against auditors. *The Accounting Review, 66*, 516–533.
Teoh, S. H., & Wong, T. J. (1993). Perceived auditor quality and the earnings response coefficient. *The Accounting Review, 68*(2), 346–366.
Turpen, R. A. (1990). Differential pricing on auditors' initial engagements: Further evidence. *Auditing: A Journal of Practice & Theory, 9*(2), 60–76.
Vanstraelen, A. (2002). Auditor economic incentives and going-concern opinions in a limited Litigious Continental European Business Environment: Empirical evidence from Belgium. *Accounting and Business Research, 32*(3), 171–186.
Vanstraelen, A. (2003). Going concern opinions, auditor switching, and the self-fulfilling prophecy effect examined in the regulatory context of Belgium. *Journal of Accounting Auditing and Finance,* 231–253.
Walker, P. L., & Casterella, J. R. (2000). The role of auditee profitability in pricing new audit engagements. *Auditing: A Journal of Practice & Theory, 19*(1), 157–167.
Wilkerson, J. E., Jr. (1987). Selecting experimental and comparison samples for use in studies of auditor reporting decisions. *Journal of Accounting Research, 25*(1), 161–167.
Williams, D. D. (1988). The potential determinants of auditor change. *Journal of Business Finance & Accounting, 15*(2), 243–261.
Woo, E., & Koh, H. C. (2001). Factors associated with auditor changes: A Singapore study. *Accounting and Business Research, 31*(2), 133–144.
Zmijewski, M. (1984). Methodological issues related to the estimation of financial distress prediction models. *Journal of Accounting Research, 22*, 59–82.