

Practice Note

**An Unintended Consequence of Full Population Testing on Auditors' Professional Skepticism**

**Grant Number: 2021B01**

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The Foundation for Auditing Research

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**September 2024**

*The authors would like to thank the auditors who participated in their experiment.*

*Furthermore, the authors thank the Foundation for Auditing Research (FAR) for their grant 2021B01. The views expressed in this document are those of the authors and not necessarily those of the FAR.*

## **An Unintended Consequence of Full Population Testing on Auditors' Professional Skepticism**

### **Executive Summary**

The emergence of data analytics allows auditors to test entire populations of data drawn from clients' information systems, rather than relying solely on sampling methods. While full population testing increases the *sufficiency*—or quantity—of evidence examined, it typically relies heavily on client-internal data. Therefore, auditors must remain skeptical when subsequent, more *appropriate* evidence from external sources contradicts a client's financial reporting. In an experiment, we find that auditors using full population testing, compared to sample testing, are less likely to subsequently exercise skeptical actions when an external, industry growth trend reveals a fraud red flag. We do not find that this unintended consequence is exacerbated when full population testing results are visualized (versus tabulated), a typical format used for presenting data analytic tests in practice.

### **Main Takeaways**

- Auditors using full population testing, compared to sample testing, are *less* likely to exercise skeptical actions when subsequently confronted with a fraud red flag revealed by an external industry growth trend.
- Auditors using full population testing, compared to sample testing, overestimate their evaluation of the appropriateness of client-internal evidence.
- Presenting the testing results in a visualized compared to tabulated form does not exacerbate the negative effect of full population testing on auditors' skeptical actions.

**Keywords:** external evidence, fraud, full population testing, professional skepticism

## The Issue

Emerging technologies like data analytics are expanding the scope of auditors' evidence by shifting audits towards testing entire populations (i.e., every transaction recorded in an account), instead of relying on sampling methods to draw conclusions. Full population testing offers numerous advantages. For example, unlike sampling, it potentially enables auditors to identify all misstatements in an account. Additionally, it is anticipated to enhance efficiency over manual testing methods. Ultimately, full population testing is expected to improve audit quality (e.g., Johnson and Wiley 2022).

However, one potential drawback of full population testing is its heavy reliance on electronic data drawn exclusively from clients' internal information systems, such as client invoices (e.g., Freiman, Kim, and Vasarhelyi 2022; Huang et al. 2022). As a result, compared to sample testing, full population testing primarily enables auditors to obtain more *sufficient* evidence generated from client-internal sources (*internal* evidence). However, full population testing is not likely to be applied to *external* evidence.<sup>1</sup> Importantly, internal evidence is more vulnerable to management manipulation. A larger volume of internal evidence cannot compensate for a lack of more *appropriate external* evidence from independent sources. Indeed, as stated in Proposed ISA 500 Revised, "more audit evidence, however, may not compensate for its poor quality." (IAASB 2022a, p. 29)].

Exclusive reliance on internal evidence becomes particularly problematic when external evidence contradicts a client's financial reporting. For example, a client's unusually rapid sales growth, relative to industry peers, could signal potential fraud, necessitating further investigation (e.g., Brazel, Jones, and Lian 2023). Over-relying on internal evidence may, therefore, hinder fraud detection (e.g., AICPA 2021; IAASB 2022b). As such, even when testing an entire population of internal evidence, it remains critical to also adequately consider the potentially more appropriate external evidence, which is essential for maintaining professional skepticism and enhancing fraud detection (e.g., AICPA [2021]).

We predict that auditors using full population testing, as opposed to sample-based testing, will substitute their assessment of evidence *sufficiency* (i.e., quantity) for their evaluation of

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<sup>1</sup> The inclusion of *external* evidence in full population testing, while theoretically possible, is highly unlikely in audit practice to date. Discussions with an audit director specializing in digital transformation at an international non-Big Four audit firm revealed that full population testing, like the three-way matches we employ, currently exclusively relies on standardized data drawn from the *client's* systems. Integrating data from external sources (e.g., bank statements) would present considerable challenges, largely due to the potential lack of standardization. Also, such tests would yield a substantial number of exceptions that, after further manual investigation, would ultimately be deemed false positives due to data standardization issues.

evidence *appropriateness* (i.e., quality). As a result, they will then overestimate the appropriateness of internal evidence obtained via full population testing. This inflated sense of appropriateness may cause auditors to exhibit less skepticism when subsequently confronted with a fraud red flag revealed by more appropriate *external* evidence, such as an inconsistent industry trend.

Additionally, we predict that presenting full population test results in a visual format—a common practice for presenting data analytic tests—might further exacerbate the negative effect of full population testing on auditors’ skeptical actions.

Overall, we seek to answer the following questions:

- Does full population testing, compared to sample testing, reduce auditors’ skeptical actions when they later encounter a fraud red flag related to external evidence?
- Does presenting the testing results in a visualized format, rather than a tabulated form, worsen the negative effect of full population testing on auditors’ skeptical actions?

## **Methodology**

We conducted an online experiment with senior-level auditors in the Netherlands. Participants received an audit case that included background information about a hypothetical audit client. After receiving the background information, participants learned that their audit team had performed interim tests on sales account transactions from January 1, 2022 to October 31, 2022. All participants were informed that these tests involved two three-way matches of the client’s sales transactions. The first match compared the *quantities* in internal sales orders, sales invoices, and shipping documents. The second match compared the *prices* in internal sales orders, sales invoices, and the client’s master price list.

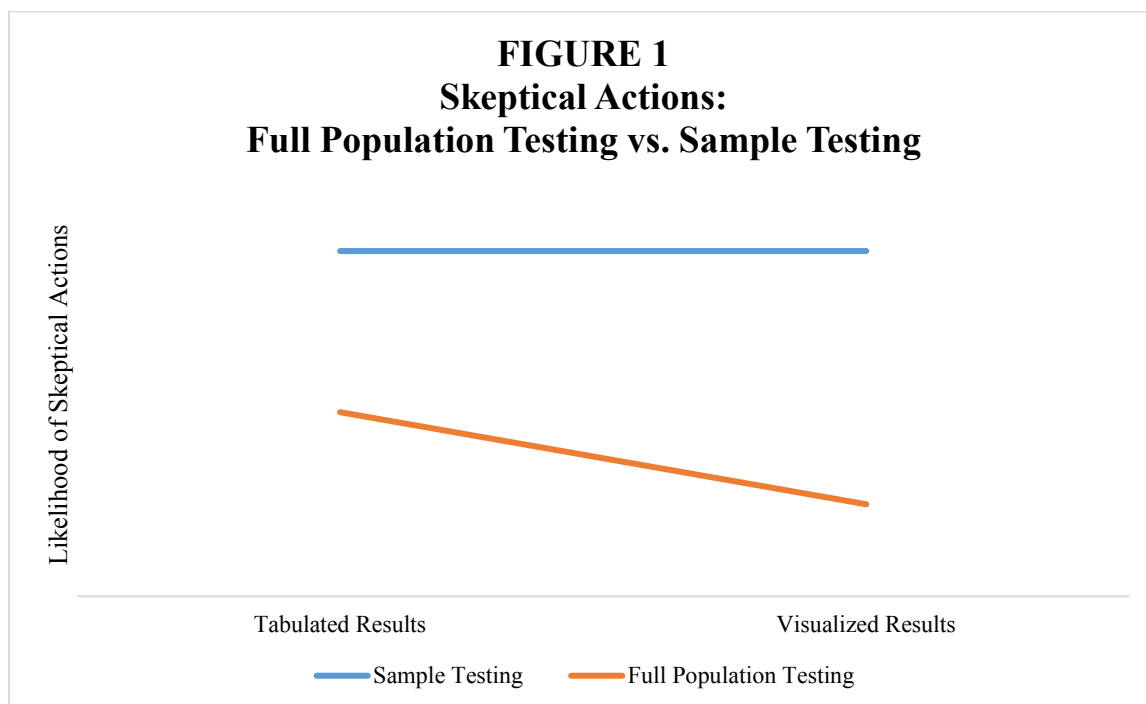
Participants were then randomly assigned to one of four groups. Participants in the *Full Population Testing* group were told that their two three-way matches covered the *entire population* of sales transactions from January 1, 2022 to October 31, 2022. In contrast, those in the *Sample Testing* group were informed that the matches had been performed on a *sample* of the sales transactions from the same period. Participants in the *Visualized Results* group received the three-way match results as visualizations, while those in the *Tabulated Results* group saw the results presented in tables.

After reviewing the interim testing results, participants performed a year-end substantive analytical procedure for the sales account. They had access to a comprehensive set of information to develop their expectation for the account. We embedded an inconsistency in

the external evidence, showing that the client’s current year sales growth exceeded the industry growth rate by about 17 percent. This inconsistency served as a red flag, similar to those observed in fraudulent firms by Brazel, Jones, and Lian (2023). Based on the provided data, participants developed an expectation for the sales account and determined whether additional testing was necessary. Our primary measure of skeptical action was whether participants intended to test or inquire about the industry growth red flag with client management and/or communicate the industry growth red flag to their audit manager.

### Findings

We find that auditors using full population testing, compared to sample testing, are less likely to inquire of client management and/or inform their manager about the industry growth red flag. While these results align with our first prediction (see Figure 1), we find no statistically significant evidence that presenting the testing results in a visualized format, compared to a tabulated format, worsens the negative effect of full population testing on auditors’ skeptical actions. This is reassuring, given that visualizing full population testing results is a common practice in auditing.



### Relevance to Audit Practice

Although full population testing offers significant benefits, our study reveals a potential unintended consequence: it may affect auditors’ evaluation of audit evidence and their application of professional skepticism. Technological advancements, such as artificial

intelligence, facilitate a growing access to information from various external sources (e.g., IAASB 2022). However, our findings suggest that despite these advancements, auditors may not fully leverage this expanded availability of external evidence to improve audit quality when relying on full population testing of internal evidence.

Our findings have important implications for audit firms, particularly concerning their quality control systems and training programs. To ensure that advancements in data analytics not only enhance audit efficiency but also promote higher quality audits, firms may need to address this issue. Training programs should emphasize that, despite technological advances like full population testing, auditing standards clearly distinguish between evidence sufficiency and appropriateness. Audit quality can be compromised if auditors conflate these two concepts when using advanced technologies. For example, data analytic tools could include alerts to help auditors differentiate between evidence sufficiency and appropriateness. Moreover, audit firms should consider modifying their training programs to ensure auditors better calibrate their reliance on both internal and external evidence, particularly in light of the respective detection risk.

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