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THE IMPACT OF RISK ALLOCATION ON INVESTMENT EFFICIENCY IN PUBLIC–PRIVATE PARTNERSHIP (PPP) PROJECTS

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Abstract. This article examines the impact of risk allocation on investment efficiency in Public–Private Partnership (PPP) projects. The study analyzes the main PPP models, key risk categories, and their influence on cost control, service quality, revenue stability, financial sustainability, and investor confidence. The findings show that effective and balanced risk allocation between public and private partners is a crucial factor in improving project performance and ensuring the long-term sustainability of PPP investments.

Keywords: Public–Private Partnership, PPP, risk allocation, investment efficiency, financial sustainability, private investment, infrastructure projects.

Аннотация. В статье рассматривается влияние распределения рисков на инвестиционную эффективность проектов государственно-частного партнерства (ГЧП). Проанализированы основные модели ГЧП, ключевые категории рисков и их влияние на контроль затрат, качество услуг, стабильность доходов, финансовую устойчивость и доверие инвесторов. Результаты исследования показывают, что эффективное и сбалансированное распределение рисков между государственным и частным партнерами является важным фактором повышения результативности проектов и обеспечения долгосрочной устойчивости инвестиций в ГЧП.

Ключевые слова: государственно-частное партнерство, ГЧП, распределение рисков, инвестиционная эффективность, финансовая устойчивость, частные инвестиции, инфраструктурные проекты.

INTRODUCTION

Public–Private Partnership (PPP) has become one of the most important institutional mechanisms for financing and implementing large-scale infrastructure and public service projects. In modern economic conditions, governments increasingly rely on PPP arrangements to attract private capital, improve the quality of infrastructure, reduce pressure on public budgets, and enhance the efficiency of investment projects. Through cooperation between the public and private sectors, PPP projects create opportunities to combine public interests with private sector financial resources, managerial experience, and technological capabilities.

However, the successful implementation of PPP projects is closely related to the effective identification, assessment, and allocation of risks. Since PPP projects are usually long-term and capital-intensive, they are exposed to various construction, operational, financial, legal, political, market, environmental, and demand-related risks. If these risks are not properly allocated between public and private partners, project costs may increase, expected revenues may decline, and investor confidence may weaken. Therefore, risk allocation is not only a contractual issue, but also a key factor influencing the investment efficiency and long-term sustainability of PPP projects.

The main principle of effective risk allocation is that each risk should be assigned to the party best able to manage, control, or mitigate it at the lowest cost. When risks are allocated appropriately, PPP projects can achieve better cost control, higher service quality, more stable revenues, improved financial sustainability, and stronger value for money. Conversely, excessive or poorly structured risk transfer may reduce the attractiveness of projects for private investors and create additional fiscal burdens for the public sector.

The purpose of this article is to analyze the impact of risk allocation on investment efficiency in Public–Private Partnership projects. The study examines the main types of PPP models, identifies key risk categories affecting project performance, and evaluates how balanced risk-sharing mechanisms contribute to improving financial stability, investor confidence, and long-term project effectiveness.

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LITERATURE REVIEW

Public–Private Partnership (PPP) projects have become an important mechanism for attracting private capital, improving infrastructure development, and enhancing the efficiency of public investment. In this context, risk allocation is one of the key factors determining the financial viability and investment efficiency of PPP projects. The existing literature shows that the success of PPP arrangements depends not only on the availability of financial resources, but also on the proper distribution of construction, legal, financial, operational, market, and political risks between public and private partners.

Land acquisition can be one of the most challenging aspects of developing a PPP project. Delays in obtaining land have created significant hurdles or even blocked some promising PPP projects. There are many options for dealing with risk associated with land acquisition delays or difficulties. Some governments adopted a policy of freeing land before launching a project to the market, thereby accepting and taking this risk out of the contractual equation—such as for transport projects in India. Others allocate to the private party the responsibility for identifying the plots of land that will be needed for the project, and for undertaking the necessary processes to acquire that land and free it from occupancy. Still others prepare carefully the land acquisition process, detailing the need for land and the identification of owners, but then transfer to the private partner the responsibility for obtaining the land. The best option may depend on circumstances—not least the prevailing legislation regarding compulsory acquisition of land[1].

A comprehensive review conducted by Nur Alkaf Abd Karim in “Risk Allocation in Public-Private Partnership (PPP) Project: A Review on Risk Factors” [1] classified PPP risks into ten major categories, including political, construction, legal, economic, operational, market, project finance, project selection, relationship, and natural risks. The study found that changes in law, delays in project approvals, and land acquisition issues are among the most frequently occurring risks in PPP projects worldwide. The author argues that identifying and allocating these risks appropriately is essential for improving project efficiency and attracting private investment.

In the scientific literature, risk allocation is considered one of the central mechanisms for improving investment efficiency in Public–Private Partnership (PPP) projects. Pauline Hovy, in the discussion paper “Risk Allocation in Public-Private Partnerships: Maximizing Value for Money” [2], emphasizes that optimal risk allocation is a key driver of value for money in PPP projects. According to the author, PPP models allow governments to transfer certain risks, such as construction cost overruns, delays, and long-term maintenance risks, to the private sector. However, excessive or inappropriate risk transfer may reduce value for money and weaken the financial attractiveness of the project for private investors.

The Public–Private Partnership (PPP) mechanism represents an important institutional tool for the efficient implementation of large-scale investment projects, the modernization of strategic sectors of the economy, and the achievement of sustainable long-term economic growth by harmonizing the financial and economic interests of both the public and private sectors [3].

In the literature on Public–Private Partnership (PPP) projects, financing mechanisms and economic analysis are considered essential factors in improving investment efficiency. S.D. Bakirov, in the article “Financing Public–Private Partnership (PPP) Projects and Their Economic Analysis” [4], examines the role of PPP mechanisms in attracting private investors to infrastructure projects supported by public and local authorities. The author emphasizes that successful PPP implementation depends on effective financial mechanisms, a favourable investment environment, and a strong legal framework.

The successful implementation of Public–Private Partnership (PPP) projects is largely determined by the effectiveness of long-term economic risk management and the proper structuring of risk allocation mechanisms. The study findings reveal that the principle of allocating risks to the party best positioned to manage them constitutes a critical institutional and financial framework for enhancing the financial sustainability, operational efficiency, and long-term viability of PPP projects [5].

Thus, the reviewed literature demonstrates that effective risk allocation is directly linked to the investment efficiency of PPP projects. Studies by Karim, Hovy, Bakirov, Ollokulova, and Ergashev confirm that risks should be assigned to the party most capable of managing them, while excessive or poorly structured risk transfer may reduce investor confidence and weaken project sustainability. Therefore, a balanced, transparent, and flexible risk allocation mechanism can be considered a necessary condition for improving the financial stability, value for money, and long-term effectiveness of PPP projects.

1 https://ppp.worldbank.org/allocating-risks

RESEARCH METHODOLOGY

This study employs a qualitative research approach based on a comprehensive review and analysis of academic literature, international reports, and institutional publications related to Public–Private Partnership (PPP) projects and risk allocation practices. Comparative analysis was used to examine different PPP models and their approaches to risk distribution. In addition, descriptive and analytical methods were applied to assess the relationship between risk allocation mechanisms and investment efficiency. The study draws upon international experiences and theoretical frameworks developed by the World Bank, UNESCAP, and leading scholars in the field of PPP risk management. The findings are synthesized to identify the key risk categories affecting PPP projects and to evaluate their impact on project performance, financial sustainability, and investment efficiency.

ANALYSIS AND RESULTS

Public–Private Partnership (PPP) projects can be implemented through various contractual models that differ in terms of asset ownership, investment responsibilities, risk allocation, and contract duration. The selection of an appropriate PPP model plays a crucial role in determining the efficiency of project implementation and the distribution of risks between public and private partners. International practice demonstrates that different PPP structures are designed to address specific infrastructure and service delivery needs, ranging from short-term management contracts to long-term concession agreements and privately financed ownership models. Understanding the characteristics of these models is essential for evaluating how risk allocation influences investment efficiency and project performance. Table 1 presents the main classifications of PPP models and their key features (Table 1).

Table 1
Classification of Public–Private Partnership (PPP) Models

Broad Category	Main Variants	Ownership of Capital Assets	Responsibility for Investment	Assumption of Risk	Duration of Contract (Years)
Supply and Management Contract	Outsourcing	Public	Public	Public	1–3
Supply and Management Contract	Maintenance Management	Public	Public/Private	Public/Private	3–5
Supply and Management Contract	Operational Management	Public	Public	Public	3–5
Turnkey	Turnkey	Public	Public	Public/Private	1–3
Affermage/Lease	Affermage	Public	Public	Public/Private	5–20
Affermage/Lease	Lease (BLT)	Public	Public	Public/Private	5–20
Concessions	Franchise	Public/Private	Public/Private	Public/Private	3–10
Concessions	BOT, BTO, BOOT, BROT	Public/Private	Public/Private	Public/Private	15–30
Private Ownership of Assets and PFI Type	BOO/DBFO	Private	Private	Private	Indefinite
Private Ownership of Assets and PFI Type	PFI	Public/Private	Private	Public/Private	10–20
Private Ownership of Assets and PFI Type	Divesture	Private	Private	Private	Indefinite

Source: Adapted from UNESCAP (2011), *A Guidebook on Public–Private Partnership in Infrastructure*; cited in Karim N.A.A. (2011), *Risk Allocation in Public-Private Partnership (PPP) Project: A Review on Risk Factors*, International Journal of Sustainable Construction Engineering & Technology, 2(2), pp. 8–16.

The classification presented in Table 1 demonstrates that PPP models differ significantly in terms of asset ownership, investment obligations, risk allocation, and contractual duration. Short-term arrangements, such as outsourcing, maintenance management, and turnkey contracts, are characterized by limited private sector involvement, with the public sector retaining ownership of assets and assuming most investment responsibilities.

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Consequently, the majority of project risks remain under public control, resulting in relatively lower incentives for private-sector innovation and efficiency improvements.

In contrast, concession-based models, including Franchise, BOT, BTO, BOOT, and BROT arrangements, involve a more balanced distribution of ownership rights, investment responsibilities, and risks between public and private partners. These models are particularly suitable for large-scale infrastructure projects because they encourage private investment while allowing governments to benefit from private-sector expertise, technology, and managerial capabilities. The longer contractual periods associated with concession agreements also enable investors to recover their capital expenditures and generate sustainable returns.

The highest level of private-sector participation is observed in BOO, DBFO, and Divestiture models, where private entities assume full responsibility for financing, ownership, and risk management. While these arrangements may enhance investment efficiency by promoting cost control, operational effectiveness, and innovation, they also expose private investors to greater financial and market-related risks. Therefore, the success of such models depends heavily on the existence of a stable legal, regulatory, and economic environment.

Overall, the analysis suggests that the degree of risk transfer increases as PPP arrangements move from traditional management contracts toward concession and private ownership models. This finding supports the view that investment efficiency in PPP projects is closely linked to the allocation of risks among project participants. Appropriately assigning risks to the parties best able to manage them can improve project performance, reduce transaction costs, strengthen investor confidence, and enhance the long-term sustainability of PPP investments.

The effectiveness of Public–Private Partnership (PPP) projects largely depends on the proper identification, assessment, and allocation of project-related risks. Since PPP arrangements involve long-term cooperation between public and private entities, various categories of risks may influence project costs, service quality, revenue generation, and overall investment performance. International experience suggests that assigning risks to the parties best equipped to manage them enhances project efficiency and reduces the likelihood of financial losses. Therefore, understanding the relationship between different risk categories and investment outcomes is essential for improving the sustainability and success of PPP initiatives. Figure 1 illustrates the major risk categories that affect investment efficiency in PPP projects and highlights their direct impact on key performance dimensions (Figure 1).

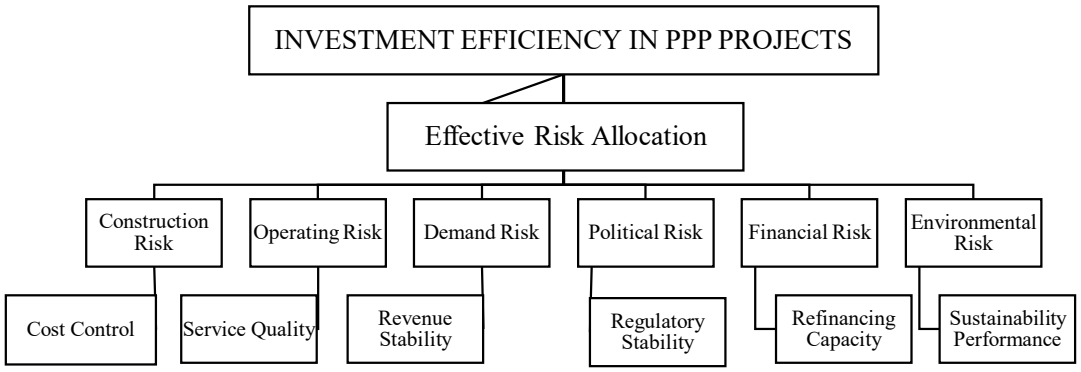

Figure 1. Major Risk Categories Affecting Investment Efficiency in Public–Private Partnership (PPP) Projects[2]

As illustrated in Figure 1, investment efficiency in PPP projects is significantly influenced by the effectiveness of risk allocation mechanisms. The figure demonstrates that different categories of risks affect specific dimensions of project performance, making balanced risk-sharing a critical prerequisite for achieving successful investment outcomes. Construction risk primarily affects cost control, as delays, design changes, and cost overruns may substantially increase project expenditures and reduce financial efficiency. Similarly, operating risk directly influences service quality, since ineffective operational management can lead to lower performance standards and reduced user satisfaction.

Demand risk is closely associated with revenue stability because actual demand for infrastructure services may differ from initial forecasts, affecting the project's ability to generate expected cash flows. Political and regulatory risks influence regulatory stability, as changes in government policies, legislation, or contractual

2 Source: Compiled by the author based on World Bank PPP Reference Guide

conditions may create uncertainty for investors and negatively affect project viability. Financial risk, particularly refinancing and interest-rate risks, determines the capacity of project sponsors to secure long-term financing under favorable conditions. Meanwhile, environmental risk has a direct impact on sustainability performance, as environmental compliance requirements and climate-related challenges increasingly shape the long-term success of infrastructure investments.

The figure further indicates that effective risk allocation serves as a connecting mechanism between these risk categories and investment efficiency. International PPP practice suggests that risks should be assigned to the party best able to manage, mitigate, and absorb them at the lowest possible cost. Consequently, projects characterized by balanced risk allocation tend to achieve better cost control, more stable revenues, improved service delivery, stronger investor confidence, and greater long-term sustainability. Therefore, risk allocation can be regarded as one of the most important determinants of investment efficiency in Public–Private Partnership projects.

CONCLUSION AND RECOMMENDATIONS

The study concludes that risk allocation is a critical factor influencing investment efficiency in Public–Private Partnership (PPP) projects. The findings indicate that balanced risk-sharing mechanisms improve financial sustainability, strengthen investor confidence, enhance service quality, and increase the overall effectiveness of PPP investments. Conversely, inappropriate risk allocation may lead to higher project costs, reduced investment attractiveness, and weaker project performance.

To improve investment efficiency, risks should be allocated to the parties best able to manage them. Governments should establish transparent risk allocation frameworks, strengthen the legal and regulatory environment, and ensure balanced sharing of political, financial, and operational risks. These measures will contribute to the successful implementation and long-term sustainability of PPP projects.

Based on the results of the study, the following recommendations can be proposed:

First, PPP projects should be developed on the basis of a clear and transparent risk allocation framework. Each major risk category should be identified at the project preparation stage and assigned to the party that has the greatest capacity to manage or mitigate it.

Second, governments should avoid transferring excessive risks to private investors, especially political, regulatory, land acquisition, and force majeure risks, which are often beyond the control of the private sector. Such risks should be retained by the public sector or shared through balanced contractual mechanisms.

Third, financial and demand-related risks should be carefully assessed before project implementation. Revenue forecasts, refinancing conditions, currency risks, and long-term payment obligations must be evaluated in order to ensure project bankability and investment sustainability.

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