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Journal Name:	Asian Journal of Advanced Research and Reports
Manuscript Number:	**Ms_AJARR_42521**
Title of the Manuscript:	**Improved Estimator of Finite Population Variance using Coefficient of Quartile Deviation**
Type of the Article	

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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.
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PART 1: Review Comments

	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)*
Compulsory REVISION comments		
Minor REVISION comments	**Short description** This manuscript presents a modification of the class of ratio (mean-per-unit) type estimators using certain parameters of the auxiliary variable. The efficiency of the proposed estimators is demonstrated by numerical explorations. The manuscript has lot of syntax/grammar errors which I tried to correct. **General rules about the format of the mathematical expressions:** (a) All the mathematical notations/quantities that the authors use have to be in the **same size** as the text, and in **italics** (or in "Math" style in MathType®); for example, $X, x, f(x), i, j, t$, etc. instead of $\mathrm{X}, \mathrm{x}, \mathrm{f(x)}, \mathrm{i}, \mathrm{j}, \mathrm{t}$, respectively. Known mathematical functions should be in **upright** form (non-italics, or "Function" style in MathType®), like $\sin x, \log y, \exp(x)$, etc. instead of $sinx, log\, y, exp(x)$ etc. Moreover, numbers should be in **upright** form (bold or italics are usually for emphasizing). (b) When you use indexes in mathematical notations/quantities that are textual (not variables or other mathematical quantities) please use **upright** form not italics. For example, you should write A_{total} instead of A_{total}. (c) When you write in-line mathematical expressions, avoid (when it is possible) large mathematical notations. For example, you can write $f(x)=x/(1-x)$ instead of $f(x)=\frac{x}{1-x}$. Otherwise, use equation lines, where a new line is devoted for those expressions, for example $$f(\mathrm{x})=\frac{x}{1-x}.$$ (d) Put the corresponding equation numbers at the right end of equation line. (e) Please put a full stop at the end of an equation line if your sentence ends there, or put a comma if your sentence continues after the equation line. Please apply the above general rules throughout your manuscript. Here are some minor revision comments: *Note:* The text in red below represents the suggested changes/additions. **Page 1.** **Abstract:** Please, rewrite as "This study introduces a new, better, class of ratio estimators for the estimation of population variance of the study variable by using the coefficient of quartile deviation of auxiliary variable. Bias and mean square error of the proposed class of estimators are also derived. The conditions of efficiency comparison are also obtained. Simulation and different secondary data sets are used to evaluate the efficiency of proposed class of variance estimators over existing class of estimators. The empirical study shows that the suggested class of estimators is more efficient the existing class of	

estimators for the population variance.".

1st paragraph of Introduction: Please, rewrite as "Let us consider a finite population of size *N*, and *Y* be the real variable under investigation. Estimations of the unknown population parameters are used in general when the sample information is only available. The finite population variance $S_Y^2 = \frac{1}{N-1}\sum_{i=1}^{N}(Y_i - \overline{Y})^2$ " is based on random sample selection from population. Many forms of population variances can be found in literature. In this study, our aim is to propose and investigate a better class of estimators of population variance in simple random sampling (SRS). We consider the helping information that the auxiliary variable offers; in sampling theory, we usually get the upgraded sampling design in order to have a more accurate analysis. We consider this supplementary information to increase the accuracy of population variance; see for details Bhat et al. (2018).". Please apply general comment (c) to the entire manuscript.

2nd paragraph of Introduction: Please, rewrite as "The first ratio estimator for population variance was introduced by Isaki (1983) and many of the statisticians improved it in various ways for better performance. The notations used in this study are below:".

Notations at the end of the Page 1: Please, use *X* any *Y* instead of *x* and *y* in the corresponding subscripts of the notations.

Page 2.

Eqs. (1), (2), (3): Please, describe quantities γ and λ appeared in eqs. (2) and (3). Also, put a comma at the end of eq. (1) and eq. (2), and a full stop at the end of eq. (3). Put also the eq. numberings at the right end of their equation lines. Please, apply general comments (d) and (e) to the entire manuscript.

Paragraph after eqs. (1)-(3): Please, rewrite as "The estimation of variance plays, in general, a significant role in life sciences, as it is quite often used in sampling theory, while many effort have been made to enhance its estimated accuracy. Motivated by Kadilar and Cingi (2006), Subramani and Kumarapandiyan (2012b) suggested a class of estimators by using quartiles and some functions of quartiles of the supplementary variable, like the Inter-quartile range, Semi-quartile average and Semi-quartile range. In the following Table 1 we present some existing estimators along with their biases and means squared error (MSEs), where $A_{JG1} = \ldots$ ".

Page 3.

Paragraph after Proposed Classes of Estimators: Please, rewrite as "The quartile deviation, which is a relative measure of dispersion, is known as the coefficient of quartile deviation. It is free of units of measurement and is a pure number (Bonett, 2006). Proposed estimators with their biases and MSEs given Table 2.". When you are referring to a table numbered X, please write "Table X" instead of "table X". Apply this to the rest of the manuscript.

Eq. (4): Please, put a comma at the end of eq. (4), start the next line with "where", and put a full stop at the end of this line.

Page 4.

1st paragraph: Please, rewrite as "From Table 2, the MSEs of the proposed class of estimators for the population variance can be written as:.".

Eq. (5): Please, put a comma at the end of eq. (5), start the next line with "where", and put a full stop at the end of this line.

Paragraph after eq. (5): Please, rewrite as "From equations (3) and (5), the efficiency condition has been derived, according to which the proposed class of estimators shows more efficient behaviour than the traditional ratio estimator for the population variance. Similarly, from equations (4) and (5), the efficiency condition is also derived, showing again that the proposed class of estimators are more efficient than the existing class of ratio estimators for the population variance as given by Subramani and Kumarapandiyan (2012b).".

Eqs. Below the above paragraph: Please, put a comma at the end of the first equation, and then write "and". Put also a full stop at the end of the second equation.

1st paragraph of Empirical Study: Please, rewrite as "The simulated and secondary data are used to check the efficiency of the suggested class of estimators for the population variance over the existing class of estimators. The first data set is taken

	from Murthy (1967), the second data set is taken from Singh and Chaudhary (1986), and the Third data set, concerning the production of rice crop for the period 1982-83 to 2014-15 in the Punjab, Pakistan, is taken from the Agricultural Statistics of Pakistan…". **Page 6.** **Paragraph after Table 5:** Please, rewrite as "Table 4 presents the values of the biases of existing and proposed ratio type estimators. Each proposed ratio type estimator has a lower bias value compared to the bias value of the existing ratio type estimator. Similarly, each value of MSE of the new proposed estimators is also lower than the corresponding MSE value of the existing estimators, as given in Table 5.". **Conclusion:** Please, rewrite as "Each estimator of the class of the proposed estimators is compared to the corresponding existing estimator. Numerical explorations was used to show the behaviour of the efficiency condition, biases and MSEs of both the existing and the new estimators. It is then concluded that the proposed estimators are more efficient.".	
Optional/General comments		

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