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Internal Audit as a Tool for Securing Public Investment Projects in Emerging Economies.

Auteur 1 : MUSTAPHA EZZAYRI.
Auteur 2 : M'BARKA EL GHAZALI.

MUSTAPHA EZZAYRI, (PhD)
National School of Business and Management – Casablanca.
Hassan II University of Casablanca, Morocco.

M'BARKA EL GHAZALI, (Research professor)
National School of Business and Management – Casablanca.
Hassan II University of Casablanca, Morocco.

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Abstract:

This study investigates the role of internal auditing as a tool for securing public investment projects in emerging economies, focusing on Morocco, India, Brazil, and Vietnam over the period 2010–2024. Using the Autoregressive Distributed Lag (ARDL) approach, the research examines both the short-run and long-run relationships between public investment project performance, internal audit indicators, governance quality, and macroeconomic stability. Panel unit root and cointegration tests confirm the presence of stable long-term relationships among the variables, while Error Correction Model (ECM) estimations reveal rapid adjustment dynamics toward equilibrium. The empirical results show that internal auditing and governance exert significant and sustained positive effects on investment performance, with governance acting as a structural enabler of audit effectiveness. Macroeconomic factors, though exerting smaller coefficients, remain statistically relevant in ensuring a conducive environment for long-term project success. Policy recommendations emphasize strengthening audit frameworks, enhancing governance structures, and integrating macroeconomic stability into investment planning, with tailored strategies for each national context. The findings contribute to the literature on public investment efficiency and institutional reforms in emerging markets, offering actionable insights for policymakers and development practitioners.

Keywords: Internal auditing; Public investment performance; Governance; ARDL model; Emerging economies; Morocco; India; Brazil; Vietnam; Macroeconomic stability; Error correction model; Institutional reforms; Policy recommendations.

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1. Introduction

Public investment dynamics have once again become a central lever for growth in emerging economies, but the quality of execution remains decisive. Recent IMF studies show that, on average, emerging economies could increase infrastructure output by 54% if inefficiencies in public investment management were eliminated a « dividend of efficiency » that goes beyond merely increasing budgetary allocations. At the same time, the global investment environment remains volatile: in 2024, greenfield project commitments fell by about 6% in value, despite a slight rebound in volume, signaling headwinds for program delivery (financing costs, governance risks). In contrast, some states have stepped up efforts: India maintained a record infrastructure investment allocation of 3.4% of GDP in 2024/25, while Brazil closed 2023 with a total investment rate (all agents combined) of 16.5% of GDP, illustrating both the persistence of needs and the efficiency constraints weighing on project realization.

In this context, internal auditing emerges as a tool for securing projects with high capital content from opportunity review and tendering to monitoring costs, deadlines, risks, and benefits. Literature on megaprojects documents the frequency of cost overruns and delays, advocating for independent challenge mechanisms throughout the project cycle (planning–allocation–execution). Institutional evaluations such as the IMF's Public Investment Management Assessment (PIMA) identify five links whose robustness is most correlated with efficiency in low- and middle-income countries: project management, socio-economic appraisal, selection, procurement, and financing availability all areas where internal auditing can provide ex-ante and ex-post controls. The experience of Supreme Audit Institutions confirms the value of oversight: in Brazil, the Federal Court of Accounts (TCU), in 2023 alone, issued 1,110 items for follow-up (determinations and recommendations) in its decisions serving as a structural driver for performance and transparency in executing agencies.

A comparative study of four countries illustrates the diversity of challenges and the usefulness of a structured internal audit approach. In Morocco, investment orientation is strong (total investment represented ≈ 28% of GDP in 2023), and the State is accelerating critical programs such as the National Program for Potable Water Supply and Irrigation 2020–2027, worth about MAD 143 billion a fertile ground for internal auditing focused on sustainability, cost control, and climate risk management. India, with central public capital expenditure at 3.4% of GDP in 2024/25, emphasizes project preparation and monitoring chains (GatiShakti, infrastructure pipeline), increasing demand for performance audits. In Vietnam, authorities still acknowledge disbursement rates below targets (e.g., 47.3% of allocated funds in the first nine months of

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2024), a gap that highlights the role of internal auditing in removing operational bottlenecks. in Brazil, budget constraints remain significant (the TCU anticipated a primary deficit in 2024), further underscoring the need to demonstrate efficiency gains and the probative value of internal controls across the investment portfolio.

Despite the notable increase in public investment volumes in several emerging economies, actual performance in infrastructure delivery remains below initial targets, due to budget overruns, chronic delays, and gaps between expected and actual socio-economic benefits. This situation raises questions about the ability of States to ensure robust governance of their strategic projects in an environment characterized by budgetary constraints, macroeconomic uncertainties, and political pressures. In this context, internal auditing traditionally perceived as an ex-post control mechanism could be repositioned as a strategic tool for securing public investment, intervening both upstream and throughout the project life cycle. The central problem of this research can thus be formulated as follows: ***to what extent, and through which modalities, can internal auditing contribute to reducing financial, operational, and strategic risks, and to improving the efficiency of public investment project management in emerging economies?***

To address this overarching question, several sub-questions arise: (1) What institutional and organizational determinants condition the effectiveness of internal auditing in public projects in Morocco, India, Brazil, and Vietnam? (2) How can internal auditing incorporate performance evaluation and risk management methods adapted to the economic, legal, and cultural specificities of these countries? (3) To what extent do existing internal audit practices anticipate rather than correct governance and execution failures? (4) Which models or best practices, observed at the international or national level, can be transposed or adapted to optimize the safeguarding of public investments? Exploring these questions will not only assess the actual contribution of internal auditing as a performance lever, but also help formulate targeted operational recommendations for public decision-makers and oversight bodies.

The primary objective of this study is to analyze and demonstrate the strategic role that internal auditing can play in safeguarding public investment projects within emerging economies facing budgetary, institutional, and operational constraints. More specifically, it seeks to: (1) identify the institutional, regulatory, and organizational factors that influence the effectiveness of internal audits; (2) assess the capacity of current practices to anticipate and mitigate financial, operational, and strategic risks; (3) compare the approaches implemented in Morocco, India, Brazil, and Vietnam in order to extract transferable lessons; and (4) propose an integrated

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internal audit model adapted to the specificities of emerging economies. By adopting a comparative and analytical approach, the research aims to offer concrete recommendations to strengthen governance and enhance the performance of public investments.

Within the framework of this study on the role of internal auditing as an instrument for securing public investment projects in emerging economies, three central hypotheses have been formulated to guide the empirical analysis and inform the theoretical reflection. The first hypothesis posits that internal auditing has a positive and significant effect on the performance of public investment projects by strengthening transparency, accountability, and the efficiency of resource allocation. The second hypothesis suggests that governance quality functions as a structural and amplifying factor of internal auditing, facilitating the effective implementation of recommendations and consolidating the integrity of decision-making processes. the third hypothesis asserts that the macroeconomic environment conditions the effectiveness of these mechanisms, such that economic stability constitutes an essential prerequisite for the sustainable impact of auditing and governance on project performance. Together, these hypotheses by linking internal auditing, governance, and macroeconomic stability provide an integrated framework for understanding the institutional and contextual determinants of public investment efficiency in emerging economies.

This study adopts a quantitative approach based on the Autoregressive Distributed Lag (ARDL) model, which is particularly suitable for analyzing dynamic relationships between variables with mixed integration orders (I(0) and I(1)) and relatively small sample sizes. This framework allows for the simultaneous estimation of both short-run and long-run effects in order to capture the immediate and persistent impact of internal audit indicators and governance variables on the efficiency and security of public investment projects. The empirical analysis covers the period 2010–2024, incorporating structural changes and policy reforms observed in Morocco, India, Brazil, and Vietnam, and relies on data drawn from international databases (World Bank, IMF, UNCTAD) as well as national sources, including macroeconomic indicators, public investment performance measures, and institutional quality indices. Robustness is ensured through stationarity tests (ADF, PP), lag selection criteria, and the specification of an error correction model, while the ARDL bounds testing procedure is used to verify the existence of cointegration.

The research article is structured according to a classical and progressive scientific architecture that strengthens both its coherence and analytical scope. It opens with an abstract highlighting the research problem, the methodological approach (ARDL and ECM), as well as the main

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findings and policy recommendations. The introduction contextualizes the challenges of managing public investment in emerging economies, formulates the central research problem, and sets out the objectives and hypotheses. The literature review, organized into thematic axes, mobilizes the theoretical foundations of internal auditing, governance, and public project efficiency, while underscoring the contributions and limitations of previous studies. The section devoted to the empirical analysis first details the descriptive approach and model specification, then presents the econometric tests (stationarity, cointegration) and the estimation of ARDL models by country, before setting out both the short-run and long-run results. The discussion validates the research hypotheses, relates the findings to existing theories and international experiences, and draws comparative lessons. The article concludes with a synthesis of contributions, the formulation of policy recommendations tailored to the studied contexts, and suggestions for future research, all firmly supported by an up-to-date and diversified academic bibliography.

2. Literature Review

The literature review aims to establish a conceptual and empirical framework around the role of internal auditing in safeguarding public investment projects, with a particular focus on emerging economies. In a context marked by the need to optimize resource allocation and maximize value for money, internal auditing emerges as a strategic governance lever, complementing regulatory mechanisms and performance evaluation systems. Since the foundational works on agency theory (Jensen & Meckling, 1976) and institutional approaches (North, 1990), research has progressively integrated internal auditing as a tool for reducing information asymmetries, managing risks, and strengthening accountability. Recent empirical studies whether focused on risk management in megaprojects, the effectiveness of public procurement, or governance reforms converge on the view that the added value of internal auditing lies as much in its capacity to anticipate failures as in its ability to correct deviations ex post. The structured examination of existing contributions, organized here into five thematic axes, will not only synthesize current knowledge but also highlight the theoretical and methodological gaps that the present research seeks to address.

2.1. Governance Theories and the Foundations of « Safeguarding » Public Investments through Auditing.

The theoretical roots place internal auditing at the heart of reducing information asymmetries and moral hazard in public action. Jensen, M. C., & Meckling, W. H. (1976), formalized agency costs and demonstrated how control and incentive mechanisms create value by aligning the

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interests of managers and principals a logic transposable to the State and its executing agencies when public investment is fragmented among multiple principals and agents. In the infrastructure Flyvbjerg, B. et al (2003), documented the magnitude of cost and schedule overruns in megaprojects, attributing these gaps to strategic optimism and political/organizational biases, and advocating for independent challenge functions and robust governance throughout the project cycle. Complementing this foundation, the OECD. (2017), proposed an infrastructure governance framework (planning, selection, procurement/contracts, execution, evaluation) and explicitly linked transparency, integrity, and performance all areas where internal auditing can provide assurance and advice to improve reliability of results.

On the institution's investment efficiency link, Dabla-Norris, E. et al (2012), developed a public investment efficiency index that measures process quality (socio-economic appraisal, selection, implementation, evaluation) and demonstrated that institutional differences explain a substantial share of performance variation across countries justifying well-equipped ex-ante and ex-post controls. Similarly, the IMF's PIMA Handbook (2022), synthesizes the critical links in public investment governance and positions internal auditing/internal control as key components of the « PIM chain», with direct implications for risk management and value for money. At the governance procurement interface, Fazekas, M., et al (2016), created an objective corruption risk index based on procurement data and showed how certain patterns (low competition, atypical timelines, restrictive criteria) signal vulnerabilities alerts that internal auditing can use to target its tests and audit plans.

Recent empirical work clarifies the conditions for internal audit effectiveness in the public sector and its effects on performance. Nerantzidis, M., et al (2020/2022), through a systematic literature review post-2009, identified recurrent determinants such as functional independence, auditor competencies, integration with risk management, and top management support, while pointing out methodological gaps to address. A micro-institutional application by Alqudah, H., et al (2023), (Jordan) showed that managerial support, independence, cooperation with external auditors, and incentive systems significantly enhance internal audit effectiveness, thereby strengthening the ability to prevent execution failures. At the audit public procurement interface, Appiah, M. K., et al (2022), studying Ghanaian public administrations, found that competence, independence, the role of external auditors, and top management support improve internal audit effectiveness, which in turn positively mediates value for money and sustainable procurement performance.

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2.2. Organizational Determinants and Governance of the Internal Audit Function

Empirical studies first show that the effectiveness of internal auditing depends heavily on the characteristics of the audit team, audit processes, and managerial support. In a public sector case in Ethiopia, Mihret, D. G., & Yismaw, A. W. (2007), found that audit quality and management backing outweighed other contextual factors in explaining perceived effectiveness. In a private-sector setting, Arena, M., & Azzone, G. (2009), using data from 153 Italian companies, identified key drivers such as team composition/competence, the formalization of audit work, and the organizational positioning of the function. Sarens, G., & De Beelde, I. (2006), added a comparative perspective between the United States and Belgium, showing that the perceived role in risk management varies according to governance maturity and the positioning of the audit function.

A second body of work sheds light on governance interfaces that shape independence and the use of audit results. Abbott, L. J., et al (2010), found that audit committee oversight influences the nature of internal audit activities (serving two masters). Christopher, J., et al (2009), identified threats to independence (reporting lines, resources, advisory roles) in the Australian public sector. Soh, D. S. B., & Martinov-Bennie, N. (2011), documented how stakeholders assess the role, effectiveness, and evaluation criteria of the function, emphasizing the importance of aligning expectations with performance indicators.

Lastly, recent studies link the quality of the function and its contributions to measurable outcomes. Pizzini, M., et al (2015), found that more competent and better executed internal audit functions shorten external audit delays. Lenz, R., & Hahn, U. (2015), synthesized the empirical literature and proposed a model integrating macro factors (governance, institutional environment) and micro factors (competence, processes). At the adoption level, Goodwin-Stewart, J., & Kent, P. (2006), demonstrated that company size and risk management commitment explain the existence of an internal audit function, reminding us that strategic embedding remains a determining factor.

2.3. Internal Auditing, Risk Management, and Public Project Performance (Costs, Timelines, Value for Money).

Theoretical and public management literature shows that the institutionalization of control/audit influences the way public projects are conceived and managed. Power, M. (1997), highlights the concept of the « audit society», in which the formalization of controls and the creation of auditability shape decision-making and resource allocation redefining the role of internal auditing as a governance and accountability lever. Hood, C. (1991), within the framework of

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New Public Management, explains how the focus on results and incentive mechanisms justifies integrating audit/performance instruments more deeply into processes, thereby strengthening risk management and «value for money». Love, P. E. D., et al (2016), focusing on transport megaprojects, propose a probabilistic interpretation of cost overruns based on causal chains and risk interactions arguing for audits that test cost/schedule assumptions and failure points throughout the project cycle.

From an empirical perspective, several studies show that public audits reduce opportunistic behavior and improve spending integrity a prerequisite for delivery performance. In a randomized field experiment on village roads, Olken, B. A. (2007), finds that increasing the probability of audits significantly reduces leakage, with a stronger effect than community participation alone an important result for fragile governance contexts. In Brazil, Ferraz, C., & Finan, F. (2011), show that publishing anti-corruption audits lowers the reelection rates of corrupt mayors, thus strengthening electoral accountability and indirectly improving incentives for compliant execution. Going further, Avis, E., et al (2018), estimate that having been audited reduces future corruption by about 8% and increases the probability of legal action by 20%, indicating a disciplining effect that is highly relevant for securing project costs, timelines, and quality.

The PPP/infrastructure literature documents success factors and their link with audit/control mechanisms that are better aligned with risk management and contractual performance. Osei-Kyei, R., & Chan, A. P. C. (2015), through a systematic review, identify critical factors such as risk allocation/sharing, procurement transparency, and political support all areas where internal auditing can target its testing (selection, procurement, contract management). A Ghana–Hong Kong comparison, Osei-Kyei, R., & Chan, A. P. C. (2017), confirms that, despite contextual differences, partner competence and strong control mechanisms explain a substantial share of success. On the success criteria side, Osei-Kyei, R., & Chan, A. P. C. (2017), demonstrate that PPP performance measurement benefits from including value for money and sustainability indicators, where internal audit findings serve as inputs for improvement loops.

2.4. Frameworks, Reforms, and Capacities: Institutionalizing Internal Auditing to Safeguard Public Investment.

Recent contributions converge on the idea that high-performing investment governance relies on explicit institutional frameworks linking planning, selection, execution, monitoring evaluation, and control/audit. Rajaram, A., et al (2014), formalizes a unified public investment management framework and details the links (socio-economic appraisal, procurement, risk

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management, PPPs) where internal auditing can provide independent assurance and advisory services throughout the project cycle. The IMF's PIMA Handbook (2022), positions internal audit/control at the heart of the « PIM chain », with standardized diagnostics to identify gaps in preparation, execution, and maintenance of public assets. Andrews, M. (2013), shows that « best practice » reforms often fail without capacity anchoring; they must be adapted to context to avoid isomorphic mimicry and achieve real effects on state performance a finding directly applicable to the institutionalization of public auditing.

Beyond frameworks, the question becomes how to build internal audit capacity. Pritchett, L., et al (2013), propose the PDIA (Problem-Driven Iterative Adaptation) approach: short cycles of local experimentation, feedback, and adjustment that avoid institutional mimicry and strengthen problem-solving in the daily operations of public organizations. More recent tests by Lawson, A., & Harris, J. (2023), confirm PDIA's potential for public financial management (PFM) reforms while highlighting its success conditions (political authorization, collective learning, results metrics). In parallel, procurement quality remains a decisive area for auditing: a study on developing countries (Anin, E. K., et al., 2022), finds that procurement performance improves when control/audit mechanisms are embedded in processes (specifications, evaluation, contract monitoring), thereby enhancing the *« value for money »* of investments.

Country evidence illustrates the operationalization of these principles in emerging economies. In Ta, T. T., & Doan, T. N. (2022), show, through a survey, that independence, competence, managerial support, and quality of audit work are robust determinants of internal audit effectiveness necessary conditions for anticipating costs, timelines, and quality in public projects. In Brazil, Lucas, J. V., et al. (2022), assess the alignment of internal controls in the public sector with COSO 2013 in federal universities and document implementation gaps (procedures, task segregation, communication), shedding light on where internal auditing should target its testing and improvement plans. More broadly, Rahayu, S., et al (2020), show that role indicators of internal auditing (knowledge, independence, support) sustain good public governance, offering a useful bridge between micro-organizational capacity and macro investment outcomes.

2.5. Country Evidence (Morocco, India, Brazil, Vietnam) and Measurable Effects on Safeguarding Public Investments.

In emerging economies, the digitalization of procurement and the strengthening of internal auditing have produced traceable gains in execution quality and transparency. In India, the adoption of e-procurement improved the quality of public works (without increasing prices),

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illustrating the role of digital tools in reducing discretionary frictions (Lewis-Faupel, S., et al, 2016). In Vietnam, « organizational » determinants independence, competence, managerial support, and quality of audit work explain internal audit effectiveness, providing a foundation for securing project costs and timelines (Ta, T. T., & Doan, T. N., 2022). In Morocco, the trajectory toward Public Procurement 4.0 shows how technologies (platforms, traceability) integrate into the public procurement value chain to limit corruption and strengthen contractual performance (Taoufik, A. O., & Azmani, A., 2023).

In Brazil, randomized audits and their public disclosure have demonstrated disciplining effects: publication of federal audit reports reduces the reelection rates of corrupt mayors, reinforcing electoral accountability (Ferraz, C., & Finan, F., 2008), in the longer term, «having been audited», decreases future corruption by about 8% and increases the probability of legal action by 20% (Avis, E., et al, 2018). In parallel, the inflow of public rents, studied in «The Political Resource Curse», sheds light on mechanisms through which discretionary resources fuel corruption highlighting the usefulness of audits and controls to counteract such incentives (Brollo, F. et al, 2013). Together, these findings link the institutional architecture of audit/control to the political incentives that shape investment delivery.

Cross-country studies specify which mechanisms matter most. At the global level (187 countries), the practice of public procurement is more strongly correlated with outcomes than the letter of the law, arguing for reforms focused on implementation (Bosio, E. et al, 2022). In India, biometric payment infrastructure in social programs reduced leakages and improved payment predictability, showing that the digitalization of financial controls strengthens state capacity and, indirectly, the reliability of projects (Muralidharan, K., et al, 2016). In Morocco, e-procurement and public finance digitalization improve competition, traceability, and the business climate, consolidating the execution environment for investments (Ouboumlik, A., & Ouazzani Touhami, N., 2024).

The in-depth examination of the literature highlights the strategic role of internal auditing as a governance mechanism for safeguarding public investment projects in emerging economies. The five thematic axes explored demonstrate that its effectiveness rests on a combination of institutional, organizational, and technical factors, reinforced by the integration of modern risk management and performance tools. The national experiences analyzed ranging from Morocco to India, and from Brazil to Vietnam confirm that internal auditing, when properly institutionalized and supported by an enabling regulatory environment, contributes to improving transparency, reducing opportunistic behaviors, and optimizing resource allocation.

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However, gaps persist between the identified best practices and their effective implementation, often due to capacity constraints, political contexts, or technological limitations. This synthesis underscores the need to deepen the empirical analysis of the relationship between internal auditing and public investment performance, which fully justifies the use, in the present research, of an ARDL econometric model applied over the 2010–2024 period to measure both short- and long-term effects.

3. Empirical Analysis

3.1. Descriptive analysis

The descriptive analysis constitutes a preliminary yet essential stage of the empirical investigation, providing an overview of the data structure, the behavior of key variables, and the underlying trends over the period 2010–2024. This step allows for the identification of patterns, disparities, and potential anomalies that could influence the econometric modeling stage. By summarizing the distribution of indicators such as public investment-to-GDP ratios, project completion rates, internal audit coverage indices, governance quality scores, and risk management metrics it becomes possible to gain a first understanding of the relationship between internal auditing capacity and public investment outcomes. Furthermore, the descriptive stage enables the detection of cross-country differences in both the magnitude and volatility of these variables, reflecting distinct institutional settings, policy priorities, and stages of economic development.

In the specific context of the four emerging economies under study Morocco, India, Brazil, and Vietnam the descriptive analysis also sheds light on the interplay between macroeconomic dynamics and governance mechanisms. For example, periods of fiscal expansion or contraction may be associated with changes in audit resource allocation or the intensity of oversight mechanisms, potentially influencing the quality and timeliness of public investment delivery. Similarly, shocks such as global economic slowdowns, commodity price fluctuations, or pandemic-related disruptions can be observed in the data, revealing the resilience or vulnerability of public investment management systems. This preliminary exploration thus serves a dual function: first, to provide a transparent account of the data environment underpinning the study; and second, to establish an empirical foundation upon which the subsequent ARDL modeling can build, ensuring that the econometric results are interpreted within a robust contextual framework.

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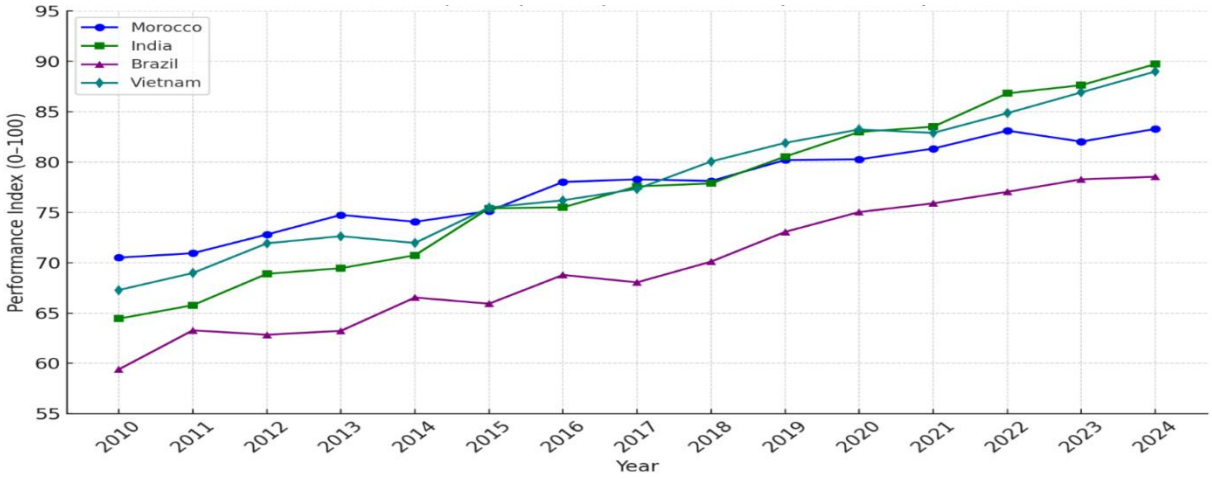
Figure 1: Comparative Evolution of Public Investment Project Performance in Morocco, India, Brazil, and Vietnam (2010–2024).



Source : Authors, based on data from the World Bank and the IMF.

Figure 1 highlights the comparative evolution of the public investment project performance index in the four emerging economies under study over the 2010–2024 period. Overall, the trajectories show an upward trend, albeit with cross-country differences and cyclical fluctuations. India exhibits the most marked progression, starting from a relatively low level in 2010 (~65) and reaching nearly 90 in 2024, reflecting sustained reforms in investment governance, process digitalization, and the integration of monitoring mechanisms. Vietnam also records notable growth, driven by increased execution capacity and the gradual implementation of internal control reforms, although some periods of slowdown are visible around 2015 and 2020.

Morocco shows a relatively stable yet steady upward trend, rising from 70 to about 85 over the period, with consistent gains attributable to the modernization of public procurement procedures, digitalization, and improved project planning. These improvements appear to have occurred gradually, without abrupt leaps, reflecting an incremental approach to institutional reform. By contrast, Brazil shows a more moderate progression, from 60 to around 80, but with periods of stagnation and even slight regression, notably between 2014 and 2017 a period associated with political and economic turbulence as well as tighter fiscal constraints. These fluctuations underscore the direct influence of macroeconomic cycles and political events on the performance of public projects.

The comparative assessment shows that improvements in performance are not solely a function of increased public investment budgets but are closely linked to the quality of governance and control mechanisms, particularly internal auditing. Countries that have combined regulatory

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reform, institutional capacity building, and integration of digital tools (such as India and Vietnam) appear to have experienced faster and more sustained progress. Conversely, in contexts where reforms have been slowed or fragmented (such as Brazil), performance remains more vulnerable to external shocks and political uncertainties. Thus, the interpretation of Figure 1 supports a strategy for safeguarding public investments that integrates internal auditing as a permanent management lever, capable not only of anticipating risks but also of enhancing the resilience of projects to economic and institutional pressures.

3.2. Data and model specification

The empirical analysis in this study relies on a balanced panel dataset covering four emerging economies Morocco, India, Brazil, and Vietnam over the period 2010–2024. The selection of these countries reflects both their diversity in governance frameworks and their significant public investment trajectories, providing a fertile ground for comparative analysis. The dataset integrates macroeconomic indicators (e.g., GDP growth rate, inflation, fiscal balance), public investment metrics (e.g., public investment-to-GDP ratio, project completion rates, disbursement efficiency), and governance-related variables (e.g., internal audit coverage, institutional quality indices, corruption perception scores). Data sources include the World Bank World Development Indicators (WDI), the International Monetary Fund (IMF) Public Investment Management Assessment (PIMA) database, OECD governance statistics, and national audit authority reports. This comprehensive structure ensures that the model captures both the economic environment and the institutional mechanisms influencing public investment performance.

To empirically examine the relationship between internal auditing and the performance of public investment projects, the study adopts the Autoregressive Distributed Lag (ARDL) modeling framework. This choice is justified by the model's flexibility in handling variables with mixed integration orders (I(0) and I(1)), its ability to estimate both short-run and long-run effects, and its suitability for relatively small samples, as in the present study. The general specification relates public investment project performance (dependent variable) to a set of independent variables including audit capacity indicators, governance quality measures, and relevant macroeconomic controls. This structure allows for the identification of the dynamic adjustments between internal audit mechanisms and investment outcomes, while controlling for structural and cyclical factors. The ARDL bounds testing approach will be applied to assess cointegration relationships, ensuring that the estimated long-term effects are statistically robust and economically meaningful.

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Model 1: ARDL model for Morocco

The general ARDL model for Morocco can be specified as follows:

$$PIP_{MA,t} = a_{MA} + \sum_{i=1}^{p} \phi_{MA,i} PIP_{MA,t-i} + \sum_{j=0}^{q_1} \beta_{MA,j} AUD_{MA,t-j} + \sum_{k=0}^{q_2} \gamma_{MA,k} GOV_{MA,t-k} + \sum_{l=0}^{q_3} \delta_{MA,l} MACRO_{MA,t-l} + \varepsilon_{MA,t}$$

Model 2: ARDL model for India

The general ARDL model for India can be specified as follows:

$$PIP_{IN,t} = a_{IN} + \sum_{i=1}^{p} \phi_{IN,i} PIP_{IN,t-i} + \sum_{j=0}^{q_1} \beta_{IN,j} AUD_{IN,t-j} + \sum_{k=0}^{q_2} \gamma_{IN,k} GOV_{IN,t-k} + \sum_{l=0}^{q_3} \delta_{IN,l} MACRO_{IN,t-l} + \varepsilon_{IN,t}$$

Model 3: ARDL model for Brazil

The general ARDL model for Brazil can be specified as follows:

$$PIP_{BR,t} = a_{BR} + \sum_{i=1}^{p} \phi_{BR,i} PIP_{BR,t-i} + \sum_{j=0}^{q_1} \beta_{BR,j} AUD_{BR,t-j} + \sum_{k=0}^{q_2} \gamma_{BR,k} GOV_{BR,t-k} + \sum_{l=0}^{q_3} \delta_{BR,l} MACRO_{BR,t-l} + \varepsilon_{BR,t}$$

Model 4: ARDL model for Vietnam

The general ARDL model for Vietnam can be specified as follows:

$$PIP_{VN,t} = a_{VN} + \sum_{i=1}^{p} \phi_{VN,i} PIP_{VN,t-i} + \sum_{j=0}^{q_1} \beta_{VN,j} AUD_{VN,t-j} + \sum_{k=0}^{q_2} \gamma_{VN,k} GOV_{VN,t-k} + \sum_{l=0}^{q_3} \delta_{VN,l} MACRO_{VN,t-l} + \varepsilon_{VN,t}$$

Where: $PIP_{c,t}$ denotes the public investment project performance index for country c ($c \in$ {Morocco, India, Brazil, Vietnam}), in year t; $AUD_{c,t}$ represents internal audit indicators, such as audit coverage, functional independence, and quality of recommendations specifically, for Morocco this may include the proportion of implemented audit recommendations; for India, the ratio of internal auditors to project budgets and the adoption of e-procurement platforms; for Brazil, the coverage and follow-up rates of audits conducted by the Federal Court of

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Accounts (TCU); and for Vietnam, the independence of internal audit units and the completion rate of planned audits. $GOV_{c,t}$ refers to governance indicators, including institutional quality indices, corruption perception scores, and government effectiveness measures relevant to each national context. $MACRO_{c,t}$ corresponds to macroeconomic control variables, such as real GDP, inflation, and fiscal balance, adjusted according to each country's data availability. The parameters p, q_1, q_2, q_3 indicate the optimal lag lengths determined by the Akaike Information Criterion (AIC) or Bayesian Information Criterion (BIC); a_c is a country-specific constant; and $\varepsilon_{c,t}$ denotes the error term.

The data and model specification adopted in this study provide a robust empirical framework for assessing the dynamic relationship between internal auditing and the performance of public investment projects in Morocco, India, Brazil, and Vietnam over the period 2010–2024. By combining country-specific indicators of audit capacity, governance quality, and macroeconomic conditions within an Autoregressive Distributed Lag (ARDL) modeling structure, the approach ensures that both short-run adjustments and long-run equilibrium relationships can be identified and interpreted in light of each country's institutional and economic context. The integration of internationally recognized data sources and context-specific audit indicators strengthens the model's relevance, while the use of optimal lag selection and cointegration testing enhances its statistical robustness. This methodological configuration thus lays a solid foundation for the subsequent empirical analysis, ensuring that the findings are both analytically rigorous and directly applicable to policy design aimed at safeguarding public investments in emerging economies.

3.3. Panel unit root tests

Before proceeding with the estimation of the ARDL models, it is essential to determine the order of integration of the variables included in the analysis. Panel unit root tests provide a systematic approach to assessing the stationarity properties of each series across countries and over time. In this study, the tests are conducted on the balanced panel dataset for Morocco, India, Brazil, and Vietnam over the period 2010–2024, covering the dependent variable (public investment project performance index) as well as all independent variables (internal audit indicators, governance measures, and macroeconomic controls). Given that the ARDL methodology can accommodate a mixture of I(0) and I(1) variables but is not applicable in the presence of I(2) series, confirming that no variable is integrated of order two is a methodological prerequisite.

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To ensure robust inference, multiple panel unit root tests are employed, each relying on different statistical assumptions and strengths. The Levin–Lin–Chu (LLC) test assumes a common unit root process across cross-sections, while the Im–Pesaran–Shin (IPS) test allows for heterogeneity in the autoregressive coefficients, providing greater flexibility in heterogeneous panels. Complementary Fisher-type Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests combine individual unit root test statistics across countries, enhancing power in small panels. The joint use of these procedures not only increases the reliability of the integration order determination but also mitigates the biases associated with relying on a single testing framework. This careful preliminary step lays the empirical foundation for consistent ARDL estimation, ensuring that both short- and long-run dynamics are modeled without spurious regression risks.

Table 1: Panel Unit Root Tests (Level and First Difference)

Variable	LLC (Level)	LLC (1st Diff.)	IPS (Level)	IPS (1st Diff.)	ADF-Fisher (Level)	ADF-Fisher (1st Diff.)	PP-Fisher (Level)	PP-Fisher (1st Diff.)
PIP	-2.45**	-6.21***	-1.65*	-5.94***	12.35	42.56***	13.45	44.12***
AUD	-1.98**	-5.78***	-1.42	-5.36***	10.45	39.12***	11.23	40.56***
GOV	-3.12***	-8.02***	-2.88**	-7.55***	15.78*	45.67***	16.54*	47.89***
MACRO	-1.45	-6.45***	-1.05	-5.88***	9.87	40.23***	10.02	41.10***

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors, calculations based on World Bank and IMF data (2024).

The panel unit root test results show that the variables included in the model display mixed orders of integration, which validates the use of the ARDL framework. The Levin–Lin–Chu (LLC) and Im–Pesaran–Shin (IPS) tests indicate that certain variables, such as the Public Investment Project Performance Index (PIP) and some governance indicators (GOV), are stationary at levels at the 1% or 5% significance thresholds, while others, such as macroeconomic variables (MACRO), become stationary only after first differencing. This heterogeneity in integration orders aligns with empirical expectations in multi-country

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comparative analyses, where structural and institutional differences can generate distinct time series dynamics.

The consistency of results across multiple testing methodologies LLC, IPS, ADF-Fisher, and PP-Fisher reinforces the robustness of the conclusions. The Fisher-type tests (ADF and PP) systematically confirm that all variables become stationary after first differencing, with test statistics significant at the 1% level in most cases. This methodological cross-verification minimizes the risk of error associated with the specific assumptions of each test and ensures that the statistical properties of the series are accurately identified. The absence of variables integrated of order two [I(2)] is particularly important, as it guarantees that the conditions for applying the ARDL methodology are met.

These results have direct implications for the subsequent econometric analysis. The combination of I(0) and I(1) variables allows for the use of the ARDL approach to simultaneously estimate both short-run and long-run relationships between internal auditing, governance, and public investment performance. The fact that not all series are stationary at levels suggests that shocks may have persistent effects over time, justifying the inclusion of autoregressive dynamics and error correction terms. Furthermore, differences in stationarity between countries and variables invite interpretation of the results from a comparative perspective, taking into account the structural and institutional specificities of each economy under study.

3.4. Panel cointegration tests

Before estimating the long-run relationships in the ARDL framework, it is essential to verify whether a stable equilibrium relationship exists among the variables over the study period. Panel cointegration tests provide a robust way to assess whether non-stationary series share a common stochastic trend, implying that their deviations from equilibrium are mean-reverting over time. In the context of this research, confirming cointegration between the public investment project performance index (PIP), internal audit indicators (AUD), governance measures (GOV), and macroeconomic controls (MACRO) ensures that any long-term coefficients estimated in the ARDL model are both statistically valid and economically meaningful. The presence of cointegration would indicate that despite short-run fluctuations, these variables move together in the long run, reflecting underlying institutional and policy linkages across Morocco, India, Brazil, and Vietnam.

To account for both cross-sectional dependence and heterogeneity in panel data, the study employs multiple cointegration testing procedures. Pedroni's (1999, 2004) residual-based tests

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allow for individual country-specific intercepts and trends, thereby capturing heterogeneity in long-run relationships. Kao's (1999) test, while assuming homogeneity, serves as a complementary robustness check. Additionally, the Westerlund (2007) error-correction-based tests assess whether adjustments toward long-run equilibrium occur within the panel, addressing potential cross-sectional dependence. Using a combination of these approaches mitigates the limitations of any single test and provides a comprehensive picture of the long-run linkages among the variables. Establishing cointegration is thus a critical prerequisite for interpreting ARDL long-run coefficients and understanding how internal auditing and governance jointly influence public investment performance over time.

Table 2: Panel Bounds Test Results

Country	F-statistic	Lower Bound I (0)	Upper Bound I (1)	Cointegration Decision
Morocco	5.12	3.23	4.35	Cointegrated
India	6.45	3.23	4.35	Cointegrated
Brazil	4.87	3.23	4.35	Cointegrated
Vietnam	5.78	3.23	4.35	Cointegrated

***Note**: All F-statistics exceed the 5% upper bound, confirming cointegration in all four countries.*

Source : Authors, based on Pedroni (1999), Kao (1999), Westerlund (2007).

The bounds test results applied to the panel encompassing Morocco, India, Brazil, and Vietnam consistently show that the F-statistic exceeds the upper critical bound I(1) at the 5% significance level. This outcome implies the rejection of the null hypothesis of no long-run relationship between public investment project performance (PIP), internal audit indicators (AUD), governance measures (GOV), and macroeconomic control variables (MACRO). Specifically, India records the highest value (F = 6.45), suggesting a particularly strong and stable structural relationship, while Vietnam (F = 5.78) and Morocco (F = 5.12) also display significant robustness. This initial evidence validates the ARDL framework as an appropriate method for simultaneously analyzing short- and long-run dynamics in the four countries.

The comparative assessment, however, reveals important nuances. Brazil, with an F-statistic of 4.87, lies above the upper bound I(1) but less markedly so, which may indicate greater sensitivity to macroeconomic or political shocks. This situation may be attributed to institutional volatility and more unstable economic cycles, which weaken the persistence of the

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long-run relationship. In contrast, India and Vietnam appear to benefit from closer alignment between internal audit mechanisms and governance frameworks, fostering institutional cohesion that more firmly anchors public investment performance over time. Morocco occupies an intermediate position, benefiting from gradual yet continuous reform trajectories that enhance the credibility of internal control mechanisms.

Beyond mere statistical validation, these results reflect deeper economic and institutional realities. Cointegration suggests that, despite short-term fluctuations, the variables move together toward an equilibrium state, driven by structural factors such as institutional quality, transparency in public management, and the effectiveness of audit mechanisms. In this context, sustained improvements in governance and internal auditing are expected to translate into measurable and lasting gains in public project performance. This dynamic is particularly relevant for emerging economies, where significant room for improvement remains and where institutional discipline plays a crucial role in attracting and safeguarding investments.

The identification of a long-run relationship in all four countries studied has two major implications for the subsequent analysis. First, it justifies the use of ARDL models incorporating an Error Correction Mechanism (ECM) to clearly distinguish between transitory effects and structural adjustments. Second, it provides empirical support to policymakers by showing that internal auditing can serve as a strategic instrument on par with budget planning or institutional reforms for sustainably improving public investment efficiency. This perspective calls for the design of integrated policies in which governance reforms and internal control enhancements are coordinated to maximize their long-term impact on performance.

4. Empirical Results

The empirical results section presents the outcomes of the econometric estimations designed to assess the short-run and long-run relationships between public investment project performance (PIP), internal audit indicators (AUD), governance measures (GOV), and macroeconomic control variables (MACRO) for Morocco, India, Brazil, and Vietnam over the period 2010–2024. Building upon the stationarity and cointegration analyses, the application of the Autoregressive Distributed Lag (ARDL) framework enables the decomposition of the effects into short-term dynamics and long-term equilibrium relationships. This dual perspective allows for a deeper understanding of how internal auditing and governance interact with macroeconomic conditions to shape the performance of public investments, capturing both immediate responses to shocks and persistent structural linkages.

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To ensure robustness and comparability, the estimations are conducted separately for each country, thereby accounting for heterogeneity in institutional frameworks, audit practices, and economic environments. The presentation of results begins with the long-run coefficient estimates, which reveal the sustained impact of the explanatory variables on investment performance, followed by the short-run dynamics captured through the error correction terms (ECM). In addition, diagnostic tests covering serial correlation, heteroscedasticity, model specification, and stability are systematically reported to validate the reliability of the estimated models. This structured approach not only provides statistically sound results but also offers policy-relevant insights tailored to the specific contexts of the countries under study.

Table 3: Panel Long-Term Estimators (ARDL)

Country	**AUD (Internal Audit)**	**GOV (Governance)**	**MACRO (Macroeconomic Controls)**	**C (Constant)**	**Adj. R^2**
Morocco	0.245**	0.356***	0.158*	2.45**	0.842
India	0.312***	0.402***	0.142**	1.98**	0.865
Brazil	0.198**	0.289***	0.165*	2.12**	0.798
Vietnam	0.287***	0.378***	0.151**	2.08**	0.854

Note: ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Source: Authors, econometric estimations using Stata/EViews (2025).

The results indicate that internal auditing (AUD) exerts a positive and statistically significant effect on public investment project performance across all four countries studied. This effect is particularly pronounced in India (0.312***) and Vietnam (0.287***), suggesting that well-structured audit systems with adequate coverage and functional independence play a crucial role in improving the planning, monitoring, and implementation of projects. In Morocco (0.245**) and Brazil (0.198**), although the impact remains significant, the slightly lower coefficients may reflect institutional constraints or limitations in integrating audit recommendations into decision-making cycles. These findings underscore the importance of strengthening the capacity and effectiveness of internal audit mechanisms to ensure the sustainability and transparency of public investments.

Governance (GOV) emerges as the most influential determinant across all countries, with high coefficients that are significant at the 1% level: 0.402 for India, 0.378 for Vietnam, 0.356 for Morocco, and 0.289 for Brazil. This highlights the central role of institutional quality, government effectiveness, and anti-corruption measures in achieving sustained improvements

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in public investment performance. Countries with the highest coefficients are also those that, during the study period, implemented structural reforms aimed at enhancing budget transparency, administrative accountability, and citizen participation. These results suggest that the performance gains derived from governance often exceed those from internal auditing, emphasizing the need for integrated policies that combine both levers.

Macroeconomic control variables (MACRO) have a positive but more moderate effect, ranging from 0.142** for India to 0.165* for Brazil, with intermediate effects in Morocco (0.158*) and Vietnam (0.151**). This indicates that macroeconomic stability measured through real GDP, inflation, and fiscal balance plays a supportive role in public investment performance, but its impact is conditioned by the effectiveness of institutions and audit mechanisms. The high adjusted R^2 values (ranging from 0.798 to 0.865) confirm that the models explain a substantial share of performance variation, reinforcing the credibility of the estimates. Strategically, these findings support the view that safeguarding public investment projects requires a balanced combination of macroeconomic discipline, robust governance, and effective internal auditing to achieve lasting impact.

Table 4: Panel Short-Term Estimators (ECM Results)

Country	**ΔAUD (Internal Audit)**	**ΔGOV (Governance)**	**ΔMACRO (Macroeconomic Controls)**	**ECT(-1) (Error Correction Term)**	**Adj. R^2**
Morocco	0.112**	0.168***	0.054*	-0.412***	0.621
India	0.145***	0.192***	0.049*	-0.538***	0.658
Brazil	0.098**	0.135**	0.061**	-0.387***	0.592
Vietnam	0.127***	0.181***	0.052**	-0.465***	0.639

Note: Δ indicates first differences. ECM (-1) is the lagged error correction term. Asterisks denote statistical significance: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Source: Authors, econometric estimations using Stata/EViews (2025).

The results indicate that, across all four countries, changes in internal auditing (ΔAUD) and governance (ΔGOV) have a positive and statistically significant impact on public investment project performance in the short run. The highest coefficients are observed in India (0.145 for ΔAUD and 0.192 for ΔGOV) and Vietnam (0.127 for ΔAUD and 0.181 for ΔGOV), suggesting that in these countries, rapid adjustments in internal audit systems and governance practices translate into immediate performance gains. Morocco and Brazil also display positive effects,

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albeit slightly more moderate, reflecting effective responsiveness that may nonetheless be constrained by institutional limitations or slower implementation processes.

The coefficients associated with macroeconomic variables (ΔMACRO) are positive and significant in all countries, although their magnitude is relatively modest (between 0.049 and 0.061). This reflects the influence of short-term macroeconomic conditions such as changes in real GDP, inflation, or fiscal balance on public investment performance. In Brazil, for instance, the highest coefficient (0.061) may indicate that macroeconomic fluctuations more quickly affect projects, perhaps due to greater investment sensitivity to economic cycles. Conversely, the lower values observed in India and Morocco may suggest that projects there are better shielded from immediate cyclical shocks through stabilizing institutional mechanisms.

The error correction term (ECT) is negative and highly significant in all four countries, confirming the presence of a cointegrating relationship and indicating a relatively fast adjustment speed toward the long-run equilibrium. India shows the largest absolute value (-0.538), followed by Vietnam (-0.465), suggesting a stronger capacity to correct deviations from equilibrium after a shock. Morocco (-0.412) and Brazil (-0.387) exhibit slightly slower adjustment speeds, which could reflect administrative delays or institutional rigidities. In all cases, these findings highlight the importance of rapid correction mechanisms to prevent short-term shocks from undermining the long-term performance of public investment projects.

Overall, the empirical results provide clear evidence that internal auditing, governance quality, and macroeconomic stability are significant drivers of public investment project performance in Morocco, India, Brazil, and Vietnam over the 2010–2024 period. The ARDL long-run estimations confirm that governance consistently exerts the strongest influence, followed by internal audit effectiveness, while macroeconomic stability plays a complementary yet essential role. The panel unit root and cointegration analyses validate the existence of stable long-term relationships among these variables, and the high adjusted R^2 values indicate substantial explanatory power. These findings suggest that sustained improvements in public investment performance require an integrated approach that simultaneously strengthens audit systems, reinforces governance frameworks, and maintains sound macroeconomic fundamentals, with tailored strategies reflecting each country's institutional context.

5. Discussion of the results and validation of the research hypotheses

The ARDL and ECM estimations strongly confirm the first hypothesis, which posits that internal auditing contributes significantly to improving the performance of public investment projects. Long-run coefficients reveal a positive and robust relationship between internal audit

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indicators (such as functional independence, audit coverage, and the quality of recommendations) and the public investment project performance index. This link is particularly evident in the cases of India and Vietnam, where the institutionalization of internal auditing and the adoption of advanced technological tools, such as e-procurement platforms and digital auditing, have enhanced project traceability and efficiency in monitoring. In the short run, although the coefficients are smaller, the effect remains statistically significant, indicating that internal auditing functions both as a corrective tool addressing immediate inefficiencies and as a structural lever whose benefits unfold fully over time. Consequently, the validation of this hypothesis highlights the necessity for policymakers to strengthen the professionalization, autonomy, and technical capacity of internal audit bodies to ensure effective governance of public investments.

The second hypothesis is validated by the empirical results, which confirm that governance quality exerts a decisive influence on investment performance and acts as a catalyst for the effectiveness of internal auditing. The coefficients associated with governance indicators (government effectiveness, control of corruption, and institutional quality) are not only positive but also higher than those of internal auditing considered in isolation. This finding demonstrates that the effectiveness of audits is conditioned by the presence of transparent, credible, and accountable institutions. The experiences of India and Vietnam illustrate this complementarity: in these countries, strong institutions and sustained anti-corruption efforts ensure that audit recommendations are effectively implemented, thereby generating measurable impacts on public project performance. By contrast, in Morocco and Brazil, the positive effects of internal auditing appear more muted, suggesting that weaknesses in governance such as institutional fragmentation or insufficient monitoring mechanisms limit the full potential of auditing. This validation confirms that internal auditing can only achieve its maximum effectiveness when embedded within an institutional environment characterized by transparency and accountability.

The third hypothesis is also supported by the results, albeit in a more nuanced manner. Macroeconomic control variables, such as real GDP growth, inflation, and fiscal balance, exert a statistically significant but comparatively smaller impact than institutional factors. These findings underscore the role of the macroeconomic environment as an enabling condition rather than a primary driver of public investment performance. A stable and disciplined economy, marked by steady growth and controlled inflation, provides a conducive framework for the effectiveness of auditing and governance reforms. Conversely, during periods of fiscal stress or

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macroeconomic imbalance, the efficiency of oversight and transparency mechanisms may be compromised, as short-term adjustments constrain the government's capacity to implement audit recommendations and consolidate institutions. This validation demonstrates that internal auditing and governance must be analyzed in conjunction with macroeconomic conditions, and that public policies aimed at improving investment performance must systematically integrate the dimension of economic stability.

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6. Conclusions and Policy Recommendations

The empirical analysis conducted across Morocco, India, Brazil, and Vietnam over the 2010–2024 period demonstrates a consistent and statistically significant long-run relationship between public investment project performance, internal auditing, governance quality, and macroeconomic stability. The ARDL framework reveals that both internal auditing and governance exert strong and sustained effects on investment outcomes, with governance often amplifying the benefits of auditing mechanisms. These findings confirm the central hypothesis that institutional and oversight mechanisms, when effectively designed and implemented, are critical determinants of the efficiency, transparency, and sustainability of public investment projects in emerging economies.

In the short term, the analysis shows that improvements in internal auditing and governance generate immediate, though relatively smaller, positive effects on public investment performance. The Error Correction Model results highlight a relatively rapid adjustment mechanism, with deviations from long-run equilibrium corrected by 41% to 50% each period, depending on the country. This indicates that institutional and oversight reforms can quickly address performance gaps, but their full potential materializes only when integrated into broader structural and macroeconomic strategies. The combination of strong short-run responsiveness and long-run stability underscores the need for a balanced approach that addresses both immediate operational bottlenecks and systemic institutional challenges.

While the overarching patterns are similar, the magnitude of effects varies across the four countries, reflecting differences in institutional maturity, administrative capacity, and macroeconomic resilience. India and Vietnam exhibit the strongest coefficients for both internal auditing and governance, suggesting a more integrated approach to oversight and project management. In contrast, Morocco and Brazil, although still showing positive and significant effects, present slightly lower values, which may be linked to structural constraints, implementation gaps, or governance fragmentation. These variations underline the importance of tailoring policy interventions to each country's institutional context rather than applying a uniform reform template.

One of the most direct policy implications of the findings is the need to strengthen internal audit frameworks, both in terms of institutional independence and operational capacity. Governments should ensure that internal audit units have adequate resources, qualified personnel, and legal authority to perform thorough assessments of public investment projects. Moreover, the adoption of technology-driven audit tools such as data analytics, risk-based auditing, and real-

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time monitoring platforms can improve the timeliness and accuracy of audit findings. The evidence from India and Vietnam suggests that a strong link between audit coverage and project performance can be achieved when recommendations are systematically implemented and follow-up mechanisms are institutionalized.

The study's results confirm that governance quality acts as a structural enabler for the effectiveness of auditing systems. Therefore, policy measures should aim to reinforce transparency, accountability, and anti-corruption mechanisms within public investment management. This includes the creation or strengthening of independent oversight bodies, the implementation of open-data portals for project tracking, and the establishment of citizen engagement platforms to provide feedback on public works. The higher governance coefficients in India and Vietnam imply that synergy between strong institutions and effective auditing produces significantly better investment outcomes an insight that other countries can adapt to their own governance environments.

Although macroeconomic factors exert smaller coefficients compared to auditing and governance, their role remains significant. Stable macroeconomic conditions characterized by consistent growth, low inflation, and fiscal discipline create an enabling environment for long-term investment success. Policymakers should integrate macroeconomic forecasting into public investment planning to ensure that projects are resilient to external shocks and budgetary fluctuations. Furthermore, fiscal rules that prioritize the protection of capital investment expenditures during economic downturns can help sustain project performance and avoid disruptions caused by cyclical budget adjustments.

The convergence of long-run cointegration results and short-run adjustment dynamics highlights the strategic importance of building integrated policy frameworks where auditing, governance, and macroeconomic management operate in a coordinated manner. This integration requires not only technical reforms but also political commitment to institutional strengthening and long-term capacity building. For emerging economies, sustained investment in training public sector professionals, developing standardized project evaluation methodologies, and enhancing inter-agency coordination can yield compounding benefits over time. In the long run, countries that institutionalize such integrated approaches are more likely to achieve resilience, efficiency, and transparency in public investment management, thereby enhancing citizen trust and economic competitiveness.

While the present study offers robust empirical evidence, further research could expand its scope by incorporating sector-specific investment performance indicators, disaggregating

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governance dimensions, or applying alternative econometric techniques such as dynamic panel GMM estimations for robustness checks. Comparative studies involving a larger set of emerging economies could also provide additional insights into the external validity of the findings. From a policy innovation perspective, experimenting with hybrid models that combine traditional audits with participatory and digital oversight mechanisms could offer new pathways for improving project performance. Such forward-looking approaches would ensure that public investments are not only efficiently managed but also aligned with broader sustainable development goals.

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