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From Fiscal Input to Social Outcome: Literacy in the Effectiveness of Education Budget Policy

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ABSTRACT

This research seeks to evaluate the productivity of educational expenditure with respect to socio-economic advancement, positing literacy as a mediating variable across a cross-national sample. Employing a comparative quantitative design, the investigation utilizes panel dataset encompassing ten nations from the ASEAN and Sub-Saharan African regions, covering the years 2000 to 2022 to trace causal linkages amongst expenditure, literacy, and per capita GDP. Pathway regression indicates a sustained positive effect of educational outlay upon GDP per capita, with the effect manifesting both directly and indirectly via heightened literacy. Using the Sobel statistic, we are able to verify the mediating path as statistically recognizable, hence confirming literacy as a major transmission process. Inter-regional contrast shows that the member states with the best budgetary governance mainly from ASEAN increase the mediating coefficients more than those in Sub-Saharan Africa. This tendency supports the claim that the success of educational budgetary policy heavily relies on measurable results and the support of skilled institutions. The use of literacy as an evaluative endpoint thus furnishes an explicit lever of policy assessment concerning fiscal interventions upon human development. The investigation therefore prescribes a recalibration of educational budgeting frameworks, migrating decisively towards an outcomes-centred orientation; systematic embedding of literacy performance in budgetary review cycles; and fortification of bureaucratic proficiencies alongside intentional intra- and cross-sectoral collaboration. Limitations of the study arise from the absence of comprehensive literacy datasets for a subset of countries, coupled with the intentional omission of political and cultural determinants from the analytic frame.

Keywords: Education Spending, Literacy, Budget Effectiveness, Economic Development, Public Governance
JEL Classification: H52, I25, O15, C33, D73

INTRODUCTION

Countries that emphasize fiscal support for education signal a sustained intention to construct a resilient future environment for their citizens. Within various developing contexts, education continues to be a recurrent priority reflected in long-term national expenditure planning. Governments dedicate sizeable percentages of national GDP to the sector, operating under the premise that such persistent investment will upgrade the skill base, enhance macroeconomic vigour, and catalyze equitable social advancement (Priyanto et al., 2022; Alshubiri, 2021). Nonetheless, observed budget execution contradicts the confident expectation of stitched social uptake; persistent fiscal increases are unmapped from parallel progress in social indicators. A mosaic of nations documents plateaus in health, labour, and civic cohesion metrics, inaugurating the inquiry into the precise mechanism that undergirds the transference from financial endowment to transform excluded GDP (Bearman et al., 2023). The inquiry foregrounds a broader political-economic prism: is the binding thread the quantity of educational expenditure, or are reputational, managerial, and structural dynamics equally forceful in mediating the explanatory force of fiscal input on living conditions observable in cohorts?

The muted social return relative to pronounced fiscal commitment recommends a recalibration of evaluative protocols that track education policy expenditure. Convention continues to rest on input indicators, quantities of learning centres, arithmetic ratios of teachers to nominal enrolments, and budget ceilings, while progressively structural, governance, and pedagogic determinants that calibrate, reinforce, or dilute the return remain peripheral in evaluative frames (Jackson & Mackevicius, 2024). A prudent reconception entails a differentiated scrutiny of fiscal policy, enabling equitable and efficacious gains to be made knowingly, as it moves beyond prior ratios of fiscal input disclosed. In contemporary evaluation frameworks, quantitative inputs such as test scores and completion rates often mask disparities in educational efficacy and economic transfer capacity- ty among diverse population groups (Hou et al., 2025). Within the long-term agenda of sustainable development, the decisive factor is the extent to which educational systems enhance agency, thereby empowering individuals and communities to engage in self-determination and resilient economic exchange. The literature now argues in favour of formulating evaluative matrices that transcend enrolment and throughput ratios, and instead quantify the actual developmental externalities flowing from educational bankruptcy (Spyromitros & Panagiotidis, 2022).

Among the scarce and strong metrics that link formal schooling to tangible life outcomes, literacy adapts gracefully to the comparative, longitudinal, and reversible scrutiny of national accounts. Beyond transcribing graphemic symbols, functional literacy encapsulates the skills of discursive reasoning, evaluative filtration of emergent discourses, and utilitarian retrieval, delivering a scalar window into discursive, civic, and economic mindfulness (Boman, 2022). A literate citizenry acts in dual capacity, preserving the living instantiation of institutions while also recalibrating the frontier at which fiscal reserve disbursement is reconsidered. Systematic empirical networks have collapsed the analytically distinct domains of civil resilience, inclusive fiscal ontology, and economic dynamism, forcing their simultaneous appraisal and activation. Within such networks, the literate actor traverses archives of collective duty and acquired right, releases the dormant capacity of taxation, and compresses systemic uncertainty at the points of legislative and administrative deliberation. Ingeniously promoting inclusive literacy thus enables systemic investment to synthesize public benefit, rendering a coherent metric process between educational allotment and development redemption (Timidi & Okuro, 2024).

The literacy mediation framework for evaluating the productivity of public expenditures in education advances a more contingent and temporally responsive lens than static efficiency ratios. When literacy is modelled as an intermediary mechanism that transmits education investment to broader socio-economic dividends, the mapping of causal linkages is rendered more granular and historically sensitive (Kao, 2022). Expenditures on education, in isolation, do not exert a predictable lift on measures such as per capita GDP or composite indices of human development; instead, the consequential effects are precipitated by the enhancement of learning outcomes, and specifically by literacy, through which the effects become observable and quantifiable. Furthermore, the framework highlights the moderating effects of specific institutional and contextual determinants such as the quality of fiscal oversight, the absorptive capacity of bureaucracies, and the strategic orientations of education policies on the transference of resources to measurable gains in literacy and hence in welfare. Literacy, in this construct, transgresses the role of a mere technical yardstick; it serves as an interpretative lens of the efficacy and integrity of policy execution in the sector (Asaad & Hara, 2025).

This article evaluates the effectiveness of public education budget policies through a literacy mediation framework. Rather than relying solely on the nominal magnitude of budget allocations, the framework investigates the extent to which these sums translate into literacy gains and, by extension, into broader socioeconomic advancement. Constraining the analysis of fiscal outlay toward education by integrating literacy as a mediating variable enables a more discriminating illumination of the channels through which allocative decisions translate into social results. When literacy is thus an intervening variable, the varying fiscal trajectories of ASEAN with its relatively grouped but expanding social capacities, and the more dispersed commissions of Sub-Saharan Africa, can be effectively reconciled. By situating human competence as the missing but decisive link, such frameworks fortuitously hone both causal attribution and the chronic under-specification of contextual diversity in existing comparative accounts.

Second, a scarce but persistent reliance on education-budget literature privileges input and procedural markers, relegating the mediating literacy variable, which interlinks an input with outcome, to an implicit, often voiceless, status. Concretely, predominant empirical models equate the logic of efficacy with a formulaic ratio of financial transfer and with surface enrolment levels, whereby retention, attendance, and available classroom space are the functional indicators. In such frameworks, the literacy outcome, as a subsequent and decisive point of analytics, remains either unexplored or rendered tacit. Such conceptual closure produces the impression of precision while crowding out a fuller unraveling of the probationary, and often decisive, social performance against which efficiencies ought legitimately to be calibrated. For policy makers committed to sustainable development, however, literacy is the operative variable, since it captures the final, lived effect of enhanced resource provision in unmistakable socioeconomic terms (Mitchell, 2023; Chiu et al., 2024). Second, the budget-monitoring frameworks that prevail in numerous jurisdictions overlook literacy as a performance benchmark. They treat the variable as a discrete educational input, disconnected from the fiscal and administrative judgment processes that bottleneck funding and duration. Such treatment retards the articulation of ex post performance standards and defers results-orientation in policy discourse (Guariso et al., 2023). Finally, multi-regional comparative research that explicitly ties fiscal governance to literacy achievement remains at an insufficient volume. The bulk of axial deployment that uses systematic country-by-country juxtaposition has, to date, predominantly pivoted on allocation volume rather than on the fiscal architecture itself, and this restraint limits the inference of an operative fiscal architecture on the coupled junction of educational spending, literacy impact, and broader socioeconomic evolution (Parvin, 2025).

This investigation pursues a dual objective: first, to quantify the extent to which financial allocations to education translate into measurable gains in socioeconomic development; second, to examine the conditional role of literacy in mediating such gains. Consequently, the primary question of the inquiry centres on the extent to which the correlation between education expenditure and aggregate socioeconomic improvement is, in statistical and causal terms, genuinely unqualified, or whether it arises only in programmes in which basic literacy attainment is substantially elevated. By treating literacy both as a strategic intermediate output and as a direct outcome, the analytical design endeavours to furnish a rigorous, synthesised plurality of both between- and within-country comparisons. Further, the research parses the educational effectiveness landscape between two key regional aggregates: commissioned ASEAN member-states and selected countries on the Sub-Saharan African continent. The study vividly demonstrates by clearly setting forth the two contrasting groups the extent to which the fiscal structure, bureaucracy, and dominant policy concepts in law and practice have an impact on the logic of the educational investment and the productivity, equitable access, wage, and health improvement that are to be expected accordingly.

With this analytic framework, the present study is able to contribute to the discussions on public policy and the economics of education at the same time while also providing practical guidance for policymakers who want to design education budgets that are more likely to generate measurable outcomes. Literacy, which is viewed as the key connecting factor between the financial commitment and the measurable social yield, carries the crucial epistemic role of shifting public policy towards the ideals of equity and sustainability. Institutionalising literacy as the benchmark within budgetary audits of instructional programmes necessitates a jurisprudential re-orientation from the entrenched paradigm of input metrics to an allocation regime predicated upon outcome achievement, in which clearly attributable societal dividends command the dominant currency in legislative deliberation. Such a shift aligns with the canonical tenets of sound governance and public accountability, where every budgetary commitment must demonstrate and authenticate the societal dividend that has been salvaged in the immediate and medium-term horizons.

The present international environment, characterised by unrelenting exigencies for heightened efficiency and verifiable transparency, has thereby rendered outcome-oriented evaluative frameworks extraordinarily salient. Nations with emerging economies face the dual obligation of not only expanding educational expenditure ceilings but also of demonstrating that expanded fiscal flows affect durable social transformation (Touchton et al., 2023). Within this calculus, literacy serves as a mediating variable linking budgetary intent with developmental consequence. Incorporating literacy-related performance indicators into the state's routine budget hearings permits a more discerning approximation of policy effectiveness, whilst also deepening the scale and effectiveness of public oversight. Such embedding allows for the swift identification of deviations from intended programme trajectories, thereby directing corrective intervention to those administrative nodes that yield the most substantial marginal returns (Karatzimas, 2023; Kokogho et al., 2024).

The argument, accordingly, advances a decisive mandate that assessments of public education budget policy concentrate upon the downstream effects that modify the quality of human living rather than rely upon a census of resource inputs. Set within a sustainable development optic, the conceptualisation of literacy as both a distinctly observable policy endpoint and as an enabling conduit through which the entire education sector influences other elements of human capital furnishes an integrative and locally salient benchmark, superior to the use of conventional proxy indicators. Examining the productive efficiency of public resources through literacy interventions, this study aspires to furnish evidence and normative guidance that will lead to public policies featuring higher levels of inclusiveness, deliberativity, and empirical justification. The deliberate adoption of a cross-regional analytic lens further amplifies explanatory depth by juxtaposing practices from diverse sovereign contexts, thereby catalyzing the diffusion of helpful policy ideas and sharpening the strategic design of potential budgetary revisions by embedding them within locally salient configurations of governance and civic expectancy.

LITERATURE REVIEW

The review presented herein is predicated upon the premise that the appraisal of public financial policies can no longer rest upon aggregate allocation volume or mechanistic adherence to statutory procedure. Instead, it must be reoriented towards observable, verifiable results that are manifest to the affected communities. Within this re-orientation, contemporary public budgeting doctrines, namely, performance-based budgeting, value for money, and fiscal responsiveness, serve as pivotal conceptual anchors.

Performance-based budgeting stipulates that each public outlay is to be tethered to formally specified, quantifiable output and outcome criteria, rather than to the fulfilment of procedural thresholds. Value for money requires that public expenditures demonstrate, in integrated assessment, optimum efficiency, demonstrable effectiveness, and strict economy. Concurrently, fiscal responsiveness asserts the necessity for the sovereign to modify budgeting and revenue policies with agility in response to evolving societal requisites. Collectively, these frameworks advance a more robust evaluative posture, wherein social returns illustrated, for example, by changes in literacy rates, supplant mere financial metrics as the definitive measures of policy success rather than simply the numbers represented in a fiscal report, in the discursive tradition of Chotib et al. (2025).

Within sustained human-development discourse, literacy occupies a central, strategic role as a resource that underpins the adaptive and productive capacities of both individuals and collectives. Human-capital theory systematically treats education and literacy as postponed but definitive forms of saving that result in elevated productive output, wage trajectories, and social cohesion over time. Therefore, literacy is not just the ability to read and write, but rather, it is the very basis for recognizing, informed, and significant participation in economic and civic domains (Leoni, 2025). Being literate means having the ability to analyze, question, combine and form one's own opinion on the information. In this way, people, in general, become less vulnerable to the fast-changing and confusing social issues. When government officials and experts decide on how to distribute and what to spend on education, they consider literacy as a tool for measuring the efficiency and fairness of the policies (Wei et al., 2023). In resource-poor countries, the constant rise in literacy levels is the main driver of the social modernization process that cuts across different systems and brings about the reduction of poverty, health improvements, and the extension of the civic accountability and responsiveness. In this case, literacy cannot be viewed merely as a byproduct of educational systems; it also serves as an indicator of good, redistributive fiscal governance (Spivak et al., 2024).

UNESCO and the OECD have persistently advanced literacy as one of the primary outcome indicators in international education policy discourse. Within its Education for All agenda and the Sustainable Development Goals framework, UNESCO regards literacy as an intrinsic element of contemporary sustainable development and social equity (Souza, 2024). Concurrently, the OECD employs the Programme for International Student Assessment (PISA) and its global education dashboards to substantiate the link between literacy competence, economic inclusion, and quality of life outcomes (Liu et al., 2025). Their frameworks confer the additional advantage of enabling cross-national and longitudinal comparisons, thus rendering literacy an appropriate benchmark for appraising the efficacy of education budgetary decisions. When construed in this manner, literacy transcends a mere technical metric, functioning instead as an instrument of strategic advocacy designed to galvanize results-oriented policy reform. Embedding literacy indicators within national budget-monitoring routines furnished ministries of education with the analytical capacity to scrutinize the practical appropriateness of educational expenditure, allowing for the systematic identification of sub-sectors where targeted corrective measures remain indispensable (Wyse & Bradbury, 2022).

Empirical evidence strongly affirms that an outcome-based logic should govern budgetary policy in education. Kurniati et al. (2025) argue that performance-linked budgeting provides governments with a mechanism to match financial commitments to policy objectives with enhanced transparency and accountability. In educational expenditure, such a perspective privileges the assessment of results quantified, for instance, in rising literacy benchmarks over more conventional inputs, such as the mere enumeration of physical infrastructure or teaching personnel. Saini et al. (2023) reinforce the established view that sustained, inclusive growth hinges more decisively on the depth of learning, as measured by literacy and numeracy expertise, than on the more frequently cited metric of enrolment expansion. Their argument foregrounds the higher prospective economic return from enhancing pedagogical rigor, rather than from incrementing access. Parallel work by Williams (2021) warns researchers and policy-makers that the constraining–or enabling–role of local context, coupled with the efficiency of the bureaucratic apparatus, exerts greater influence on the effectiveness of policy than uniform resource manipulation. Identical levels of financial commitment, therefore, can produce disparate performance patterns, dependent on the skill and motivation of the actors who recast allocative directives into routine administrative and pedagogical action. Evaluative studies of budgetary impact on educational success must thus integrate the institutional and social surveillance that determine the operative covariate apparatus linking fiscal input, learning achievement, and broader developmental output, a cognizance that is prescriptive in the most ambitious ex-ante and ex-post analyses of contemporary policy discourse.

The existing literature demonstrates that outcome-oriented evaluative methodologies, especially those informed by literacy indicators, rest on a robust theoretical and empirical underpinning. Nonetheless, their operationalization within policy environments continues to encounter significant barriers. In numerous developing nations, budgetary frameworks remain predominantly oriented toward input and procedural metrics, affording scant attention to actual educational results (Hamidi et al., 2024). Processes of policy monitoring and evaluation are predominantly bureaucratic, failing to register meaningful social transformations. Moreover, existing literacy datasets tend to be either sparse or inconsistent, thereby impeding adequate cross-national comparability. Despite these limitations, literacy possesses considerable promise as an outcome variable that can inform planning, reporting, and policy adjudication. Systematic incorporation of literacy indicators into budgetary frameworks would permit governments to strengthen accountability, optimize resource allocation, and align educational policy more closely with societal exigencies (Morawska-Jancelewicz, 2022).

The employment of literacy as an evaluative metric in cross-regional inquiry, moreover, enables a more substantive comparative discourse. ASEAN states and Sub-Saharan African polities manifest divergent fiscal regimes, social structures, and institutional frameworks; consequently, the marginal efficacy of educational expenditure diverges. Such comparative analyses facilitate the discernment of effective policy trajectories alongside the identification of context-specific impediments (Farayibi & Folarin, 2021). When treated as a mediating construct, literacy illuminates the mechanisms through which allocative decisions differently translate into developmental outcomes across national boundaries. An examination of the educational expenditure–literacy–socio-economic progression nexus equips policy actors to calibrate interventions more precisely to the nuances of individual settings. Substantial scholarly evidence endorses the theoretical soundness and empirical utility of this evaluative vantage for budgetary policies in the education sector worldwide (Kogar, 2021).

Literacy occupies a pivotal role within assessments of public finance policy for education. The prevailing budgetary discourse advocates for a performance-oriented paradigm, while the human capital literature identifies literacy as a developmental asset of strategic importance (Widarni, 2021). Multilateral agencies, corroborated by a range of empirical inquiries, reinforce the claim that literacy serves as a credible, actionable metric of educational effectiveness; notwithstanding, hurdles persist, particularly the necessity of embedding literacy targets within budgetary oversight systems and of augmenting the capabilities of public administration (Rapina et al., 2023). Against this backdrop, the present investigation seeks to reconcile theoretical postulates with administrative practice by analysing literacy as an intermediary mechanism that links public educational expenditure to socio-economic advancement. By adopting this lens, the analysis aspires to develop an evaluative framework that is comprehensive, context-sensitive, and firmly anchored in demonstrable outcomes. The study advances the hypothesis that public educational finance exerts a positive effect on socio-economic development, both in direct terms and indirectly through enhanced literacy, the latter functioning as a mediating variable that attenuates the distance between budgetary outlay and developmental gains.

H1: Education spending has a positive impact on socio-economic development.

H2: Education spending has a positive impact on literacy.

H3: Literacy has a positive impact on socio-economic development.

H4: Literacy mediates the relationship between education spending and socio-economic development.

RESEARCH METHODS

This investigation adopts a cross-national comparative quantitative framework to evaluate the influence of education budget policies upon socio-economic development, with literacy operationalized as a mediating variable. Such a framework facilitates the examination of systematic transnational disparities in education expenditure, literacy indicators, and economic outcomes, while offering the analytical leverage necessary to interrogate more intricate causal chains. The research centres upon testing two interrelated propositions: first, that education expenditures exert a substantive effect upon economic development by way of enhanced literacy, and second, that the effect persists across regions displaying heterogeneous fiscal and social attributes. By integrating cross-temporal and cross-national panel datasets, the investigation aims to identify recurrent policy trajectories and elucidate the mediating mechanisms through which literacy influences development outcomes.

Type of Research

The study employs a cross-country comparative quantitative methodology anchored in a budget policy framework. Such a framework facilitates the investigation of the contingent interplay among pedagogical expenditure and public policy variables across diverse national environments and enables a systematic appraisal of how effectively educational outlays achieve stated objectives in distinct sovereign contexts. Quantitative methods predominate because they yield systematic, replicable, and empirically verifiable indicators, and the comparative cross-national design permits scholars to scrutinize heterogeneous fiscal, social, and institutional parameters that mediate the transposition of expenditure into policy output. The methodological synthesis thus designed yields findings that satisfy rigorous scholarly requirements while simultaneously supplying contextualized, actionable guidance for fiscal authorities and educational administrators in a plurality of constitutional settings.

Data Source

The analytical framework data of the present study draws upon World Bank Open Data for the period spanning 2000 through 2022. This institution was selected in light of its established reputation for reliability, the uniformity of its reporting standards, and its comprehensive geographical scope. Within the dataset, the requisite economic, social, and educational variables are made available, thereby facilitating the simultaneous examination of governmental educational expenditure, literacy attainment, and broader measures of economic advancement. The protracted temporal breadth of the dataset, moreover, affords the examination of persistent trends and the unfolding of nuanced, long-term dynamics between the cited variables. Subordinating the investigation to secondary data amassed by a supranational entity further preserves international comparability, such that the resulting empirical insights may be audited and corroborated through independent analysis on a worldwide scale.

Sample Countries

This analysis utilizes two satisfactory convenience samples: the ten-member-strong Association of Southeast Asian Nations (ASEAN) and a matched subset of the Sub-Saharan African region. Within the ASEAN delegation, substantive budgetary engagements from Indonesia, Malaysia, Thailand, Vietnam, and the Philippines actively bias the inquiry, while the African counterpart is represented by the progressively liberating budgetary ecosystems of Kenya, Nigeria, Ghana, Ethiopia, and Tanzania. The bipolar choice reflects marked, purposely distinct endowments of fiscal norms, social capital, and institutional maturation, thereby satisfying the comparative command of heterogeneity without introducing restrictive institutional assemblages. ASEAN economies conventionally display coherent line-item votes, cadenced multi-annual horizons, and a thrust towards performance revelation, a fiscal phenotype already mapped by multiple meta-analyses. Sub-Saharan peers, by statistical necessity, grapple with recurrent fiscal strangulation, fragile treasury oversight and endemic administrative drift, phenomena richly circumscribed by comparative applied studies. The resulting evaluation is designed, therefore, to interpolate how situated stochastic regimes within the same discourse of external economies mediate the productivity of educational budgets in the activation of connective social and developmental vectors.

Research Variables

The analysis relies on four principal categories of variables: independent, mediator, dependent, and control. Education expenditure, expressed as a percentage of gross domestic product, serves as the independent variable and proxies the relative budgetary priority allotted by the state to the education domain. The mediator, defined as the literacy proportion among the cohort aged fifteen and older, quantifies educational output and, by extension, the domestic capacity for human capital development. The dependent variable, measured as gross domestic product per capita in constant US dollars, encapsulates the prevailing level of socio-economic advancement. The model incorporates a set of control variables, namely, inflation, the rate of urbanisation, and population growth, to mitigate confounding effects that may distort the estimated links among the primary hypothesised variables. Table 1 presents a description of the variables.

Table 1. Variable Description

Type	Variables Name	Data Source	Variable Description
Independent	Education spending (% of GDP)	World Bank	The proportion of education budget to a country's total Gross Domestic Product (GDP) per year. Describing the government's fiscal commitment to the education sector.
Mediator	Literacy rate (% of population aged 15+)	World Bank	Percentage of the population aged 15 and over who can read and write. Used as an indicator of educational outcomes and human development capacity.
Dependent	GDP per capita (constant USD)	World Bank	Gross Domestic Product per capita in constant dollars. Representing the level of socio-economic development and community well-being.
Control	Inflation, urbanization,	World Bank	External variables that can influence the relationship between the main variables. Inflation reflects economic

	population growth		stability; urbanization indicates population distribution; population growth affects pressure on public services.

Table 1 elaborates the variable taxonomy adopted in the present investigation, furnishing the conceptual scaffolding for an econometric assessment of the nexus between educational expenditure policy and socioeconomic advancement. The independent variable, educational expenditure as a share of gross domestic product, operationalizes the discretionary fiscal commitment of the state toward the education sector, signalling, ex ante, the extent of political and resource dedication to the cultivation of human capital. Conversely, the dependent variable, GDP per capita expressed in constant monetary terms, approximates the anticipated macroeconomic yield of educational dedication, specifically in terms of aggregate societal welfare and augmented productivity.

Literacy, assimilated here as a mediating variable, temporally and logically intermediates fiscal outlays and comprehensive socioeconomic dividends. Adopted an operationalization of the segment of the population aged fifteen and above capable of functional reading and writing, literacy synthesizes the quality of educational provision and the subsequent habilitations of citizens for individual and collective socioeconomic participation. The ongoing specification affirms that literacy constitutes a more robust outcome indicator than either enrolment ratios or teacher-pupil ratios, since it quantifies the actual outputs and productive potential of state educational investment in the formation of human capital. Complementary covariates, namely, the inflation rate, the degree of urbanization, and the rate of population growth, are introduced to the model in order to isolate extraneous shocks that might otherwise distort the identified relationship between public educational spending and subsequent economic maturity.

Inflation indexes supply a surrogate gauge for macroeconomic stability, whereby the ephemeral reduction of real disposable income, aggravated by referred thresholds in public capital disbursement, circumscribes the marginal rate of productive addition inhering in the education budget. In parallel, urban agglomeration is construed as a translocational diffusive channel of demographic density that refurbishes allocative jotting, entrenched within educational service skimming along the distributive matrix. Conclusively, demographic expansion constrains the exogenous framework of fiscal sustainability upon which emerging educational systems are built, compressing congestion across both real and notional fiscal vectors. By rendering each structuring gradient both in-period and ex post, the outlined econometric apparatus clarifies via a hermetically sealed synthetic counterfactual, thus enabling a schematic absorption of educational and literacy cash-moulds prior to their propagation into long horizons of growth yield. Frangible datasets, embedded in comparative macro-matrix isolates, exhibit a decidable, delimiting, findings-glare heuristic frame. Literacy is therefore consolidated within the sequential induction for its action as a transductive mediator that equalises fiscal multiplication into potential increments of human capital, thus inducing recourse to virtual tunnelling across transmission paths of economic causality past the surface-yield focus of cost-effects. The adaptability of panel datasets, coupled with the World Bank's real and analytic mirrors, provides a resilient empirical foundation, supporting systematic empirical analysis of fiscal and educational policies and their broader macro-social implications.

Analysis Method

The analytical strategy employed in the present inquiry comprises multiple interrelated statistical phases. The initial stage involves panel data regression, which evaluates the effect of education expenditure on both GDP per capita and literacy levels. This design enables the simultaneous observation of cross-country and temporal variation while controlling for both fixed and random unobserved heterogeneity. The final model specification is guided by the Hausman specification test, which discerns the optimal choice between the Fixed Effects Model and the Random Effects Model on the basis of the data structure. Subsequent to the regression analysis, the study conducts a mediation test to ascertain the capacity of literacy to serve as an intermediary variable in the relationship between education spending and broader socio-economic advancement. The mediation assessment is operationalized following the Baron and Kenny four-step procedure, which involves a sequence of least squares regressions to decompose the total effect into direct and indirect components. In tandem, the Sobel test is performed to provide a formal inferential evaluation of the mediation effect. These procedures collectively elucidate the causal mechanisms by which shifts in educational budgets eventually translate into measurable socio-economic benefits.

The third stage of model evaluation comprises classical assumption tests, specifically targeting multicollinearity, heteroskedasticity, and autocorrelation. The multicollinearity assessment evaluates whether the predictor variables exhibit excessive pairwise correlation; high levels of correlation can inflate standard errors and obscure the economic significance of individual predictors. Heteroskedasticity is examined by assessing whether the conditional variance of the regression errors is invariant across the domain of the predictors; violation of this assumption can lead to suboptimal point and interval estimation. Finally, the autocorrelation test determines whether the residuals exhibit serial correlation, an issue frequently encountered in panel datasets that can compromise the asymptotic properties of the estimators. The application of all three diagnostic tests is imperative to ensure the robustness and credibility of the regression specifications.

Complementing the classical tests, this study implements Structural Equation Modelling via the Partial Least Squares pathway (SEM-PLS) as a further robustness check. SEM-PLS evaluates the fitted structural model in a simultaneous framework, allowing the researcher to explicitly test the hypothesized pathways as well as to gauge the strength of the mediating construct, mediation literacy. Notably, the SEM-PLS procedure is well-suited for settings where sample sizes are modest and where deviations from multivariate normality are present; the method is otherwise regarded as a distribution-free estimation technique. The covariance-based, latent-variable features of SEM-PLS facilitate hierarchical deconstruction of the pathway model, thus affording greater precision in ascertaining the relative empirical contribution of each endogenous latent construct to developmental outcomes.

By integrating these methodological techniques, this study anticipates producing findings that are both robust and trustworthy concerning the impact of education budget policies. The cross-national comparative quantitative design, reinforced by panel datasets and subsequent mediation analyses, affords an analytical scope that transcends mere description, advancing toward inferential and causal adjudication. Consequently, the resultant evidence may serve as a foundational input for the formulation of public policies that are more effective, more transparent, and more closely aligned with demonstrable societal outcomes.

RESULT AND DISCUSSION

This section synthesizes empirical evidence derived from a cross-country panel data analysis designed to elucidate the contemporaneous linkages among public expenditure on education, adult and youth literacy rates, and broader measures of socio-economic development. Following systematic stages of descriptive statistics, regression diagnostics, and mediation analysis, the objective is to quantify, contextualize, and interpret the observed interdependencies, and to elevate the discussion to an actionable public policy dialogue. Employing a Fixed Effect Model and corroborating the functional presence of mediation through the Sobel criterion, the outcome not only achieves acceptable levels of statistical significance but also emphasizes the mediating role of literacy as a critical conduit through which education budgets enact macro-level economic effects. The ensuing discussion substantively appraises the mechanisms whereby education outlays translate into enhanced literacy and, consequently, into greater social-economic advantage, whilst also interrogating the moderating influence of divergent fiscal governance regimes on the observed linkage; government structures, budget autonomy, and expenditure oversight emerged as decisive. From the empirical patterns and contextual insights, a calibrated suite of policy recommendations is advanced, foregrounding outcome metrics and social inclusiveness as central evaluative and implementation priorities.

Descriptive Statistic

Descriptive statistics yield an Overview summarizing the central distributional features of the key variables incorporated in this analysis. The database encompasses ten nations drawn from the ASEAN and Sub-Saharan African regions and spans the period 2000–2022, thereby incorporating a wide array of fiscal and social configurations. The ensuing tabulation supplies the mean, minimum, maximum, and standard deviation for each variable and establishes the benchmark from which the interrelationships among public expenditure on education, literacy outcomes, and economic progress are subsequently interrogated. Table 2 presents descriptive statistics below in.

Table 2. Descriptive Statistics on Education Spending, Literacy, and GDP per Capita (2000–2022)

Variable	Average	Minimum	Maximum	Standard Deviation	Unit
Education Spending	4.2	2.1	7.8	1.3	% of GDP
Literacy Rate	84.5	61.2	98.7	10.4	% Age 15+
GDP per capita	3,85	620	12,4	2,95	USD constant

The mean public expenditure on education, measured at 4.2% of national GDP, demonstrates only moderate fiscal engagement by the nations included in the study. A broader examination, however, of the observed range spanning 2.1% to 7.8% reveals pronounced divergence, suggesting that resource allocation may be dictated as much by divergent policy priorities as by the varying fiscal leeway of individual governments. The computed mean adult literacy rate of 84.5% appears encouraging on the surface; nevertheless, the finding that the lower quartile position registers a troubling 61.2% signals persisting hurdles in ensuring both the wider diffusion and the sustained quality of foundational education.

The indicator of GDP per capita, examined here as a proxy for economic well-being, displays pronounced heterogeneity, with a minimum of USD 620 and a maximum that peaks at USD 12,400. The derived standard deviation of USD 2,950 lends further credence to the interpretation that the standard of living, as captured through this metric, is unevenly distributed among the sampled constituents. Cross-regional comparisons reinforce this conclusion; the ASEAN cohort, as a whole, records elevated per capita GDP figures relative to counterparts in Sub-Saharan Africa. This pattern is credibly ascribed to divergences in fiscal governance frameworks, varying degrees of effectiveness in national education strategies, and the observed literacy profiles of the respective populations.

The summary statistics presented here furnish a critical quantitative backdrop against which subsequent regression and mediation procedures will be benchmarked. Observed disparities among nations and across the dataset reveal that linkages among instructional expenditures, literacy attainment, and indicators of economic development are neither straightforward nor globally consistent; instead, these associations are mediated by intertwined institutional, structural, and policy contingencies. For this reason, the analytical framework adopted in the present investigation seeks to excavate more nuanced and contextually grounded causal mechanisms that regulate the effectiveness of budgetary directives in education across varied regional settings.

Estimation Results

Table 3 contains the results of the panel-data regression, demonstrating a robust and statistically significant correlation among education expenditure, literacy rates, and GDP per capita. The three specified regression models consistently reveal that educational outlays exert a direct positive effect on economic growth, while, concurrently, the effect is reinforced by an indirect channel wherein enhanced literacy functions as a mediating variable.

Table 3. Results of Panel Data Regression Estimation (2000–2022)

Regression Model	**Independent Variable**	**Dependent Variabel**	**Coeficient**	**Standard Error**	**t-Statistik**	**p-Value**	**Interpretation**
Education Spending → GDP per Capita	Education Spending (% of GDP)	GDP per Capita (USD constant)	420.75	105.32	3.99	0.0001	Education spending has a significant positive impact on GDP per capita.
Education Spending → Literacy Rate	Education Spending (% of GDP)	Literacy Rate (% Age 15+)	2.85	0.94	3.03	0.0026	Education spending significantly increases literacy rates.
Literacy Rate → GDP per Capita	Literacy Rate (% Age 15+)	GDP per Capita (USD constant)	65.40	18.75	3.49	0.0007	Literacy has a significant positive impact on GDP per capita.
Estimation Model:	Fixed Effect Model (FEM)						
Hausman Test:	$\chi^2 = 12.87$, $p < 0.01$ → FEM is more suitable than REM.						
Number of Observations	230 (10 countries × 23 years)						
Average of R^2:	0.58–0.62						

Table 3. Panel Data Regression Estimation Results (2000–2022) unequivocally establish a robust and statistically significant association involving public expenditure on education, adult literacy rate, and GDP per capita, observed across a balanced set of countries over a twenty-three-year horizon. The Fixed Effect Model

(FEM) was adopted as the estimation strategy, a choice subsequently validated by the Hausman specification test ($\chi^2 = 12.87$, $p < 0.01$), thereby confirming the predominance of unobserved, time-invariant country-specific effects over random error. The analytical sample comprises 230 balanced observations, synthesizing data for ten countries and twenty-three annual intervals. The model demonstrates satisfactory explanatory capacity, as corroborated by an average within-R^2 ranging from 0.58 to 0.62; this implies that the independent variables collectively account for between fifty-eight and sixty-two per cent of the cross-temporal variance observed in per capita GDP.

In the first examined model, the relationship of education expenditure expressed as a share of per capita GDP yields a coefficient of 420.75, a t-statistic of 3.99, and a p-value of 0.0001. These results indicate that a marginal, 1-percentage-point increase in the share of GDP spent on education is associated with a rise in per capita GDP of USD 420.75. The statistical significance at the 0.01 level confirms that this effect is unlikely to be due to random chance. Hence, the model presents robust evidence that fiscal injections into the education sector generate a measurable, positive effect on economic growth, suggesting that nations committing a relatively larger share of their budgets to educational services experience more substantial improvements in per capita economic well-being.

The second estimated model linking public-education expenditure to adult-literacy performance reports a coefficient of 2.85, accompanied by a t-statistic of 3.03 and a p-value of 0.0026. These statistics imply that a 1 per cent elevation in recurrent and capital education spending is associated with a 2.85 percentage point uplift in the nationwide adult-literacy rate. Given that the estimated parameter is statistically significant, the finding substantiates the proposition that fiscal investment in education affects not only physical inputs, such as infrastructure and the number of public and private schools, but also the depth of learning as indexed by the literacy skills possessed by the working-age population. In this context, literacy serves as a proxy for the success of policies oriented towards measurable, attainment-focused educational outcomes.

The third regression specification connects the literacy rate itself to per-capita gross domestic product (GDP) and yields a coefficient of 65.40, with a t-statistic of 3.49 and a p-value of 0.0007. Interpreted economically, an incremental one percentage point increase in the adult literacy rate correlates with an estimation of an increase of USD 65.40 per annum in aggregate GDP per capita. The estimated coefficient is significant and reinforces the view that literacy embodies not just the end-product of educational processes, but also serves as an economic resource. A more literate workforce displays higher productivity, enhanced capacity for continuous technological adaptation, and a greater propensity to enter the formal labour market; consequently, higher literacy yields measurable and direct contributions to national economic expansion.

In summary, the delineated triadic association, namely, public outlay in education, achieved literacy attainment and subsequent per-capita GDP, constitutes a coherent and vigorous causal trajectory. Within this schema, literacy functions not merely as a terminal measure but as a mediating channel that translates resource injunctions into heightened productive potential. Estimation results consistently reveal both direct and indirect channels through which educational public expenditure conveys potency to per-capita national income, thereby legitimising budgetary architectures that assign pre-eminence to pedagogical investment as an enduring macroeconomic propellant. Such empirical insight remains heuristically significant for developing economies that, in the process of recalibrating fiscal architecture, pursue the dual objectives of human-capital consolidation and income-disparity abatement.

Medation Test

The mediation analysis conducted herein interrogates the hypothesis whereby investment in educational expenditure influences economic outcomes, proxied by per capita GDP, solely via its enhancement of literacy levels. Within the canon of public policy assessment, mediation is elevated beyond surface correlation; it assesses the extent to which budgetary commitments to human capital translate into distal economic dividends. Literacy serves as the proximal cognitive capability through which fiscal inputs yield substantial socio-economic returns. The econometric procedure synthesizes the hierarchical regression criteria advanced by Baron and Kenny with Sobel-provided tests of conditional significance, such that the analytical circuitry tests whether budgetary increments conditional upon educational expenditure foster economic growth exclusively through the upsurge of literacy. The concomitant results indicate that literacy constitutes both a terminal educational measure and a de facto locus of public-policy agency, thereby affirming its standing as a salient axis of human-capital policy. In contexts governed by performance-based budgeting mechanisms, conceptual clarity of this mediation trajectory is indispensable for calibrating expenditure instruments toward targeted, high-yield, and sustainable impact.

Table 4 presents evidence from the mediation analysis evaluating the relationship between education spending and per capita GDP, with economic literacy serving as the mediating variable. The estimated indirect effect coefficient of 186.39 provides a robust quantification of how education expenditures transmit their influence on GDP through enhanced literacy. The corresponding standard error of 58.42 yields a Sobel z-statistic of 3.19, establishing statistical significance at a confidence level beyond 99.86 per cent, as indicated by the p-value of 0.0014. The analysis, therefore, affirms that literacy mediates the capacity of fiscal policy, namely education budgets, to augment national economic performance. Within a comparative cross-national framework, the implication is twofold: nations that allocate fiscal resources toward education and concomitantly elevate literacy levels tend to manifest accelerated per capita GDP growth. Literacy, properly conceptualized, is both an endpoint of formal schooling processes and an enabling vector of productive individual and collective economic engagement. Suppose fiscal policy instruments concentrate solely on funding levels without anchoring such provision in measurable literacy outcomes. In that case, resultant economic growth trajectories may be circumscribed, signalling the prospect of attenuated temporal returns on sustained educational expenditure.

Table 4. Literacy Mediation Test: Indirect Effect and Sobel Test Significance

Mediation Path	Koefisien Indirect Effect	Standard Error	Sobel z-Statistik	p-Value	Interpretation
Education Spending → Literacy Rate → GDP per capita	186.39	58.42	3.19	0.0014	Literacy significantly mediates the relationship between education spending and GDP per capita

Table 4 provides strong evidence that literacy serves as a substantive mediating variable affecting the link between public education expenditure and per capita gross domestic product (GDP). The reported indirect effect coefficient of 186.39 implies that an increment of one unit of education expenditure translates into an additional increase of approximately $186.39 per capita in GDP, attributable to gains in literacy skills. Correspondingly, the standard error of 58.42 quantifies uncertainty in the indirect-path estimate, suggesting moderate precision. The Sobel z-statistic, computed as 3.19, yields a one-tailed p-value of 0.0014, thereby substantiating the mediating pathway at a significance threshold well below 0.01, which establishes the mediation result as statistically robust.

These results reinforce the proposition that literacy ought to be viewed as a developmental asset rather than as a mere educational product. An increase in public investment in education does not yield its full return until literacy rates show a concurrent improvement. Such rates now serve as the transmission mechanism by which planned fiscal allocations transmute into higher economic performance. Enhanced literacy effectively amplifies the growth dividend of teachers, curricula, or school facilities, rendering educational policy a growth-input policy by parity. It follows that budget interventions claiming to be results-oriented must formally account for literacy as an operational yardstick. This reasoning generalises beyond single economies. Cross-national diffe-ren-ces in the calibre of governance within education sectors, and in the iron discipline of public expenditure, furnish variations in economic growth rates that are otherwise unexplained. In this light, rising literacy emerg-es as both an explanatory and a confirmatory variable for fiscal designs pursued within human--capital frameworks. To reinforce the empirical strength of the evidence in Table 4, Table 5 de-composes the coefficient into total, direct, and indirect components within the mediation architecture. A computed total effect equal to 607.14 confirms the prevailing proposition that total education expenditure exercises a statist-ically robust influence over per capita GDP, accentuating the systemic linkage between growth and fiscal, educa--tive policy.

When literacy is introduced as a mediating variable, the direct effect diminishes to 420.75, yielding an indirect effect transmitted through literacy of 186.39. The divergence between these figures reveals that the preponderance of the influence of education expenditure on economic development is channelled via the enhancement of literacy. Consequently, literacy is not ancillary but rather a central ingredient determining the capacity of fiscal education policy to induce economic gains. The statistical significance of all three estimated pathways ($p < 0.01$) not only augments the robustness of the estimated model but also corroborates that an outcome-oriented indicator such as literacy furnishes a more precise account of the economic returns to education expenditure.

Table 5. Comparison of Total Effect and Direct Effect in a Mediation Model

Type of Effect	Coefficient Estimation	Standard Error	Significant (p-value)	Interpretation
Total Effect	607.14	112.80	0.0000	The overall effect of education spending on GDP per capita, including both direct and indirect pathways thru literacy.
Direct Effect	420.75	105.32	0.0001	The direct effect of education spending on per capita GDP without considering literacy as a mediator.
Indirect Effect	186.39	58.42	0.0014	The indirect effect of education spending on per capita GDP thru increased literacy.

The analysis presented in Table 5, which juxtaposes the total and direct effects within a mediational framework, underscores the mediating capacity of literacy in the nexus between educational expenditure and economic advancement. The total effect coefficient of 607.14, accompanied by a standard error of 112.80 and a highly significant p-value of 0.0000, decisively confirms that, in aggregate, heightened fiscal allocations to the education sector engender a robust elevation of per capita GDP. This total effect encapsulates both the direct channel whereby expenditure transmits immediate economic returns and the indirect channel, namely, the increment in GDP that operates via enhanced literacy. Consequently, the evidence asserts that policies orienting fiscal resources to education yield immediate returns and concurrently augment national productive potential through the cultivation of a more literate and capable labour force.

The estimated direct effect coefficient associated with total education expenditure on per capita GDP is 420.75, with an estimated standard error of 105.32 and a corresponding p-value of 0.0001. This indicates a quantitatively robust and statistically significant direct impact; however, the magnitude of the estimated relationship suggests that the observed coefficient is insufficient on its own to account for the total causal effect. When literacy is introduced as a mediating variable, the analysis reveals a significant attenuation of the direct coefficient, with a differential path identified. The resulting indirect effect value estimated at 186.39 carries a standard error of 58.42 and exhibits a p-value of 0.0014, which confirms that the educational expenditure effect transmitted through literacy attainment exhibits an independent, statistically robust and economically observable effect. The mediated path thus reveals that literacy acts as an amplifying channel; it carries a substantive share of the impact of education expenditure on economic growth and enhances the transmission of the initial direct effect, further supporting the contention that targeted increases in literacy are a salient mechanism within the broader education-investment-growth channel.

The substantive comparison between the total effect of education expenditure on per capita GDP and the direct effect isolates a mediation effect of approximately 30.7% attributable to the pathway through literacy. This quantitative gap underscores the controlling value of the literacy variable: the economic magnitude of expanded education outlays is, in this dataset and within the relevant policy window, partly conditional on improvements in literacy. Such a result posits literacy as a pivotal mediating axis rather than a distal or incidental outcome of disproportionate educational fiscal policy, thereby registering it as a systematic determinant of economic growth. From a public management viewpoint, substantive appraisal of educational appropriations therefore demands metrics that integrate literacy as an output category alongside or in advance of basic instrumental acquisitions, such as school units or teacher headcounts. The finding further strengthens the theoretical and policy claim advanced within the human capital framework that cognitive and social processes, indexed by literacy, mediate the economic return on an education bot. Literacy forfeits its status as a mere ancillary signal and emerges as a principal accounting variable whose consequences command calibrative action: on the expenditure ledger, the conception of public value registers as incomplete and contingent, unless achievement trajectories evince a material convergence upon the normed output gap in literacy proficiency. Such a conceptual pivot persuades the re-engineering of the strategic infrastructure governing budgetary deliberations in the sphere of education finance.

From a governmental perspective committed to maximising the leverage of the education dollar against the expansive tapestry of macroeconomic architecture, the reallocation of resources towards lags in observably improved literacy instruction quality acquires an axiomatic character. Budgetary architects are thus enjoined to orient funding flows towards mechanistic inducements that fortify the value-adding core: inducements for pedagogical excellence; curricula calibrated to sub-region and developmental stage; systemic provisioning of strong reading lists; and an architecture of deep, continuous professional development for educators. Rendering literacy the explicit output variable crystallises a dual revenue channel: the simultaneous advancement of human capability stock and the addition of that stock to the national productivity account. Residual within the empirically grounded scrutiny of public policies, the taxonomic architecture forged upon literacy produces a pinpoint evaluative instrumentalism that embeds a narrowed channel through which to subject programme efficacy to systematic, longitudinal appraisal.

When the analysis migrates to a cross-national frame, the blending of direct and mediated channels compels a sharper, relativist interrogation. National sequences where disaggregated literacy evaluations shape educational governance exhibit relatively pronounced mediated pathways, because resource inputs eventually generate productive returns through the gradual enhancement of reading-intensive competencies. Systems, in contrast, whose developmental frameworks exalt the reproduction of architectural confines, physical infrastructure, and rigid pupil-teacher ratios, favor a direct channel to the detriment of mediation; as a result, the latent interdependencies remain opaque. The immediate policy corollary thus becomes the comprehensive inscription of literacy within the budgetary, monitoring, and evaluative apparatuses of state education, a necessary move not only toward trans-parency, but also to ensure that fiscal levers fulfill simultaneously the sociological requirements and macroeconomic arguments ordinarily advanced in the circumstantial language of peripheral reform discourse.

Table 5 corroborates the thesis that literacy emerges as the dominant warp along which public educational expenditure is converted into accruable economic correlates. Any attempt to monetizing that expenditure absent attention to literacy reducizes the analysis to a mere financial score sheet that misses the constituent processes. By explicit partitioning of total effects into assessed direct and acknowledged indirect components, the mediation framework constructs a fuller tableau of the causal pathways, revealing that the channels of cognition and productivity, once reignited, generate further positive spillovers that later manifest through credit markets and innovation into perceivable regional outputs. Consequently, literacy emerges as both the anchor of the empirical account and the normative yardstick. In practice, public financing proves a regression of the instructional minutiae by which the theoretical purchasing power of a given instructional outlay is transmuted into evidence of productive, completable, and reportable human capital. Empirical evaluation of peripheral rural road upgrading, health-centre clustering, and the residual rural electrification endowment can substantiate the claim for enhanced cognitive instruction. The normative appeal for aligning instructional relocation grants with chain indices progressively erodes into the further disaggregation of fiscal score sheets, bureaucracy of the loop, and mortgage-centre crossings; attendant policy imperatives thus instruct programme authorities to utilise fully the elastic propensity of the causal permutations signal by the effectiveness bar, in a manner that is cognisable exclusively to a literate civil servant.

Tables 4 and 5 distill how education expenditure planning may favour precision-commanding, leverage-driven ends rather than indiscriminate resourcing inputs. For poor economies, where fiscal roofs constrict, such targeting ceases to be prudential advice and instead becomes a normative algorithm. When treasuries channel education outlay towards boosting adult and neo-literate populations, the macroeconomic pay-off undercuts the marginal return posted by spending circumscribed to expanding resource inventories, be it the number of brick-row classrooms or the encumbrance of recurrent payroll to accept additional coupons of pedagogical personnel. Herein, literacy recurs as a mediating vector that reconciles the engineered supply and the ambient social receptivity to convert, adopt, and deploy the surplus. In effect, it recuperates surplus absorption, mediating its translation into human capital that is both broadly transmissible and market-accessible. The variable, by proxy, infers educative quality and, via the distributed micro, the aggregate potential for socioeconomic ascent. The availability of literacy-cum-compose-levels on the capillary budgeting platform enables the creation of iterative assessment cells. These cells not only confirm ex-post exşaaccountability but also facilitate the circulation of ledger choreography expenditure lines, which occupy both processing tick and ledger platform, being instrumentalized towards durable and reforming social and economic transformations.

The evidence presented carries substantive implications for budget governance practice across jurisdictions. Nations employing performance-based and outcome-driven budget frameworks invariably exhibit more pronounced mediating pathways. Within the present analysis, ASEAN member states recorded comparably robust linkages across the triad of education expenditure, literacy rates, and per capita GDP, in contrast to counterparts in Sub-Saharan Africa. The divergence is plausibly traced to disparate horizons of bureaucratic competency, the maturity of reporting architectures, and a varying intensity of political consensus around education as a central pillar of development. Utilizing the literacy outcome as the focal metric further fosters transparency and accountability in the appraisal of policy design, thereby widening the aperture for inclusive, empirically grounded budget reform. In this light, the mediation architecture advanced here acquires not only scholarly significance but also direct, operational salience for the crafting of sustainable public policy.

In exploring the mediating role of literacy between educational expenditure and broader economic growth, the present study enriches the public policy discourse by demonstrating that literacy functions both as an educational output and as an intentional lever of developmental strategy. This dual function acquires a fresh imperative at a juncture when both analysts and policymakers seek to appraise policy efficacy through observable and quotidian public advantages. Mediation analyses of the kind we advance are thus rendered compulsory rather than discretionary; they now serve as pragmatic directives. By framing literacy as the conduit through which incremental fiscal allocations are transformed into enhanced productivity and growth, policymakers are afforded a conceptual framework onto which sharper, more equity-sensitive, and results-oriented educational-system designs can be practically hinged. The value of these observations reaches well beyond a mere reaffirmation of human capital theory; the robust empirical bond we document between methodical literacy enhancement and fiscal dividend in educational spending positions literacy as an indispensable asset within the edifice of public investment strategy, rather than a negotiable adjunct amenable to periodic retrenchment.

DISCUSSION

The discussion section interprets empirical findings within the interpretative frame constituted by policy instruments, fiscal resource allocation, and the inclusive social consequences of the observed linkages among public investment in education, literacy, and patterns of economic progress. Subsequent to descriptive and confirmatory modelling, the discussion foregrounds three tightly-coupled lines of investigation: regionally differentiated mediated effects, literacy as a substantive measure of budgetary efficiency, and literacy's rising salience as enabling economic agency and social integration. A pooled-country lens affirms the empirical strength of the identified pathways while simultaneously interrogating the moderating and conditioning roles exerted by institutional integrity and prevailing policy orientations in the deployment of education funds. Whereas literacy was originally theorised as a mediating link, it is reconceived here as a deliberate and evaluative lever of human development. By centring the discussion on this emergent role, the analysis aspires to narrow the distance between empirical results and prescriptive traction within the design of resilient public budgetary policy instruments.

Comparison of Mediation Effects Based on Budget Governance (ASEAN vs Sub-Saharan Africa)

Empirical evidence demonstrates that the magnitude of the mediation of literacy within the association between education expenditure and per capita GDP is attenuated or strengthened by the calibre of budgetary governance observed across the states examined. Within the ASEAN grouping, Malaysia, Thailand, and Vietnam have adopted budget processes that display heightened structuring and performance orientation, manifesting in noticeably efficacious education outlays. Within the referenced countries, the observed public-finance trajectory appears bimodal: initial growth dividends generated by rising educational outlay are amplified when parallel gains in literacy materialise, so that educational attainment subsequently mediates further accelerated expansion. Comparison with selected Sub-Saharan African economies, particularly Nigeria and Ethiopia, reveals a parallel budget growth yet inferior mediating literacy contribution. Despite the continual expansion of nominal resource envelopes in those contexts, the transmission of enhanced educational attainment to rapid labour-market productivity and, subsequently, macroeconomic growth, has been curbed. Diagnostic reviews attribute the anomaly to an excessive resource increment uncoupled from tight, strategic, and monitored expenditure execution, dulling the growth elasticity of the educational outlay. The divergence thus suggests a critical governance threshold whereby merely high nominal expenditure is valueless unless fully coordinated to tame result-fasible expenditures, carefully aligned to the costs and benefits of productivity targets, and vigilantly monitored from budgeting through to disbursement and service entry. The micro- and macro-level dividends, in short, are scalable only if the expenditure is simultaneously rewarding, coordinated, and discrete.

Within the Association of Southeast Asian Nations (ASEAN) framework, the correlation between expenditure on education and literacy attainment exhibits a marked responsiveness, a phenomenon attributable to the implementation of increasingly sophisticated monitoring and evaluation apparatuses. Member States have, in recent years, consolidated performance reporting protocols that support the systematic appraisal of educational outputs, thereby permitting a more refined quantification of literacy progress. As the sector's principal benchmark for effectiveness, literacy serves to anchor fiscal allocation, channelling resources toward the enhancement of pedagogical effectiveness, the amplification of supplementary reading collections, and the systematic professional uplift of instructional staff. The pronounced mediating impact of education expenditure on literacy and its subsequent transmission to per capita gross domestic product (GDP) signals that performance-linked fiscal architecture can elicit diffuse, cumulative economic dividends. Such a finding substantiates the proposition that judicious budget governance, far from being a mechanism of cost containment alone, incrementally augments the propensity of fiscal inputs to translate, with greater fidelity, into durable developmental gains.

In Sub-Saharan Africa, enduring gaps in budget governance fundamentally constrain the potential of literacy to mediate growth effects. A plurality of states in the region suffers from chronic shortages of bureaucratic capacity, incomplete fiscal transparency, and underdeveloped education reporting frameworks. Consequently, the observed rise in education expenditure has yet to translate into proportional literacy gains, thus attenuating the channel through which human capital purportedly raises per capita GDP. This diminished mediating effect suggests that, absent decisive reforms to budget governance, rising education budgets risk being classified as inert resources, incapable of fostering aggregate productivity.

Literacy as an Indicator of Budget Effectiveness: A Cross-Country Analysis

Comparative cross-country regressions frequently reveal that literacy levels account for a significant proportion of the residual variance in the relationship between educational expenditure and growth in per capita GDP. Countries exhibiting high levels of adult literacy manifest a pronounced amplification of GDP per capita in response to public spending on education, indicating that capital inflows to education become effective only after a threshold of attained cognitive competence is achieved. Literate populations, therefore, occupy an ambiguous, yet informative, position; literacy encapsulates both the completion of formal curricula and the caliber of recurrent, coherent fiscal governance that incrementally accumulates cognitive capital. By designating functional literacy as the leading evaluative criterion, evaluative frameworks transcend ritualistic compliance; audit environments redirect fiscal scrutiny toward observable developmental dividends manifesting at the household and municipal strata, as opposed to formalised outputs extant only in administrative registries.

Section three of the present analysis presents literacy as a mediating construct that operationalises the linkage between public per student outlay in education and accruing per capita GDP. Path-model mediation, based on the most recent household and labour-force surveys, reveals that the compelling share of the transmission mechanism is functional literacy: fiscal transfers induce the initial budgetary volume, yet the consequential effect on GDP appears almost exclusively through demonstrable enhancements in literacy rates. Consequently, literacy constitutes a decisive mechanism that elevates the yield of budgetary interventions. Nations that effectively translate education spending into literacy gains tend to register accelerated rates of economic growth. Because of this robust empirical link, literacy emerges as a pertinent and consequential indicator for a performance-oriented budgeting framework. Embedding literacy metrics into fiscal planning and accountability processes empowers the government to verify that educational outlays realize the projected social and economic returns.

Analogous cross-national scholarship reveals that literacy possesses distinct methodological strengths attributable to its comparability across polities. Institutions such as UNESCO and the OECD have operationalized and harmonized literacy metrics that facilitate the cross-temporal and cross-national appraisal of educational governance. Within this interpretive frame, literacy transcends a purely descriptive function, emerging instead as a reflexive instrument of advocacy that shapes policy deliberations towards demonstrable outcomes. Substantive, empirical data establishes that jurisdictions that institutionalise budget-linear allocations parametrised by pedagogical literacy norms concurrently nurture educational architectures distinguished by enhanced inclusivity, tailored to the distinctive demands of resident constituencies. Hence, the operational employment of literacy as an evaluative standard of fiscal stewardship carries normative and material import that transcends circumscribed academic interrogation, positioning the quotient as a structural parameter that propels the elaboration of resilient, transparent public-policy logistics.

The Social Implications of Literacy on Economic Empowerment and Inclusion

Literacy ratchets up several dimensions of collective welfare because it grants persons the cognitive tools to translate ostensible rewards into realised agency and economic mobility. Once reduced to a simple skill, it is only the modal pathway through which persons come to narrate, evaluate, and act upon their situational circumstances. Literate persons are better equipped to sift, contest, and concatenate information; to marshal a welter of observations into reasoned options; and, thus, to reciprocate the demands of increasingly competitive labour markets. Within development-oriented discourses, the available empirical regularities situate literacy as a positive, endogenous shifter of the expectations of price, productivity, and pace, as poverty yields to more diversified subsistence, governance becomes more deliberative, and social groups enhance their claimed credit outcomes. Consequently, the appropriation of public resource allocations to raise literacy through the education budget of a nation must therefore be interpreted as a dual-economic and social investment whose dividends are registered for a protracted period.

Empirical examination in the present investigation establishes that, in the mediation model invoked, the literacy variable constitutes a decisive conduit through which education outlays yield economic expansion. Add to these measured changes in per capita GDP, that higher literacy levels are also a cause for improved labour output, fortification of democratic institutions, and attenuation of social inequities. Individuals who possess functional literacy demonstrate, for example, an augmented capacity to navigate health-care systems, to interpret and assert their legal rights, and to engage effectively in both electoral and broader civic practices. Within low-income national settings, the attainment of basic literacy emerges as an essential foundation for the founding of an inclusive, egalitarian, and empowered public sphere. Policies that explicitly target the elevation of literacy competencies, consequently, represent the most strategic site for the cultivation of widespread and sustained social change.

Expanding and contracting definitions of functional literacy necessitate persistent attention to gendered disparities and thereby implicates constituencies systematically overlooked. Emerging empirical scholarship converges on the finding that enhancing women's literacy generates a cascade of beneficial spillovers: maternal and household health indicators improve, enrollment and academic attainment across primary and secondary levels advance, and women's productive contributions acquire recognisable and meaningful agency. Once literacy is routinised, women internalise versatile competencies alongside psychosocial agency, allowing for surer and more equitable management of household resources and more assertive, yet equitable, negotiation within domestic and extra-domestic arenas. Programmatic evidence further demonstrates that inclusively designed, purpose-oriented literacy interventions that purposefully redress geographic disadvantage, such as those explicit in rural and disability inclusion, replicate and even magnify these returns. When literacy is reframed not as an instrument to satisfy fiscal benchmarks, but as a claim of distributive justice, the tripartite obligation of reading, writing, and numeracy assumes normative precedence. Intrinsically, the practice of budgetary design and the re-imagination of instruments of fiscal execution and reform not only reinforce this normative extension, but progress in functional literacy emerges as a central site of accountability. When the state institutionally prioritizes literacy education as a non-negotiable component of comprehensive education, which encompasses the intersection of social insurance, the feasibility of inclusive economic and civic participation increases. Consequently, the same policy enacts external equilibrium, leverages multipliers of upstream development, and fortifies the incremental ladders upon which equitable and sustainable development learns.

CONCLUSION

The findings elucidated in this study underscore that literacy constitutes an essential criterion in evaluating the efficiency of education budget policies, functioning simultaneously as a technical yardstick and an affirmation of sustainable human development. The data repeatedly affirm that functional reading and writing capacity mediates educational investment and subsequent economic maturation, thus necessitating that post-implementation evaluations of fiscal policy treat literacy as an essential intervening variable. A public educational budget's efficacy cannot be judged by absolute monetary sum alone; it is determined by prudent fiscal governance and by a policy orientation, which emphasises measurable social outputs. Comparative evidence from jurisdictions that establish transparent, accountable, and performance-linked budgetary practices reveals that improvements in functional literacy are amplified, and that broader economic welfare likewise conforms. A zone of elastic possibilities arises from this observation, mandating a deliberate and irrevocable migration from budgetary frameworks predicated upon input volume and procedural adherence to a rigorous, outcomes-driven budgetary philosophy, which predicates release of funds upon demonstrable attainment of pre-specified social and economic performance thresholds. Such a migration is not a technical adjunct or administrative expedient; it is a foundational strategic reengineering, which guarantees that educational investment induces irreversible and net-positive reconstitutions of social equilibrium. Within this reengineered lexicon, literacy is situated as the cognate and measurable symbol of policy efficacy, and as the structural super-venient substrate upon which development explicitly rechauffe.

RECOMMENDATIONS

The empirical analysis reported herein demonstrates that systems of national education financing will yield greater returns only if they pivot decisively toward an outcome-oriented budgeting framework and abandon the prevailing dependence on aggregate input norms and ritual procedural adherence. Effective structural re-engineering of budgetary circuits mandates the insertion of disaggregated literacy results disaggregated by age, geography, and socio-economic strata into the appraisal and accountability modules governing both project requests and audit trilogies. Such integration allows expenditures to be judged, empirically and continuously, against benchmarks calibrated to the autonomous literacy thresholds necessary for individual labour agency and to the longer-term productivity projections of the national macroeconomic regime. When literacy constitutes a defining performance benchmark within budget forecasts and ex-post reports, its continuous measurement furnishes a proxy of educational quality and an early signal of future labour-productivity profiles. Realisation of this instructive signal, in turn, mandates a commensurate strengthening of the State apparatus, involving the enhancement of competencies in data processing, implementation of results-oriented reporting, and calibrating budget programmes in a manner that responds judiciously and in real time to the evolving requirements of society. Complementarily, the elevation of budgetary performance is best reinforced through sustained, formalised instances of collaboration across sectors, involving governmental tiers and educational agencies; non-governmental agencies, employers, and philanthropic actors. Only through pooled technical, informational and financial resources may the full extent of the fiscal signal associated with education expenditure be actively rationalised. While cumulative RNA-B computation keeps educational budget privileged to technicians, objectivity on both the State and Community must be reiterated through this re-configuration. Realisation of this approach is anticipated to transition the education budget instrument from a mechanistic protocol into a coherent, policy instrument for literacy promotion, social inclusion and sustainable growth, thereby enhancing the budgetary landscape in an evidence-informed, accountability-centred manner.

LIMITATIONS AND SUGGESTIONS FOR FURTHER RESEARCH

This analysis is constrained by several limitations, which should inform subsequent inquiries seeking to advance understanding of education budget effectiveness. A cursory application of international literacy datasets from multiple countries, particularly those in Sub-Saharan Africa, distorts cross-sectional comparisons and may produce biased parameter estimates. The study does not sufficiently address how extrinsic political and cultural variables shape education budget policies, notwithstanding the established literature indicating that institutional properties and prevailing value systems modulate implementation efficacy. Refining the theoretical design warrants the incorporation of moderating indicators, specifically governance quality and corruption perceptions, to contextualise the nexus among funding, literacy gains, and broader developmental outputs. Employing quasi-experimental frameworks, exemplified by Difference-in-Differences (DiD) analytical models, would yield stronger causal inferences regarding the efficacy of budgetary realignments. Parallel fieldwork, entailing semi-structured interviews and participant observation, stands to unpack the micro-mechanisms by which budget legislation is mediated through bureaucracies, revealing the contingent roles of local social structures in literacy outcomes. Integrating the two strands, quantitative exigency fulfilled by sufficiently broad and stratified panel datasets and qualitative excavation of meaning through direct observations, affords enhanced triangulation, fortifying the internal and external validity of estimates in the multifaceted public management milieu.

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