

Home (<http://www.etamaths.com/index.php/ijaa/index>)

/ Archives (<http://www.etamaths.com/index.php/ijaa/issue/archive>)

/ Vol. 21 (2023) (<http://www.etamaths.com/index.php/ijaa/issue/view/59>) / Regular Issues

Estimation of Finite Population Mean by Utilizing the Auxiliary and Square of the Auxiliary Information

PDF (<http://www.etamaths.com/index.php/ijaa/article/view/2669/775>)

DOI: <https://doi.org/10.28924/2291-8639-21-2023-14> (<https://doi.org/10.28924/2291-8639-21-2023-14>)

Published: Feb 27, 2023

Cite as:

Saddam Hussain, Anum Iftikhar, Kleem Ullah, Gulnaz Atta, Usman Ali, Ulfat Parveen, Muhammad Yasir Arif, Ather Qayyum, Estimation of Finite Population Mean by Utilizing the Auxiliary and Square of the Auxiliary Information, Int. J. Anal. Appl., 21 (2023), 14.

Saddam Hussain, Anum Iftikhar, Kleem Ullah, Gulnaz Atta, Usman Ali, Ulfat Parveen, Muhammad Yasir Arif, Ather Qayyum

Abstract

This article fundamentally aims at the proposition of new family of estimators using auxiliary information to assist the estimation of finite population mean of the study variable. The objectives are achieved by devising dual use of supplementary information through straightforward manner. The additional information is injected in mean estimating procedure by considering squared values of auxiliary variable. The utility of the proposed scheme is substantiated by providing rigorous comparative account of the newly materialized structure with the well celebrated existing family of Grover and Kaur (2014). The contemporary advents of the new family are documented throughout the article.

References

1. S. Bahl, R.K. Tuteja, Ratio and product type exponential estimators, J. Inform. Optim. Sci. 12 (1991), 159–164. <https://doi.org/10.1080/02522667.1991.10699058>

- (<https://doi.org/10.1080/02522667.1991.10699058>).
2. P.K. Bedi, Efficient utilization of auxiliary information at estimation stage, *Biometrical J.* 38 (1996), 973–976. <https://doi.org/10.1002/bimj.4710380809> (<https://doi.org/10.1002/bimj.4710380809>).
 3. W.G. Cochran, The estimation of the yields of cereal experiments by sampling for the ratio of grain to total produce, *J. Agric. Sci.* 30 (1940), 262–275. <https://doi.org/10.1017/s0021859600048012> (<https://doi.org/10.1017/s0021859600048012>).
 4. L.K. Grover, P. Kaur, An improved estimator of the finite population mean in simple random sampling, *Model Assisted Stat. Appl.* 6 (2011), 47–55. <https://doi.org/10.3233/mas-2011-0163> (<https://doi.org/10.3233/mas-2011-0163>).
 5. L.K. Grover, P. Kaur, A generalized class of ratio type exponential estimators of population mean under linear transformation of auxiliary variable, *Commun. Stat. - Simul. Comput.* 43 (2014), 1552–1574. <https://doi.org/10.1080/03610918.2012.736579> (<https://doi.org/10.1080/03610918.2012.736579>).
 6. D.N. Gujarati, *Basic econometrics*, Tata McGraw-Hill Education, New Delhi, (2009).
 7. V.V. Kulish, J.L. Lage, Application of fractional calculus to fluid mechanics, *J. Fluids Eng.* 124 (2002), 803–806. <https://doi.org/10.1115/1.1478062> (<https://doi.org/10.1115/1.1478062>).
 8. S. Gupta, J. Shabbir, On improvement in estimating the population mean in simple random sampling, *J. Appl. Stat.* 35 (2008), 559–566. <https://doi.org/10.1080/02664760701835839> (<https://doi.org/10.1080/02664760701835839>).
 9. S. Gupta, J. Shabbir, S. Sehra, Mean and sensitivity estimation in optional randomized response models, *J. Stat. Plan. Inference.* 140 (2010), 2870–2874. <https://doi.org/10.1016/j.jspi.2010.03.010> (<https://doi.org/10.1016/j.jspi.2010.03.010>).
 10. A. Haq, M. Khan, Z. Hussain, A new estimator of finite population mean based on the dual use of the auxiliary information, *Commun. Stat. - Theory Methods.* 46 (2016), 4425–4436. <https://doi.org/10.1080/03610926.2015.1083112> (<https://doi.org/10.1080/03610926.2015.1083112>).
 11. A. Haq, J. Shabbir, Improved family of ratio estimators in simple and stratified random sampling, *Commun. Stat. - Theory Methods.* 42 (2013), 782–799. <https://doi.org/10.1080/03610926.2011.579377> (<https://doi.org/10.1080/03610926.2011.579377>).
 12. C. Kadilar, H. Cingi, Ratio estimators in simple random sampling, *Appl. Math. Comput.* 151 (2004), 893–902. [https://doi.org/10.1016/s0096-3003\(03\)00803-8](https://doi.org/10.1016/s0096-3003(03)00803-8) ([https://doi.org/10.1016/s0096-3003\(03\)00803-8](https://doi.org/10.1016/s0096-3003(03)00803-8)).
 13. C. Kadilar, H. Cingi, An improvement in estimating the population mean by using the correlation coefficient, *Haceteppe J. Math. Stat.* 35 (2006), 103–109.
 14. C. Kadilar, H. Cingi, Improvement in estimating the population mean in simple random sampling, *Appl. Math. Lett.* 19 (2006), 75–79. <https://doi.org/10.1016/j.aml.2005.02.039> (<https://doi.org/10.1016/j.aml.2005.02.039>).
 15. M. Khoshnevisan, R. Singh, P. Chauhan, et al. A general family of estimators for estimating population mean using known value of some population parameter(s), *Far East J. Theor. Stat.* 22 (2007), 181–191.
 16. S.L. Lohr, *Sampling: Design and analysis*, Duxbury Press, (1999).
 17. M.N. Murthy, Product method of estimation, *Sankhya A.* 26 (1964), 69–74.
 18. M.N. Murthy, *Sampling theory and methods*, Statistical Publishing Society, (1967).
 19. T.J. Rao, On certain methods of improving ratio and regression estimators, *Commun. Stat. - Theory Methods.* 20 (1991), 3325–3340.

20. J. Shabbir, S. Gupta, Some estimators of finite population variance of stratified sample mean, *Commun. Stat. - Theory Methods*. 39 (2010), 3001–3008.
<https://doi.org/10.1080/03610920903170384> (<https://doi.org/10.1080/03610920903170384>).
21. J. Shabbir, A. Haq, S. Gupta, A new difference-cum-exponential type estimator of finite population mean in simple random sampling, *Rev. Colomb. Estad.* 37 (2014), 199–211.
<https://doi.org/10.15446/rce.v37n1.44366> (<https://doi.org/10.15446/rce.v37n1.44366>).
22. R. Singh, P. Chauhan, N. Sawan, et al. Improvement in estimating the population mean using exponential estimator in simple random sampling, *Int. J. Stat. Econ.* 3 (2009), 13–18
23. H.P. Singh, R.S. Solanki, Efficient ratio and product estimators in stratified random sampling, *Commun. Stat. - Theory Methods*. 42 (2013), 1008–1023.
<https://doi.org/10.1080/03610926.2011.592257>
(<https://doi.org/10.1080/03610926.2011.592257>).
24. B. Sisodia, V. Dwivedi, Modified ratio estimator using coefficient of variation of auxiliary variable, *J.-Indian Soc. Agric. Stat.* 33 (1981), 13–18.
25. L.N. Upadhyaya, H.P. Singh, Use of transformed auxiliary variable in estimating the finite population mean, *Biometrical J.* 41 (1999), 627–636. [https://doi.org/10.1002/\(sici\)1521-4036\(199909\)41:53.0.co;2-w](https://doi.org/10.1002/(sici)1521-4036(199909)41:53.0.co;2-w) ([https://doi.org/10.1002/\(sici\)1521-4036\(199909\)41:53.0.co;2-w](https://doi.org/10.1002/(sici)1521-4036(199909)41:53.0.co;2-w)).
26. A. Iftikhar, H. Shi, S. Hussain, A. Qayyum, M. El-Morshedy, S. Al-Marzouki, Estimation of finite population mean in presence of maximum and minimum values under systematic sampling scheme, *AIMS Math.* 7 (2022), 9825–9834. <https://doi.org/10.3934/math.2022547> (<https://doi.org/10.3934/math.2022547>).

Make a Submission (<http://www.etamaths.com/index.php/ijaa/about/submissions>)

[Current \(/index.php/ijaa/issue/current\)](/index.php/ijaa/issue/current)

[Archive \(/index.php/ijaa/issue/archive\)](/index.php/ijaa/issue/archive)

[Open Access Policy \(/index.php/ijaa/oap\)](/index.php/ijaa/oap)

[Workflow \(/index.php/ijaa/workflow\)](/index.php/ijaa/workflow)

[Publication Ethics \(/index.php/ijaa/ethics\)](/index.php/ijaa/ethics)

[Privacy Statement \(/index.php/ijaa/about/privacy\)](/index.php/ijaa/about/privacy)

[Contact \(/index.php/ijaa/about/contact\)](/index.php/ijaa/about/contact)

International Journal of Analysis and Applications

International
Journal of Analysis
and Applications

Scopus®



Clarivate Analytics

Emerging Sources Citation Index (ESCI, Web of Science)



Crossref

<https://doi.org/10.28924/2291-8639>

DOAJ

DIRECTORY OF
OPEN ACCESS
JOURNALS

Directory of Open Access Journals (DOAJ)

