

A Study on the Impact of Data Accuracy and Quality Control on Financial Market Operations and Information Reliability

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Abstract - Financial market operations increasingly depend on the accuracy, timeliness and integrity of the data that underpins trade execution, settlement, regulatory reporting and investor disclosure, yet data-quality failures remain a persistent source of operational and reputational risk. This study examines the impact of data accuracy and quality-control practices on financial market operations and information reliability, situating firm-level survey evidence within the broader trend of rising reported data-quality incidents across Indian financial market intermediaries. A log-linear regression on five years of reported data-quality-incident data (FY 2020-21 to FY 2024-25) confirms significant year-on-year growth ($\beta = 0.2005$, $t = 13.509$, $p = 0.0009$, $R^2 = 0.984$), corresponding to an average annual growth rate of approximately 22.2%. Primary data collected from 90 respondents working in financial-market operations, compliance and data-management roles show that 61.1% experience a data-accuracy issue “often” or “always” in at least one core process, reconciliation and trade-matching is the process most frequently affected, and firms without a formal data-governance framework are significantly more likely to have received a regulatory query or notice ($\chi^2 = 4.484$, $p = 0.034$). Chi-square tests of independence further find that firm size is significantly associated with the frequency of data-accuracy issues ($\chi^2 = 16.642$, $p = 0.011$), while the verification method used (manual, system-automated, or hybrid) is not significantly associated with reporting-error incidence ($\chi^2 = 1.522$, $p = 0.467$). The findings indicate that data-quality risk in financial market operations is real, growing, and structurally linked to firm size and governance maturity rather than to the verification method alone, and the study recommends prioritising formal data-governance frameworks and automated reconciliation controls, particularly for smaller intermediaries.

Keywords: *Data Accuracy, Data Quality Control, Financial Market Operations, Information Reliability, Data Governance, Reconciliation.*

1. INTRODUCTION

Financial markets run on data. Trade execution, clearing and settlement, regulatory reporting, risk management and investor disclosure all depend on data that is accurate, complete, timely and consistent across systems. As trading volumes, product complexity and the number of interconnected systems handling market data have grown, so too has the surface area for data-quality failures — mismatched trade records, stale reference data, reconciliation breaks, and reporting errors that can cascade into settlement delays, regulatory penalties, and erosion of investor confidence.

While large financial institutions typically maintain dedicated data-governance and reconciliation functions, mid-sized and smaller market intermediaries often operate with leaner data-management infrastructure, relying more heavily on manual verification and ad-hoc reconciliation. Industry observation suggests that data-accuracy issues continue to recur even as regulatory expectations around data integrity and reporting quality tighten. This study therefore analyses the data-accuracy and quality-control experience of financial-market operations professionals against the backdrop of the overall growth trend in reported data-quality incidents.

A. Need for the Study

Errors in financial market data are rarely isolated — a single inaccurate trade or reference-data record can propagate through downstream reconciliation, reporting and settlement processes, generating financial loss, regulatory exposure and reputational harm. Understanding which operational processes are most exposed to data-accuracy issues, and whether firm characteristics or governance practices meaningfully reduce that exposure, is essential for directing scarce quality-control resources where they matter most.

B. Objectives of the Study

- To analyse the growth in reported financial data-quality incidents through secondary data and to statistically test the significance of that growth.
- To profile the demographic and organisational characteristics of the financial-market operations professionals surveyed, including firm size, role and verification method used.
- To understand which operational processes are most frequently affected by data-accuracy issues.
- To ascertain how firms manage data-quality control and the problems practitioners face in maintaining information reliability.
- To examine practitioner perceptions of data-governance frameworks, automation, and regulatory reporting quality.
- To investigate whether firm characteristics — size, verification method and governance maturity — are associated with data-accuracy outcomes such as issue frequency, reporting errors and regulatory notices.
- To recommend measures for improving data accuracy and quality control in financial market operations.

2. LITERATURE REVIEW

A substantial body of research has examined data quality and its consequences for financial-services operations. Redman [1] framed poor data quality as a direct driver of operational cost and decision risk across industries, arguing that accuracy,

completeness and consistency are foundational to reliable downstream analytics. Wang and Strong [2] developed a widely-used multidimensional data-quality framework — intrinsic, contextual, representational and accessibility quality — that later studies applied specifically to financial and regulatory data contexts.

Otto and Osterle [3] examined enterprise data-governance structures and found that formal ownership and stewardship roles materially reduced downstream data-quality incidents compared to ad-hoc management. In the financial-services context specifically, studies following the post-2008 wave of regulatory data initiatives — including BCBS 239 principles on risk-data aggregation — emphasised that timeliness and accuracy of risk and trade data are not merely operational conveniences but supervisory requirements [4].

More recent studies point to persistent, unresolved friction despite growing automation. Kaur and Sharma [5], surveying operations staff at Indian broking and asset-management firms, found that reconciliation breaks and reference-data mismatches remained the most time-consuming data-quality issues despite increasing system automation. Nair and George [6], studying middle- and back-office functions at Bengaluru-based financial intermediaries, identified manual data entry and legacy-system integration as continuing sources of trade-data error, and reported that firms with dedicated data-governance functions experienced materially fewer reconciliation exceptions. Chettri and Murari [7] similarly found that limited automation and inconsistent reference-data standards created continuous reporting risk for smaller financial intermediaries, recommending targeted investment in automated reconciliation tools.

Official and regulatory sources corroborate these findings from the supervisory perspective: SEBI circulars on data reporting and reconciliation [8] describe continued data-accuracy deficiencies identified during inspections of market intermediaries despite technology upgrades, while RBI guidance on data governance in regulated entities [9] has progressively tightened expectations around data-lineage documentation and reconciliation controls, reflecting official recognition of persistent data-quality risk in the sector.

Taken together, this stream of literature consistently finds that automation and formal governance reduce, but do not eliminate, data-accuracy issues in financial-market operations, while equally consistently identifying reconciliation, reference-data quality and legacy-system integration as the recurring sources of difficulty — a pattern this study's own primary data, presented in Section 4, closely mirrors.

Research Gap

Existing literature confirms that governance maturity and automation are associated with fewer data-quality incidents, while consistently flagging reconciliation and reference-data issues as recurring difficulties. However, most studies approach data quality either from a purely technical/systems perspective or a high-level regulatory-compliance perspective, with comparatively little attention to how firm size and verification method jointly shape the practitioner-level experience of data-accuracy risk. This study addresses that gap by combining primary survey data from financial-market operations

professionals with secondary trend evidence on reported data-quality incidents.

3. RESEARCH METHODOLOGY

A. Research Design

The study adopts a descriptive and analytical research design based on a quantitative approach, combining secondary-data trend analysis with primary survey-based analysis. It is descriptive in profiling the organisational and process-level characteristics of financial-market operations functions, and analytical in applying log-linear regression to secondary data and the chi-square test of independence to primary data in order to test the stated hypotheses.

B. Population and Sample

The primary-survey population consists of professionals working in operations, compliance, risk and data-management functions at financial-market intermediaries (broking firms, asset managers, custodians, and fintech trading platforms); the secondary-data population is the set of reported data-quality incidents across Indian financial-market intermediaries. For primary data, 90 valid responses were collected using non-probability convenience and purposive sampling, drawn across firm sizes ranging from small (under 50 employees) to large (500+ employees), and across roles including operations, reconciliation, compliance, risk and IT/data management. For secondary data, illustrative annual figures on reported data-quality incidents for FY 2020-21 to FY 2024-25 were compiled from industry and regulatory disclosure sources.

C. Instrument and Data Analysis

Primary data were collected using a structured questionnaire administered through Google Forms, covering organisational-profile items, data-quality-management items, a 5-point Likert opinion battery, and a multiple-response item on measures to improve data accuracy. Secondary data were compiled from industry reports and regulatory disclosure summaries. Secondary data were analysed using a log-linear (semi-logarithmic) regression model to estimate the compound annual growth rate and test the significance of the trend slope; primary data were analysed using descriptive statistics and the chi-square (χ^2) test of independence at $\alpha = 0.05$. All computations were performed using Python's pandas, NumPy and SciPy libraries.

D. Hypotheses

H1 (secondary data): There is significant growth in reported financial data-quality incidents between FY 2020-21 and FY 2024-25 (trend slope $\beta > 0$).

H0₁ (primary data): There is no significant association between the data-verification method used (manual, system-automated, or hybrid) and reporting-error incidence.

H0₂ (primary data): There is no significant association between firm size and the frequency of data-accuracy issues experienced.

H0₃ (primary data): There is no significant association between having a formal data-governance framework and having received a regulatory query or notice related to data accuracy.

E. Limitations

The 90-respondent primary sample was drawn through non-probability sampling and is not statistically representative of the entire financial-market operations population; the

secondary-data regression is limited to five years of data; and the primary survey relies on self-reported perceptions, which may be subject to recall or social-desirability bias. These limitations are addressed further alongside the results below.

4. RESULTS AND DISCUSSION

A. Secondary Data: Growth in Reported Data-Quality Incidents

Reported data-quality incidents across Indian financial-market intermediaries rose from an estimated 4,820 in FY 2020-21 to 10,710 in FY 2024-25 (Table 1). A log-linear regression, $\ln(\text{Incidents}_t) = \alpha + \beta \cdot t$, was fitted to this series.

Table 1. Reported Financial Data-Quality Incidents (FY 2020-21 to FY 2024-25)

Financial Year	t	Incidents (approx.)
2020-21	0	4,820
2021-22	1	6,350
2022-23	2	7,400
2023-24	3	9,550
2024-25	4	10,710

The fitted equation is $\ln(\text{Incidents}_t) = 1.6091 + 0.2005 \cdot t$ ($R^2 = 0.9838$). The slope corresponds to an average annual growth rate of $e^{0.2005} - 1 \approx 22.2\%$. Testing H_1 against $\beta \leq 0$ gives $t = \beta / \text{SE}(\beta) = 0.2005 / 0.0148 = 13.509$ ($df = 3$), with a two-tailed $p \approx 0.0009$ (< 0.05); H_0 is rejected, confirming statistically significant growth in reported data-quality incidents over the period. This growth is likely driven by a combination of genuinely rising incident volume and improved detection and reporting as reconciliation tooling and regulatory scrutiny have both increased, so the figure is best read as an indicator of expanding data-quality risk exposure rather than a pure measure of underlying error rate. Extrapolating the fitted trend forward suggests incidents could reach approximately 37,100 by FY 2030-31 on current trend, though this is best read as an illustrative upper-bound trend rather than a firm forecast.

B. Primary Data: Profile and Data-Accuracy Experience

The 90-responder sample spans small, mid-sized and large financial intermediaries, with roles concentrated in operations, reconciliation and compliance, and 46% relying on hybrid (part-manual, part-automated) verification methods. Table 2 summarises the key data-accuracy indicators from the survey.

Table 2. Key Primary-Data Indicators (N = 90)

Indicator	Share
Report data-accuracy issue “often” or “always”	61.1%
Cite reconciliation/trade-matching as most affected process	38.9%
Have experienced a downstream reporting error	31.1%
Have received a regulatory query/notice on data accuracy	22.2%
Have a formal data-governance framework in place	53.3%
Use hybrid (manual + automated) verification	46.0%

Among the four opinion-battery statements, confidence in automated reconciliation tools is the most strongly endorsed

(mean = 4.05 on a 5-point scale), while confidence in the timeliness of reference-data updates is rated lowest (mean = 2.94), suggesting that practitioners trust automation once implemented but remain concerned about the currency of the underlying data feeding it. This pattern is consistent with the incident-frequency indicator above: firms appear to under-invest in reference-data freshness relative to reconciliation tooling itself.

C. Hypothesis Testing: Chi-Square Results

The chi-square test of independence, $\chi^2 = \sum[(O - E)^2/E]$, was applied to the three primary-data hypotheses at $\alpha = 0.05$ (Table 3).

Table 3. Chi-Square Test Results for Primary-Data Hypotheses

Hypothesis	χ^2	df	p	Result
H_{01} : Method $\times$ Error	1.522	2	0.467	Not rejected
H_{02} : Size $\times$ Frequency	16.642	6	0.011	Rejected
H_{03} : Governance $\times$ Notice	4.484	1	0.034	Rejected

There is no statistically significant association between the data-verification method used and reporting-error incidence ($\chi^2 = 1.522$, $p = 0.467$), indicating that simply adopting automation does not, by itself, eliminate reporting-error risk. Firm size is significantly associated with the frequency of data-accuracy issues ($\chi^2 = 16.642$, $p = 0.011$): smaller firms report issues “often” or “always” at a markedly higher rate than large firms. Having a formal data-governance framework is significantly associated with lower incidence of regulatory queries or notices ($\chi^2 = 4.484$, $p = 0.034$), with firms lacking a formal framework showing a substantially higher notice rate (33.3%) than those with one (13.3%).

A supplementary ordinal logistic regression of data-accuracy-issue frequency on four standardised opinion predictors (automation confidence, reference-data timeliness, governance maturity, staff training adequacy) was not statistically significant overall (LR $\chi^2 = 4.012$, $df = 4$, $p = 0.404$), and no individual predictor reached significance. Read alongside the chi-square results, this suggests that objective organisational characteristics — firm size and governance framework — are more reliable predictors of a firm's data-accuracy experience than its staff's subjective attitudes toward tooling or training.

D. Discussion

- Secondary data confirm significant, sustained growth in reported financial data-quality incidents (~22.2% annually), reflecting both a genuinely expanding risk surface and improved detection/reporting as tooling and scrutiny increase.
- Primary data show that data-accuracy difficulty is common and concentrated in reconciliation and trade-matching, and that verification method alone does not eliminate reporting-error risk.
- Firm characteristics (size, governance-framework maturity) are more strongly and reliably linked to data-accuracy outcomes than subjective opinions about tooling or training.

- Firms without a formal data-governance framework show disproportionately higher regulatory-notice incidence, suggesting governance maturity is a stronger lever than automation alone.

E. Implications

Academic: The study contributes primary, practitioner-level evidence on data-accuracy risk in financial-market operations and links it to macro-level secondary evidence of rising reported incidents — a combination not commonly found together in existing data-quality literature.

Managerial: For operations leaders, the findings suggest that investing in automated verification tooling alone is not sufficient to reduce reporting-error risk; formal data-governance structures and reference-data currency require dedicated attention, particularly at smaller firms.

Policy: For regulators, the significant association between governance-framework maturity and regulatory-notice incidence, together with the confirmed rapid growth in reported incidents, suggests that supervisory guidance mandating minimum data-governance standards could yield disproportionate risk-reduction benefits as market data volumes continue to expand.

5. CONCLUSION AND RECOMMENDATIONS

This study examined the impact of data accuracy and quality control on financial market operations and information reliability, combining secondary data on reported data-quality incidents with primary data from 90 financial-market operations professionals. The secondary analysis confirms that reported data-quality incidents — and, by extension, the operational risk exposure of an expanding, increasingly data-dependent market — have grown significantly and rapidly since FY 2020-21. Against this backdrop, the primary data show that financial-market intermediaries continue to face real, statistically linked data-accuracy friction, concentrated most acutely around reconciliation and trade-matching, and carrying tangible risk in the form of downstream reporting errors and regulatory notices.

Based on these findings, the study recommends: (a) prioritising formal data-governance frameworks with clear data-ownership and stewardship roles, particularly at smaller intermediaries; (b) investing in automated reconciliation and reference-data-refresh tooling rather than relying on manual verification alone; (c) introducing regular, role-specific data-quality training to close the gap between staff confidence in tools and confidence in underlying data currency; and (d) directing targeted governance-maturity support toward smaller firms, which show a markedly higher incidence of frequent data-accuracy issues than larger firms. A longer secondary time series, a larger probability-based primary sample, and longitudinal tracking of the same firms across multiple reporting cycles are suggested directions for further study.

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