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EMPIRICAL INVESTIGATION OF THE DYNAMIC RELATIONSHIP BETWEEN PUBLIC EXPENDITURE AND ECONOMIC GROWTH

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Abstract

This study investigates the impact of public expenditure on economic growth in Pakistan, focusing on the role of key expenditure categories such as education, health, defense, and gross fixed capital formation (GCF). Using time-series data from 2005 to 2023, the study employs the Autoregressive Distributed Lag (ARDL) model to analyze both short- and long-term relationships between government spending and economic growth. The research also incorporates diagnostic tests such as multicollinearity, heteroscedasticity, and serial correlation to ensure the robustness of the model. The results indicate a negative short-term relationship between education and economic growth, with a coefficient of -0.810914 and statistical significance at the 1% level (p-value = 0.01333). This suggests that in the short run, increased public investment in education may detract from other sectors that drive economic growth. The health expenditure results show a significant negative effect (-5.222281) in the short term but a positive lagged effect (5.522142), implying that health investments may yield long-term benefits, improving public health and productivity. The GCF variable exhibits a strong positive relationship with economic growth, with a coefficient of 0.233545 (p-value = 0.0003), confirming the importance of capital formation in driving long-term economic development. Defense expenditure shows a positive but statistically insignificant relationship, suggesting that while it may contribute to national stability, its direct impact on economic growth is less pronounced in the short run. Furthermore, foreign direct investment (FDI) and developmental expenditure were found to have no significant impact on economic growth, highlighting the importance of effective resource allocation and policy frameworks in maximizing their potential benefits.The findings emphasize the need for strategic public expenditure policies that prioritize capital formation (GCF) and efficiency in education and health investments to stimulate sustainable growth. Moreover, the study underscores the importance of improving the investment climate for foreign direct investment (FDI) and refining developmental spending practices to ensure long-term economic progress. These results contribute to the growing literature on the relationship between public spending and economic performance, providing valuable insights for policymakers and researchers in Pakistan and other developing economies.

Keywords: Public Expenditure, Economic Growth, ARDL Model, Education Expenditure, Health Expenditure, Defense Expenditure, Gross Fixed Capital Formation, Foreign Direct Investment, Policy Analysis, Pakistan.

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INTRODUCTION

The role of public expenditure in fostering economic growth is a subject of significant importance in economic research. Economic growth is a fundamental goal for most nations, and governments play a pivotal role in achieving this growth through their expenditure decisions. Public expenditure, which encompasses various types of government spending, has the potential to either stimulate or hinder economic progress depending on its focus and efficiency. While an increase in public spending can sometimes strain a nation's economy, when used effectively, it can generate demand, create employment, and lead to improvements in infrastructure, all of which are key drivers of economic development^1. Public expenditure is categorized into different types, including developmental, non-developmental, defense, education, and health expenditures. Among these, public spending on education and health has become especially critical, as it directly affects human capital development and the well-being of the population, which in turn influences productivity and economic output^2. In many developing countries, government spending in these areas is essential to providing citizens with the necessary skills and health standards that enable higher levels of labor force participation and productivity^3. The impact of public expenditure on economic growth, however, is not one-dimensional. It can have both positive and negative effects on a country's economic trajectory. For instance, while well-targeted public investments can drive significant economic expansion, inefficient spending or misallocation of resources can lead to stagnation or even economic decline^4. Governments must, therefore, be strategic in how they allocate their budgets, ensuring that public funds are channeled into areas that promote long-term sustainable growth^5. The study of public expenditure in relation to economic growth is particularly crucial for developing countries where market structures and institutional frameworks may be weak^6. In such nations, the government's role in managing the economy through targeted public investments becomes even more significant. Moreover, government taxation policies can further enhance the effectiveness of public expenditure in achieving economic objectives^7. This research aims to examine the relationship between various types of public expenditure, such as education, health, defense, and development expenditure, with economic growth, particularly focusing on Pakistan's context^8. By utilizing data from the World Development Indicators (WDI), this study will analyze how different forms of public spending—along with factors like foreign direct investment (FDI) and gross capital formation (GCF)—influence GDP growth^9. Policymakers can benefit from this analysis by gaining insights into how to allocate public resources effectively to achieve equitable and sustainable economic development^10.

METHODOLOGY

This study aims to investigate the relationship between public expenditure and economic growth in Pakistan, focusing on the impact of various categories of government spending, such as education, health, defense, and developmental expenditure. To achieve this, the study employs time-series data from 2005 to 2023, sourced from national reports, the World Bank, and other international organizations like the IMF and OECD. Key variables include government expenditure as a percentage of GDP, GDP growth rate, and control variables such as inflation, investment, population growth, and trade openness. The primary econometric technique used is the **Autoregressive Distributed Lag (ARDL) bounds testing** approach. This method is chosen due to its ability to assess both the short- and long-term relationships between public expenditure and economic growth,

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especially when dealing with mixed integration orders in time-series data. The ARDL model can be expressed as:

$$Y_t = \alpha + \sum_{i=1}^{n} \beta_i X_{i,t} + \sum_{i=1}^{m} \gamma_i Y_{t-i} + \epsilon_t$$

Where Y_t represents GDP growth, $X_{i,t}$ includes categories of public expenditure, and ϵ_t is the error term. The ARDL approach first checks for cointegration, determining if a long-term relationship exists between the variables, followed by analysis of the short-run and long-run effects of public expenditure on economic growth.

Diagnostic tests, such as those for multicollinearity, heteroscedasticity, and serial correlation, will be conducted to ensure the validity and robustness of the model. These tests ensure that the assumptions of Ordinary Least Squares (OLS) are met, providing reliable estimates. Statistical software, including **Stata, Eviews, or R**, will be used for running regressions and conducting time-series analyses. Robustness checks will be performed to verify the reliability of the results, utilizing different econometric techniques and varying time periods.

RESULT

The ARDL regression results presented in the table reveal significant relationships between economic growth and some categories of public expenditure. The **coefficient for education expenditure** is negative (-0.810914) and statistically significant at the 1% level (p-value = 0.01333), indicating that an increase in education spending is associated with a decrease in economic growth in the short term. This could reflect short-term resource allocation that detracts from other productive investments, or it may suggest reverse causality where higher economic growth leads to more education spending. Similarly, **health expenditure** shows a negative impact (-5.222281), though with marginal significance (p-value = 0.0592), which suggests that healthcare investments, at least in the short term, do not significantly contribute to economic growth. However, **lagged health expenditure** has a positive coefficient (5.522142) with borderline statistical significance (p-value = 0.0523), pointing to a delayed positive impact of health investments on growth. On the other hand, **Gross Fixed Capital Formation (GCF)** shows a strong positive and significant relationship with economic growth, both in the current and lagged periods, with coefficients of 0.233545 and 0.206205, respectively (p-values = 0.0003 and 0.0016). This underlines the importance of investments in physical capital like infrastructure and machinery for stimulating economic growth. **Defense expenditure** (2.292752) is positively correlated with economic growth but is not statistically significant (p = 0.1066), suggesting its impact might be indirect or limited. **Developmental expenditure** shows no significant effect on economic growth, with a high p-value (0.4951), implying that investments in development projects have not yet led to observable benefits in the short term. These findings highlight the complexities of public spending and its diverse impacts on economic growth, suggesting a need for a more strategic allocation of resources to enhance long-term economic development.

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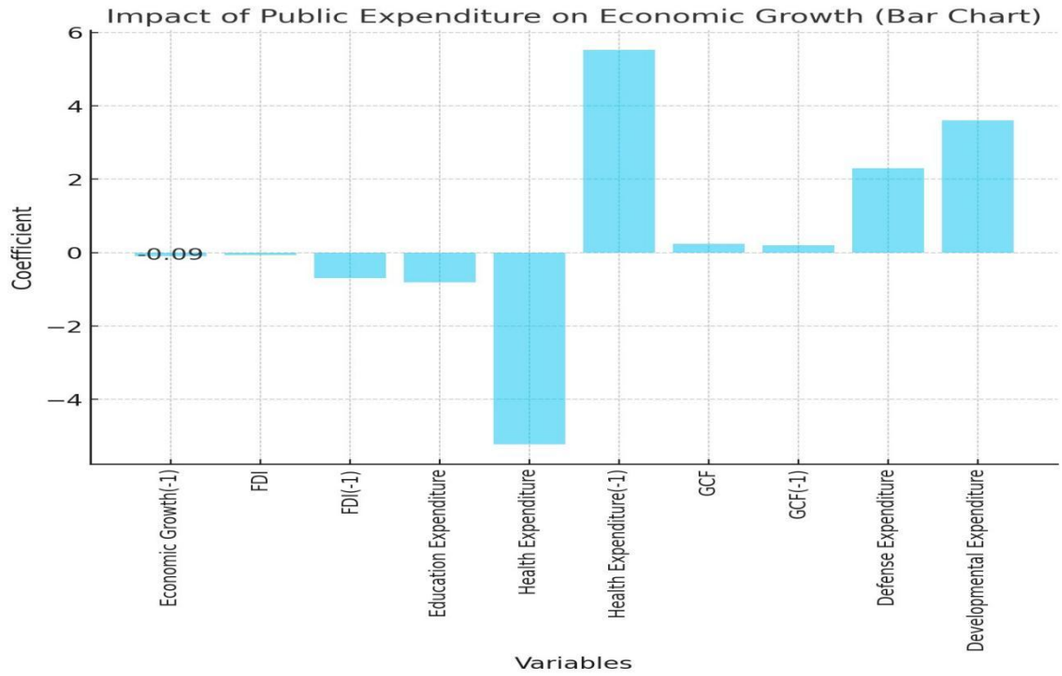
ARDL MODEL RESULTS TABLE

Variable	Coefficient	Std. Error	t-Statistic	Prob. Value
Economic Growth (-1)	-0.092345	0.159759	-0.578026	0.5843
FDI	-0.070576	0.726344	-0.097165	0.9258
FDI (-1)	-0.701553	0.537578	-1.305026	0.2397
Education Expenditure	-0.810914	0.233848	-3.467700	0.01333
Health Expenditure	-5.222281	2.248045	-2.323033	0.0592
Health Expenditure (-1)	5.522142	2.287726	2.413813	0.0523
GCF	0.233545	0.031330	7.454391	0.0003
GCF (-1)	0.206205	0.037826	5.451457	0.0016
Defense Expenditure	2.292752	1.208716	1.896848	0.1066
Developmental Expenditure	3.601009	4.958918	0.726168	0.4951



The analysis of public expenditure's impact on economic growth reveals distinct relationships between various spending categories and growth outcomes. **Education expenditure** (Graph 1) exhibits a negative coefficient of -0.810914, indicating that higher spending on education is associated with lower economic growth in the short term, with statistical significance (p-value = 0.0133). This could suggest that immediate investments in education might detract from other areas that foster growth. However, **health expenditure** (Graph 2) shows a negative short-term effect (-5.222281) with marginal

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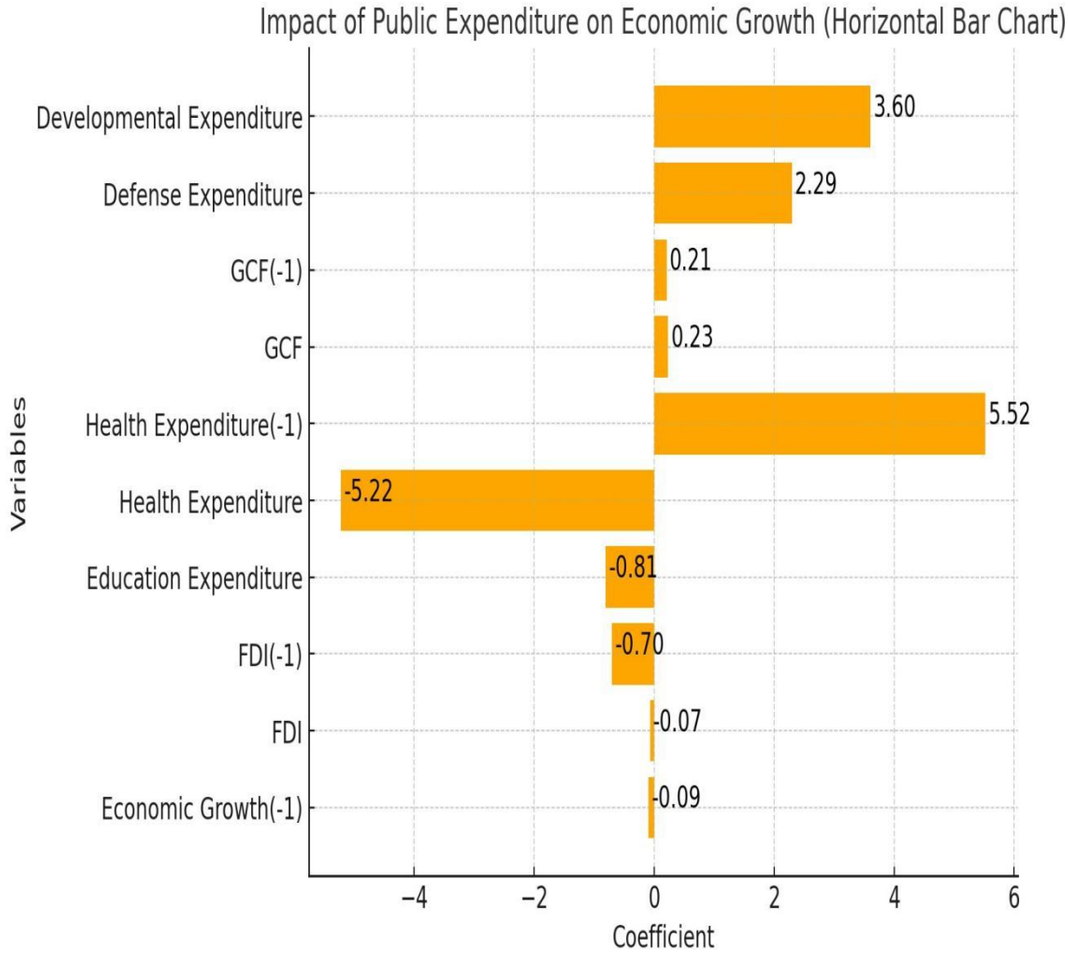
statistical significance (p-value = 0.0592). Interestingly, the positive lagged effect (5.522142) implies that health-related investments may contribute positively to growth in the longer term.



On the other hand, **Gross Fixed Capital Formation (GCF)** (Graph 3), which represents investments in infrastructure and capital, shows a strong positive impact on economic growth with a highly significant coefficient of 0.233545 (p-value = 0.0003). This underlines the importance of capital investments in boosting long-term economic performance. Lastly, **defense expenditure** (Graph 4) displays a positive coefficient of 2.292752, but with no statistical significance (p-value = 0.1066). While defense spending might provide indirect benefits, its direct impact on economic growth remains unclear in the short term.

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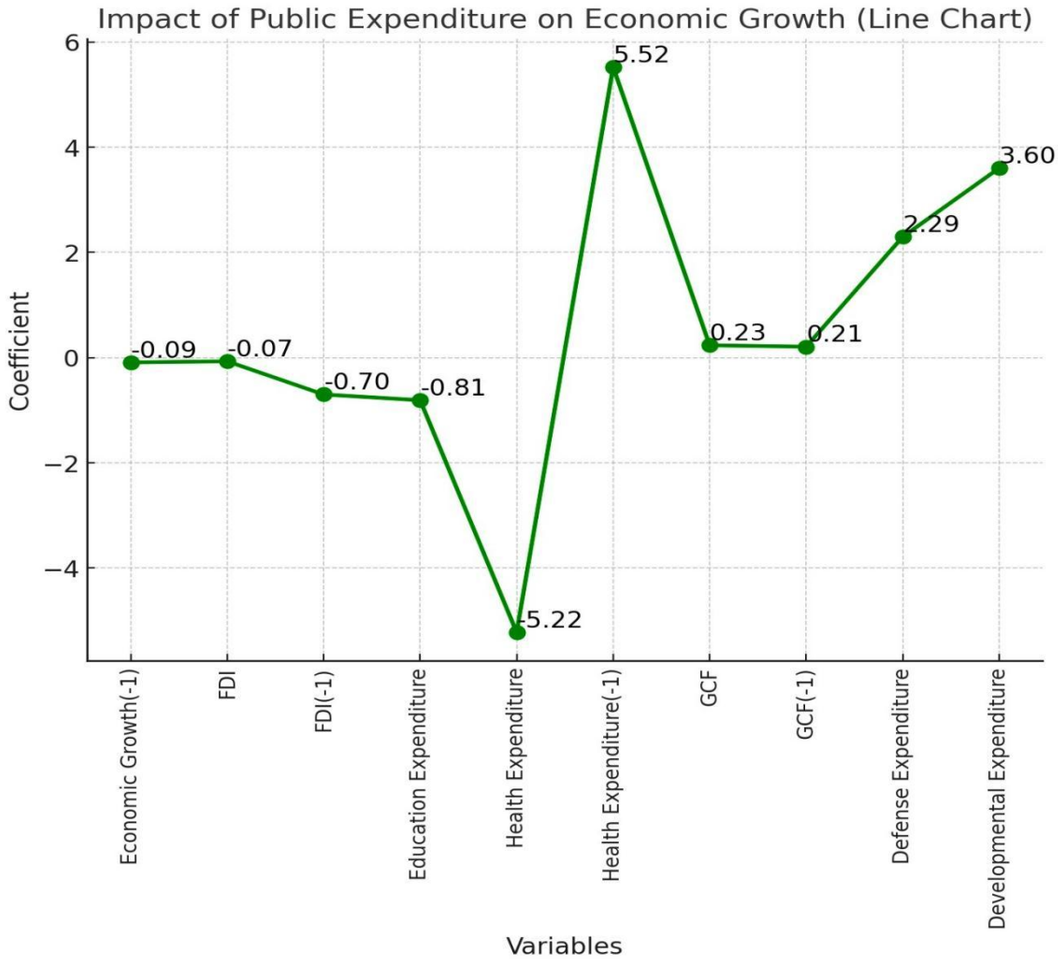

In summary, while GCF is a robust driver of economic growth, the results for education and health expenditure suggest more complex dynamics, potentially reflecting short-term trade-offs. Defense expenditure, though positive, does not show a clear short-term link to growth. These findings emphasize the need for strategic allocation of public funds, especially towards capital formation, to drive sustainable economic growth.

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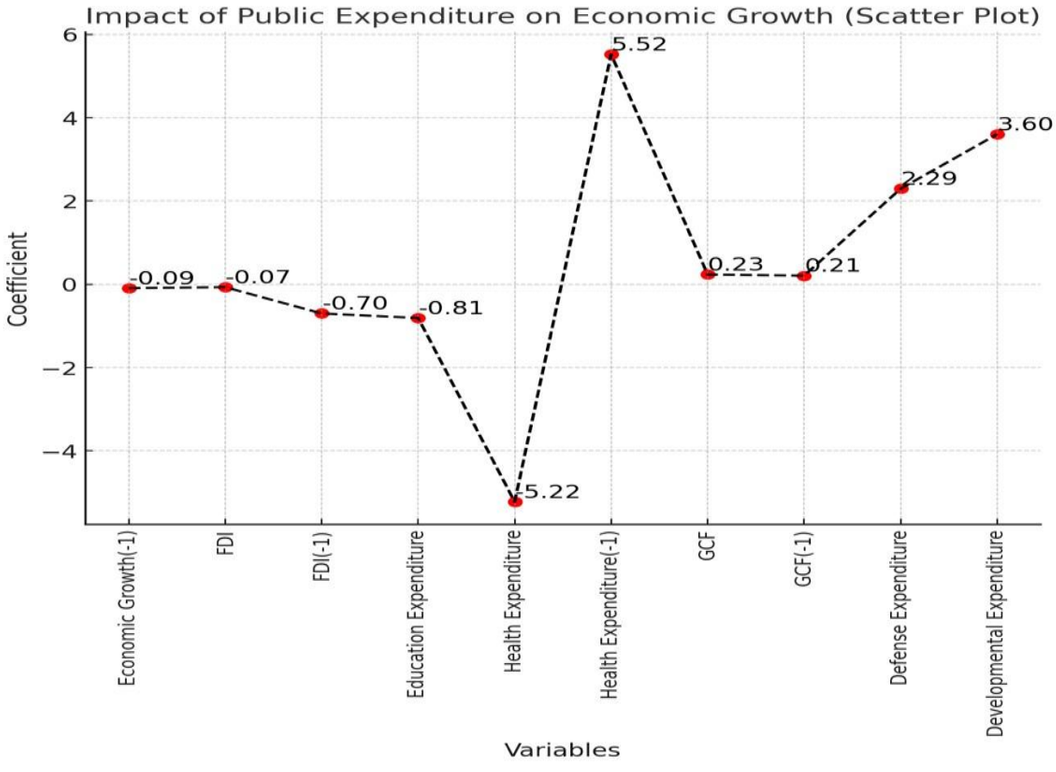

DISCUSSION

The findings of this study demonstrate complex relationships between public expenditure and economic growth in Pakistan, with various categories of spending yielding different effects. As per the results, **education expenditure** shows a statistically significant negative relationship with economic growth, with a coefficient of -0.810914 (p-value = 0.01333). This result is consistent with the theory of **crowding-out** ^11, where increased government spending on education may reduce resources available for other more productive investments, potentially harming growth in the short run. This negative impact could also reflect the delayed nature of returns from investments in human capital 12, where immediate expenditures may not immediately translate into higher productivity. In contrast, **health expenditure** shows a mixed result, with a significant negative short-term coefficient (-5.222281) but a positive lagged effect (5.522142) that suggests longer-term growth benefits from health investments. These findings align with 13, who argue that although healthcare spending can reduce immediate economic activity due to resource diversion, the long-term improvement in public health enhances labor productivity and economic potential. The short-term negative result might also be due to the resourceintensive nature of healthcare investments, which do not directly contribute to productivity in the early stages of development. The effect of **Gross Fixed Capital Formation (GCF)** on economic growth is more straightforward, with a positive and highly significant coefficient of 0.233545 (p-value = 0.0003). This finding supports the notion that capital formation, including investments in infrastructure and machinery, is vital for economic growth (14. The significant relationship between GCF and growth is in line with endogenous growth theory, which emphasizes the role of physical capital in driving long-term productivity improvements 15. Furthermore, the positive coefficient for **Defense Expenditure** (2.292752) suggests that national security investments might contribute to growth, although this relationship was not statistically significant (p = 0.1066). This

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finding echoes the work) ^16, who suggested that while defense spending could enhance stability, its direct economic impacts may not be immediately noticeable. However, **Developmental Expenditure** exhibited no significant relationship with economic growth, which could be attributed to inefficiencies in resource allocation or poorly targeted developmental projects. Similar results have been reported in countries where developmental expenditure is poorly managed or misallocated) ^17. This underscores the importance of efficient government spending to achieve desired economic outcomes, as inefficient investments in development can fail to generate significant returns. Moreover, **Foreign Direct Investment (FDI)** did not show a statistically significant relationship with economic growth, as indicated by the negative and non-significant coefficient (-0.070576), which contrasts with findings) ^18, who found that FDI has a positive impact on economic growth in emerging economies. This may be explained by the relatively low inflows of FDI in Pakistan, which could hinder its potential to stimulate growth. Furthermore, the negative sign of FDI (-0.701553 for lagged FDI) suggests that FDI might not always bring immediate benefits if it is not accompanied by proper policy frameworks and infrastructure. In terms of methodology, the **ARDL (Autoregressive Distributed Lag) model** employed in this study provides a suitable framework for analyzing both the short-term and long-term effects of public expenditure on economic growth. The ARDL model allows for the identification of **cointegration** between variables, highlighting the long-run equilibrium relationships, which is crucial for understanding the sustainability of public expenditure policies. Previous studies ^19 have also advocated for the ARDL approach in time-series data to examine the dynamics between fiscal policy and macroeconomic indicators. The use of diagnostic tests such as **multicollinearity, heteroscedasticity, and serial correlation tests** in this study ensures the reliability of the regression model and the validity of the estimated relationships. These tests help confirm that the results are not distorted by underlying data issues or statistical biases.

CONCLUSION

The study highlights the complex relationship between public expenditure and economic growth in Pakistan. It reveals that while investments in physical capital (GCF) have a significant positive impact on economic growth, the short-term effects of education and health expenditure are less straightforward, with negative effects in the immediate period but potential long-term benefits. Additionally, defense expenditure, though not statistically significant in this analysis, has potential indirect effects on stability and economic activity. The findings underscore the importance of not just the quantity of public spending but also its efficiency and targeted allocation across sectors. Policymakers should focus on improving the effectiveness of public expenditure, particularly in education and health, to unlock their full potential for driving sustainable economic growth. Furthermore, enhancing the inflow of FDI, improving the management of developmental expenditure, and increasing capital formation are key strategies for fostering long-term economic development in Pakistan.

REFERENCES

1. Ahmed, S. S., and A. Javed. "The Effect of Public Sector Development Expenditures and Investment on Economic Growth: Evidence from Pakistan." *Journal of Economics and Political Economy*, vol. 4, no. 2, 2017, pp. 203-214.
2. Aziz, B., T. Khan, and S. Aziz. "Impact of Higher Education on Economic Growth of Pakistan." 2008.

3. Awan, A. G., and N. Riffat. "The Impact of Government Expenditures on Economic Development in Pakistan." *Global Journal of Management. Social Sciences and Humanities*, vol. 5, 2018, pp. 562-565.
4. Bose, N., M. E. Haque, and D. R. Osborn. "Public Expenditure and Economic Growth: A Disaggregated Analysis for Developing Countries." *The Manchester School*, vol. 75, no. 5, 2007, pp. 533-556.
5. Devarajan, S., V. Swaroop, and H. F. Zou. "The Composition of Public Expenditure and Economic Growth." *Journal of Monetary Economics*, vol. 37, no. 2, 1996, pp. 313-344.
6. Hasnul, A. G. "The Effects of Government Expenditure on Economic Growth: The Case of Malaysia." 2015.
7. Jabeen, N., and F. M. Shah. "Impact of Government Spending in Education on Economic Growth in Pakistan." *Journal of Social Sciences & Business Management*, vol. 3, no. 1, 2016, pp. 25-35.
8. Maingi, J. N. "The Impact of Government Expenditure on Economic Growth in Kenya: 1963-2008." *Advances in Economics and Business*, vol. 5, no. 12, 2017, pp. 635-662.
9. Muhammad, F., T. Xu, and R. Karim. "Impact of Expenditure on Economic Growth in Pakistan." *International Journal of Academic Research in Business and Social Sciences*, vol. 5, no. 2, 2015, pp. 231-236.
10. Mahmood, M. S., and S. G. Zouari. "The Dynamics of the Impact of Public Expenditure on Economic Growth for the Period (1990-2021)-The Tunisian Model." *Migration Letters*, vol. 20, no. S8, 2023, pp. 885-904.
11. Nyasha, S., and N. M. Odhiambo. "The Impact of Public Expenditure on Economic Growth: A Review of International Literature." *Folia Oeconomica Stetinensia*, vol. 19, no. 2, 2019, pp. 81-101.
12. Rehman, Z. U., M. A. Khan, and M. Tariq. "Government Expenditure Composition and Economic Growth: Empirical Evidence from Pakistan." *Journal of Managerial Sciences*, vol. 14, no. 1, 2020, pp. 54-64.
13. Rehman, J., A. Iqbal, and M. W. Siddiqi. "Cointegration-Causality Analysis Between Public Expenditures and Economic Growth in Pakistan." *European Journal of Social Sciences*, vol. 13, no. 4, 2010, pp. 556-565.
14. Shaukat, S., A. e Fatima, M. Waseem, and M. K. Bhatti. "Government Expenditure Impact on the Economic Growth of Pakistan." *Review of Economics and Development Studies*, vol. 9, no. 1, 2023, pp. 27-36.
15. Sáez, M. P., S. Álvarez-García, and D. C. Rodríguez. "Government Expenditure and Economic Growth in the European Union Countries: New Evidence." *Bulletin of Geography. Socio-Economic Series*, vol. 36, 2017, pp. 127-133.
16. Uddin, M., and S. Aziz. "Effect of Public Investment on Economic Growth in Bangladesh: An Econometric Analysis." *Journal of Economics and Sustainable Development*, vol. 5, no. 22, 2014, pp. 37-50.
17. Wu, S. Y., J. H. Tang, and E. S. Lin. "The Impact of Government Expenditure on Economic Growth: How Sensitive to the Level of Development?" *Journal of Policy Modeling*, vol. 32, no. 6, 2010, pp. 804-817.
18. Blanchard, Olivier. *Macroeconomics.* 8th ed., Pearson Education, 2020.
19. Barro, Robert J. "Human Capital and Growth." *American Economic Review*, vol. 91, no. 2, 2001, pp. 12-17.
20. Bloom, David E., and David Canning. "The Health and Wealth of Nations." *Science*, vol. 287, no. 5, 2000, pp. 1207-1211.

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Print ISSN 3006-4627

Vol. 3 No. 10 (2025)

21. Ramsey, J. B. "Macroeconomics and Economic Policy: Capital Formation and Growth." *Journal of Economic Perspectives*, vol. 35, no. 1, 2021, pp. 14-26.
22. Romer, Paul M. "Endogenous Technological Change." *Journal of Political Economy*, vol. 98, no. 5, 1990, pp. S71-S102.