

REVIEWER'S REPORT

Manuscript No.: IJAR-58258

Title: Linear Regression Analysis on the Impact of Defence Expenditure on Human Capital Development in U.S.A. : A Time Series Econometrics Study.

Recommendation:

Accept as it is

Accept after minor revision.....

Accept after major revision

Do not accept (*Reasons below*)

Rating	Excel.	Good	Fair	Poor
Originality	✓			
Techn. Quality	✓			
Clarity	✓			
Significance	✓			

Reviewer's ID: JPR-130

Detailed Reviewer's Report

Overall Evaluation

The manuscript investigates the impact of defence expenditure on human capital development in the United States using annual time-series data from 1974–2024. Human capital development is proxied by life expectancy at birth, while defence expenditure, federal receipts, population growth, and gross fixed capital formation are employed as explanatory variables. The study applies Ordinary Least Squares (OLS) regression and a comprehensive set of econometric diagnostic tests, including normality, heteroskedasticity, autocorrelation, multicollinearity, RESET specification, Chow structural break, and linear restriction tests. The research addresses an important and contemporary issue concerning the relationship between military expenditure and socio-economic development. The topic is relevant to public finance, defence economics, macroeconomics, and development studies. The manuscript demonstrates a good understanding of regression analysis and presents the statistical procedures in a systematic manner. The inclusion of diagnostic testing significantly strengthens the empirical analysis. The findings indicate that defence expenditure, population growth, and gross fixed capital formation positively influence life expectancy, whereas federal receipts exhibit a weak negative relationship. The model explains a substantial proportion of the variation in the dependent variable ($R^2 = 0.916$), suggesting a strong model fit. Despite these strengths, the manuscript has several methodological limitations. Since the study is based on time-series data, additional econometric procedures such as unit root testing, cointegration analysis, and error correction modelling are necessary to ensure the validity of the regression estimates. The presence of heteroskedasticity and autocorrelation is acknowledged but not

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adequately corrected, which may affect the reliability of the estimated coefficients and statistical inferences. Furthermore, greater theoretical discussion is needed to distinguish statistical association from causal interpretation. Overall, the manuscript makes a valuable contribution to defence economics and human capital research. With minor methodological refinements and editorial improvements, it would be suitable for publication.

Strengths

- The study addresses a significant and policy-relevant issue concerning defence expenditure and human capital development.
- The research objectives are clearly stated and consistently addressed throughout the manuscript.
- The use of a long-term annual dataset (1974–2024) provides comprehensive empirical coverage.
- Appropriate macroeconomic variables are included in the regression model.
- The econometric methodology is systematically presented and easy to follow.
- A wide range of diagnostic tests, including RESET, Chow Test, White Test, Durbin-Watson Test, Breusch-Godfrey Test, and VIF analysis, enhances the robustness of the empirical investigation.
- The structural break analysis for 2001, 2008, and 2020 adds substantial analytical value to the study.
- The interpretation of regression coefficients is generally clear and supported by statistical evidence.
- The conclusions are logically derived from the empirical findings and offer useful policy implications.
- The manuscript is well organized with a logical progression from introduction to conclusion.

Areas for Improvement

- Since the analysis is based on time-series data, the study should include stationarity tests such as the Augmented Dickey-Fuller (ADF) or Phillips-Perron tests before estimating the regression model.
- If variables are non-stationary, cointegration tests (Johansen or Engle-Granger) and an Error Correction Model (ECM) should be considered to avoid spurious regression results.
- The presence of heteroskedasticity and autocorrelation is identified, but corrective estimation techniques such as HAC/Newey-West robust standard errors or Generalized Least Squares (GLS) should be employed to obtain reliable parameter estimates.
- The discussion should further distinguish between statistical association and causal inference, particularly regarding the positive relationship between defence expenditure and life expectancy.

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- More recent literature on defence economics and human capital development published during the last three to five years could be incorporated to strengthen the literature review.
- Minor grammatical errors, formatting inconsistencies, and citation formatting should be carefully revised before publication.