Review Form 3

Journal Name:	**Asian Journal of Probability and Statistics**
Manuscript Number:	**Ms_AJPAS_127301**
Title of the Manuscript:	**On a New Decile-Mean Confidence Interval Estimator of Mean for Normal and Skewed Distributions**
Type of the Article	

General guidelines for the Peer Review process:

This journal's peer review policy states that **NO** manuscript should be rejected only on the basis of '**lack of Novelty'**, provided the manuscript is scientifically robust and technically sound.
To know the complete guidelines for the Peer Review process, reviewers are requested to visit this link:

https://r1.reviewerhub.org/general-editorial-policy/

Important Policies Regarding Peer Review

Peer review Comments Approval Policy: https://r1.reviewerhub.org/peer-review-comments-approval-policy/
Benefits for Reviewers: https://r1.reviewerhub.org/benefits-for-reviewers

PART 1: Review Comments

Compulsory REVISION comments	**Reviewer's comment**	**Author's Feedback** *(Please correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Please write a few sentences regarding the importance of this manuscript for the scientific community. Why do you like (or dislike) this manuscript? A minimum of 3-4 sentences may be required for this part.		
Is the title of the article suitable? (If not please suggest an alternative title)		
Is the abstract of the article comprehensive? Do you suggest the addition (or deletion) of some points in this section? Please write your suggestions here.		
Are subsections and structure of the manuscript appropriate?		
Please write a few sentences regarding the scientific correctness of this manuscript. Why do you think that this manuscript is scientifically robust and technically sound? A minimum of 3-4 sentences may be required for this part.		
Are the references sufficient and recent? If you have suggestions of additional references, please mention them in the review form. -		

Review Form 3

Minor REVISION comments **Is the language/English quality of the article suitable for scholarly communications?**		
Optional/General comments	The article needs a major revision based on the following detailed comments section wise . **Title:** "On a New DecileMean Confidence Interval Estimator of Mean for Normal and Skewed Distributions" 1. Repetition: The word "mean" is repeated unnecessarily ("Estimator of Mean for Normal and Skewed Distributions"). Improvement: Remove redundancy. A more concise title could be: "A New DecileMean Confidence Interval for Normal and Skewed Distributions." 2. Ambiguity: The phrase "DecileMean Confidence Interval" might be unclear to readers unfamiliar with the concept. Consider briefly clarifying or simplifying. 3. Capitalization: Ensure proper capitalization for consistency and readability. **Abstract:** 1. Repetition: Phrases like "Mokhtar, Yusof & Sapiri, 2024" and "confidence intervals" are repeated excessively, which reduces clarity. Improvement: Reduce redundancy by consolidating references and merging similar ideas. 2. Grammatical Errors: Sentence: "The efficiency of these CI methods has been evaluated through examples and simulations, focusing on the length of the CI and estimated coverage probability for data exhibiting both normality and skewness." Correction: Replace "focusing on the length of the CI" with "evaluating CI length" for conciseness. 3. Ambiguity: Phrases like "a significant estimation problem is observed" do not specify what the problem is. Improvement: Clearly state the problem with the dtCI (e.g., "the dtCI failed to maintain expected coverage probability for large samples or highly skewed data"). 4. Improper Transitions: The transition between the problem and the proposed solution is abrupt. Improvement: Use a smoother transition, such as: "To address these challenges, we propose a corrective decile t confidence interval (cdtCI) that resolves these issues by..." 5. Lack of Specific Findings: The abstract mentions that the cdtCI "outperforms all other methods" but does not provide quantitative evidence. Improvement: Include specific results or a summary of findings. 6. Overall Length: The abstract is overly detailed, making it difficult for readers to identify the key contributions. Improvement: Streamline the content, focusing on the problem, proposed solution, and major findings. **Introduction:** 1. Repetition: Several sentences are repeated verbatim, such as: "Many classical estimation methods assume that the data from the underlying studies come from a normal distribution." Improvement: Remove duplicate sentences and consolidate ideas. 2. Grammatical Errors:	

	Sentence: "Many classical estimation methods assume that the data from the underlying studies come from a normal distribution. For example, the zconfidence interval (zCI) and Student's t confidence interval (tCI) methods are derived under the assumption of normality of the population distribution." Correction: Combine into a single sentence for conciseness: "Classical estimation methods, such as the zCI and tCI, often assume that data follow a normal distribution." 3. Ambiguity: Phrases like "limitations of the Student's t technique have been noted" are vague. Improvement: Specify the limitations (e.g., "The tCI is less effective for small sample sizes or skewed distributions"). 4. Overuse of References: References are cited repeatedly without adding new information (e.g., Mokhtar, Yusof & Sapiri, 2024). Improvement: Limit redundant references and group citations where appropriate. 5. Lack of Clear Focus: The introduction discusses several CI methods but does not clearly outline how the proposed cdtCI fits into this context. Improvement: State the research gap and objective early in the introduction. 6. Structure Issues: The organization of the introduction lacks a logical flow. For instance, the introduction jumps between discussing tCI, bootstrap methods, and the dtCI without a clear progression. Improvement: Use a structured approach: Paragraph 1: Briefly introduce CI methods and their challenges. Paragraph 2: Discuss the limitations of existing methods, focusing on the dtCI. Paragraph 3: Introduce the proposed cdtCI and its expected advantages. 7. Overly General Statements: Example: "A better understanding and exploration of underlying methods may lead to the recommendation of appropriate methods for constructing confidence intervals..." Improvement: Be specific about what this study contributes (e.g., "This study provides a new CI method, the cdtCI, which improves coverage probability and maintains robustness across sample sizes and skewness levels"). Suggestions for Improvement: Title: Simplify and clarify: "A Corrective DecileMean Confidence Interval for Normal and Skewed Distributions." Abstract: Focus on the problem, solution, and main results: "This study addresses issues with the decile tconfidence interval (dtCI), which fails to achieve desired coverage probabilities for large samples or skewed distributions. A new corrective decile tconfidence interval (cdtCI) is proposed, which resolves these issues by modifying the decile standard deviation. Simulations using normal, chisquared, lognormal, and gamma distributions demonstrate that the cdtCI outperforms existing methods, particularly for skewed data, in terms of coverage probability and robustness." Introduction: Revised Structure: Start with the importance of confidence intervals in statistical inference. Discuss the limitations of classical methods like tCI and bootstrap CIs for skewed data. Highlight the issues with the dtCI from prior studies. Introduce the cdtCI as a solution, emphasizing its advantages and goals. **Section 2** General Mistakes in Section 2 1. Repetition of Content: Some phrases and ideas are repeated unnecessarily (e.g., the description of the tCI in the introduction and again in subsection 2.1). 2. Terminological Ambiguity: The term "bootstrapt Decile Mean CI" is incorrectly used for dtCI, as noted in the text. 3. Lack of Clarity: The discussion of dtCI issues is incomplete, with no clear explanation for why the method fails in terms of coverage probability or underperformance.	

	Mistakes in Subsections 2.1 The tCI of Mean μ Mislabeling the Formula: The formula labeled as (1) describes the zCI but is included in the subsection for tCI, creating confusion. Overlapping Descriptions: There is redundancy in describing the robustness and limitations of tCI, which is already addressed in the introduction. 2.2 The pbCI of Mean μ Incomplete Explanation of Limitations: The pbCI method's inconsistency is mentioned but not elaborated with concrete examples or quantitative analysis. Algorithm Steps Oversight: The mathematical representation for the pbCI is not wellaligned with the textual description of the steps. 2.3 The btCI of Mean μ Ambiguity in Comparison: The btCI is said to "outperform the tCI," but no quantitative or simulationbased evidence is provided in this section. Formula Presentation: Equation (5) lacks clarity about the symbols used (e.g., no clear explanation for percentiles or their computation). 2.4 The dtCI of Mean μ Inadequate Problem Analysis: The issues with dtCI's inability to achieve desired coverage probabilities are attributed vaguely to small decile sizes and increasing sample size, but no rigorous mathematical or simulation evidence is included. Unclear Justification for Method Failures: The reason behind poor performance when bootstrap replication increases is superficially noted without detailed exploration. Misplaced Emphasis: The section downplays the dtCI's failure by focusing on theoretical formulations rather than practical results. These sections require restructuring, with emphasis on eliminating redundancy, providing clearer explanations, and including quantitative support for the claims. **3. Methodology** 1. Vague Explanation of cdtCI Development: The explanation of the corrected decile standard deviation (CDSD) lacks depth. It does not provide an intuitive understanding of how this correction resolves the issue with dtCI. Equation (8) for CDSD is introduced abruptly without sufficient theoretical backing or connection to dtCI issues. 2. Missing Algorithm Details: There is no detailed algorithm for implementing the cdtCI. The methodology assumes familiarity with concepts that require clearer explanation for general audiences. 3. Insufficient Justification for Proposed Method: The proposal for cdtCI is based on its perceived improvement over dtCI, but no direct mathematical or theoretical validation is provided in this section. 4. Poor Structure: The section discusses cdtCI improvements but doesn't bridge the gap between identifying dtCI issues and introducing the cdtCI. **4. The Simulation Study** 1. Inconsistent Description of Models: Four distribution models (gamma, normal, chisquared, lognormal) are defined, but the parameters (e.g., shape, scale) for certain models (like lognormal) are unclear or introduced without rationale. 2. Oversight in Sample Size Selection: While sample sizes range from 10 to 400, no justification is provided for this choice or why smaller/larger sizes weren't included. 3. Unexplained Statistical Assumptions: Assumptions made about the skewness levels in distributions (e.g., γ = 0.5, 1, 2) are arbitrary and not grounded in realworld contexts or prior research. 4. Incomplete Reporting on Bootstrap Settings:	

	The significance of using bootstrap replication B = 1000 over other values is briefly mentioned but not explained rigorously. **Evaluation Criteria of Simulation** 1. Superficial Definition of Evaluation Metrics: The metrics, such as "coverage probability" and "average length of CI," are mentioned but not adequately defined for readers unfamiliar with them. 2. Lack of Alternative Criteria: Other important evaluation metrics (e.g., bias, computational efficiency) are omitted despite their relevance for assessing CI methods. 3. Unclear Relationship Between Metrics and CI Performance: There is no comprehensive discussion on how the tradeoffs between coverage probability and CI length are handled. **Simulation Results** 1. Inconsistent Presentation of Results: Tables are provided with estimated coverage probabilities and lengths, but the text does not analyze these results in sufficient detail or identify trends comprehensively. 2. Neglect of Anomalies in Results: In Table 2, dtCI performs unexpectedly poorly for larger sample sizes and higher skewness. These anomalies are mentioned but not explored deeply. 3. Inadequate Comparisons Between Methods: The text states that btCI "performs best" and cdtCI "outperforms dtCI" but does not provide statistical evidence or confidence intervals for the performance differences. 4. Misleading Claims: The claim that cdtCI consistently outperforms dtCI ignores cases (e.g., symmetric normal data in Table 5) where dtCI performs comparably or better. 5. Lack of RealLife Contextualization: The simulation results are not linked back to reallife scenarios, leaving readers unclear about the practical implications of the findings. **Suggestions for Improvement:** 1. 3. Methodology: Provide a more detailed derivation of the corrected decile standard deviation (CDSD). Include an algorithm for implementing cdtCI with illustrative examples. 2. 4. The Simulation Study: Justify the choices of distribution models, parameter settings, and sample sizes based on prior literature or realworld applications. 3. Evaluation Criteria of Simulation: Clearly define metrics and explain their importance in assessing CI performance. Introduce additional evaluation metrics like bias or computational efficiency. 4. Simulation Results: Analyze trends in results and provide detailed insights into anomalies. Use visualizations (e.g., graphs of coverage probability vs. skewness) to complement tables. Relate results to practical examples to emphasize realworld relevance. **Examples and Applications with RealLife Data** 1. Inconsistent Description of Data: Example 1 and Example 2 fail to provide adequate information on the context or source of the data (e.g., specific years or sampling methods for Malaysia’s poverty and unemployment rates). Example 4 uses data revisited from a previous study (Mokhtar, Yusof & Sapiri, 2024) but does not clarify the errors in the original analysis or how the revisited analysis addresses them. 2. Skewness Analysis Issues: The description of skewness is overly simplistic. For example, in Example 1, a skewness value of 0.27 is labeled as "negatively	

skewed," but no threshold is given to justify the categorization.
Example 3 states that a skewness of 1.23 indicates positive skewness but does not explore its implications on CI performance or link it to simulation results.

3. Lack of Comprehensive Visualization:
While some examples include histograms and boxplots, their interpretations are shallow, with no direct connection to the performance of CI methods.
Important visual aids, such as overlaying CIs for comparison, are missing.

4. Oversight in Method Comparison:
The text compares CI lengths and coverage probabilities but does not analyze why certain methods perform better or worse for the given data.
The practical significance of CI lengths and coverage probabilities for decisionmaking is not discussed.

5. Inadequate Focus on Key Findings:
The examples emphasize the dtCI's shorter length but neglect its poor performance in coverage probability.
Example 3 highlights that dtCI fails to capture the true mean but does not explain why this failure occurs.

6. Ambiguous Recommendations:
The examples suggest the superiority of cdtCI but fail to provide strong evidence, particularly when the results are marginally better than other methods.

7. Poor Connection to RealLife Applications:
The implications of the findings for practical problems, such as policymaking based on poverty or unemployment data, are not addressed.

Conclusions
1. Generalized Claims Without Sufficient Evidence:
The conclusion asserts that cdtCI consistently outperforms dtCI without adequately addressing cases where dtCI performs comparably (e.g., symmetric normal data in simulations).

2. Ambiguity in Method Preference:
The recommendation of cdtCI as the preferred method for skewed distributions is made without addressing cases where other methods (e.g., btCI) perform equally or better.

3. Lack of Quantitative Summary:
The conclusion does not include a quantitative summary (e.g., improvement percentages or confidence intervals) to validate the superiority of cdtCI.

4. Unaddressed Limitations:
The discussion ignores the computational complexity of cdtCI compared to simpler methods like tCI.
Potential biases or limitations of the study, such as reliance on certain skewness parameters or distribution models, are not acknowledged.

5. Disconnect from Examples and Simulations:
The conclusions are not wellconnected to the results of the examples or simulations, leaving the reader unclear about the realworld applicability of the findings.

6. Overemphasis on cdtCI Superiority:
The narrative overly promotes cdtCI without critically evaluating scenarios where other methods might be better suited.

7. Missing Future Directions:
There is no mention of potential extensions, such as testing the cdtCI on additional distributions or exploring its performance with alternative skewness measures.

Suggestions for Improvement:
1. Examples and Applications with RealLife Data:
Provide more detailed descriptions of the data, its collection methods, and its realworld context.

	Use better visualizations, such as comparative CI plots, to enhance interpretation. Relate the findings to practical implications, such as decisionmaking in policy or economic contexts. 2. Conclusions: Include a quantitative summary of findings and explicitly acknowledge the study's limitations. Avoid overgeneralized claims and provide a balanced discussion of when cdtCI might not be the best choice. Suggest future research directions, such as broader simulations or alternative methodologies.	

PART 2:

	Reviewer's comment	**Author's comment** *(if agreed with reviewer, correct the manuscript and highlight that part in the manuscript. It is mandatory that authors should write his/her feedback here)*
Are there ethical issues in this manuscript?	*(If yes, Kindly please write down the ethical issues here in details)*	

Reviewer Details:

Name:	**E. I. Abdul Sathar**
Department, University & Country	**University of Kerala, India**