

PUBLIC-PRIVATE PARTNERSHIPS UNDER FISCAL CONSTRAINTS: COST OF CAPITAL AND INVESTMENT LEVERAGE IN UKRAINE'S GREEN RECONSTRUCTION

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Abstract: This article examines how public–private partnerships can influence financing costs and investment mobilisation for Ukraine’s green reconstruction under fiscal constraints. The methodology combines institutional and comparative literature analysis, conceptual analysis of the weighted average cost of capital and net present value, and illustrative investment leverage scenarios. Regulatory predictability, creditor protection, procedural transparency, and appropriate risk allocation are identified as potential channels for reducing risk premiums and transaction costs. The scenarios assume public capital contributions of 1.0–1.5% of a common reference GDP and aggregate investment leverage ratios of 3–5. These assumptions yield total investment of 3.0–7.5% of reference GDP, with non-government capital accounting for 66.7–80.0% of total financing. These figures illustrate financing relationships rather than forecasts or empirically estimated mobilisation effects. Guarantees and future availability payments require fiscal assessment separate from public capital contributions. The proposed framework connects institutional conditions, financing costs, investment structure, and environmental requirements, supporting subsequent project appraisal and empirical testing. Environmental benefits depend on investment in low-carbon and climate-resilient infrastructure, measurable contractual requirements, and implementation monitoring. The findings emphasise project preparation, appropriate risk allocation, environmental performance requirements, and fiscal oversight as complementary conditions for green reconstruction.

Keywords: public-private partnership, green reconstruction, investment leverage, infrastructure projects, fiscal constraints, environmental effect.

1. Introduction. The reconstruction and modernisation of Ukraine’s infrastructure are taking place amid a substantial gap between the scale of investment needs and the capacity of the state budget to finance them. According to the Fifth Rapid Damage and Needs Assessment, Ukraine’s total reconstruction and recovery needs over the coming decade are estimated at nearly USD 588 billion, with transport, energy, and housing infrastructure accounting for the largest shares [1]. The high capital intensity of infrastructure projects, their lengthy implementation periods, limited access to long-term finance, and heightened investment risks necessitate the mobilisation of private capital.

One mechanism for mobilising additional investment is public–private partnership (PPP), which facilitates long-term cooperation between the public and private sectors, the allocation of risks and responsibilities, and the combination of public, private, and international financing [2]. In the context of green reconstruction, its significance extends beyond the financing of individual infrastructure assets. PPPs can support projects aimed at improving energy efficiency, reducing emissions and resource losses, promoting technological modernisation, and integrating infrastructure systems.

The involvement of a private partner does not in itself guarantee a project’s economic efficiency or reduce the burden on public finances. The performance of PPPs depends on regulatory predictability, procedural transparency, the quality of project preparation, investor protection, risk allocation, and the appropriate design of public support. Institutional uncertainty increases transaction costs and risk premiums, thereby raising the weighted average cost of capital (WACC) and potentially reducing the net present value (NPV) of socially significant infrastructure projects. At the same time, government guarantees, availability payments, and other forms of support create long-term and contingent public liabilities that must be taken into account when assessing fiscal risks [3].

The adoption of the Law of Ukraine “On Public–Private Partnership” in 2025 established new legal foundations for the preparation and financing of PPP projects [4]. Nevertheless, the mechanism

through which the institutional parameters of PPPs affect the cost of capital, the financial viability of infrastructure projects, and the volume of private investment mobilised under existing fiscal constraints remains insufficiently explored. Examining this relationship is essential for evaluating PPPs not merely as a legal form of cooperation but as an institutional and financial mechanism for Ukraine's green reconstruction.

2. Object and subject of the research. The object of the research is the formation and implementation of public–private partnerships in financing projects for Ukraine's green infrastructure reconstruction under conditions of constrained public resources.

The subject of the research comprises the institutional and financial relationships between the operational parameters of PPPs, the allocation of project risks, the weighted average cost of capital, the financial viability of infrastructure projects, and the volume of private investment mobilised. Particular attention is devoted to the mechanism through which regulatory predictability, investor protection, public support, and the quality of fiscal commitment management affect project risk premiums, WACC, and NPV.

3. Research Aim. The aim of the research is to substantiate the institutional and financial mechanism through which public–private partnerships influence the cost of capital and investment leverage in Ukraine's green infrastructure reconstruction projects under fiscal constraints.

To achieve this aim, the study seeks to identify the channels through which the institutional parameters of PPPs affect risk premiums and the weighted average cost of capital; establish the relationship between changes in WACC and the financial viability of infrastructure projects; assess the potential for mobilising private capital through investment leverage; identify the fiscal constraints and risks associated with PPP implementation; and develop a conceptual model linking institutional quality, the cost of capital, the scale of investment, and the anticipated outcomes of green reconstruction.

The research is based on the premise that greater institutional predictability and economically appropriate risk allocation reduce financing costs, while the investment effect of PPPs depends on the proper recognition and management of the government's long-term and contingent liabilities.

4. Literature Analysis. The academic literature regards public–private partnership as a long-term organisational arrangement for the development and operation of infrastructure, whose performance depends on the allocation of functions, risks, and financial commitments between the public authority and the private partner. However, empirical findings concerning the advantages of PPPs over conventional public financing remain inconclusive. Petersen's systematic review [5] indicates that PPP infrastructure projects may, on average, entail higher costs, while the evidence supporting their consistent superiority in terms of value for money remains limited. The involvement of private capital therefore does not in itself guarantee a project's economic efficiency.

Institutional quality influences the development of PPPs through regulatory predictability, judicial independence, investor protection, trust between the partners, and the level of transaction costs. Drawing on data from 83 developing countries, Baker [6] identified a positive relationship between regulatory quality and judicial independence, on the one hand, and private investor participation in PPPs, on the other. Baker, Khater, and Haddad [7] confirmed the importance of political stability for the performance of private investment commitments in infrastructure. Casady and Peci [8] demonstrated that, in transition economies, formal regulatory changes may fail to improve PPP performance in the absence of professional capacity, trust, communication, and effective enforcement of the established rules. The institutional environment should therefore be regarded as a component of the economic mechanism of PPPs rather than merely an external condition governing their operation.

Risk pricing constitutes a key channel through which institutional parameters affect financial outcomes. The systematic review conducted by Tallaki and Bracci [9] indicates that risk allocation, transfer, and management should be considered throughout the entire PPP life cycle, including contractual amendments and possible revisions to the initial arrangements. Makovšek and Moszoro [10] argue that contractual complexity, information constraints, and uncertainty surrounding future outcomes can result in inefficient risk pricing and an additional financing premium. Geddes and

Goldman [11] supplement comparisons between the cost of public and private capital by examining agency costs and differences in residual income rights. Based on four PPP road projects in Finland, Spohr et al. [12] identified a higher cost of private financing relative to public borrowing, but concluded that the corresponding premium may constitute justified compensation for the risks transferred to the private partner. A higher cost of private capital should therefore be assessed in conjunction with the actual allocation of risks and the anticipated benefits arising from their transfer.

Public support can improve project financial viability and mobilise private resources, although its effect depends on the instrument employed. Based on an analysis of 4,484 projects across 130 countries, Wang et al. [13] found that direct capital, revenue, and in-kind forms of support facilitate the mobilisation of private investment, whereas government guarantees do not always produce an equivalent effect. Alonso-Conde, Brown, and Rojo-Suarez [14] showed that guarantees and risk-sharing mechanisms affect private-investor incentives and may transfer a substantial share of project value to the investor. At the same time, public support creates explicit and contingent fiscal commitments. Xu et al. [15] substantiate the need for a multidimensional assessment of PPP-related fiscal risk that accounts for project feasibility, standardisation, and long-term sustainability.

The cost of capital is particularly important for green infrastructure because of its high initial expenditure, lengthy payback periods, and the sensitivity of project outcomes to the discount rate. Steffen [16] identified substantial cross-country and technological differences in the cost of capital for renewable energy projects, with developing countries generally facing higher financing costs. Drawing on data from 133 utility-scale solar photovoltaic and onshore wind projects in Germany, Egli, Steffen, and Schmidt [17] found that improved financing conditions contributed to reductions in the levelised cost of electricity. Halldén et al. [18] confirmed the importance of institutional quality and financial stability for public investment in renewable energy. Studies covering EU countries [19] and sub-Saharan African economies [20] similarly indicate that financial-system development and institutional quality are associated with renewable energy use and the performance of the low-carbon transition.

Previous studies therefore illuminate individual relationships between institutional quality, risk allocation, public support, the cost of capital, private investment, and environmental outcomes. Their integration into a unified mechanism nevertheless remains insufficiently explored, particularly with regard to how the institutional parameters of PPPs, through changes in WACC and NPV, affect the financial viability of infrastructure projects, investment leverage, and the fiscal risks associated with Ukraine's green reconstruction. Addressing this relationship constitutes the research gap examined in this article.

5. Research Methods.

The methodological framework of the study combines institutional, financial, scenario-based, and environmental-economic approaches. Institutional analysis was employed to identify the channels through which regulatory predictability, risk allocation, public support, and investor protection affect the financing conditions of public–private partnership (PPP) projects. A comparative analysis of the academic literature and international guidelines enabled the relevant institutional parameters to be systematised and their relationships with risk premiums, transaction costs, the cost of capital, and the feasibility of environmentally oriented infrastructure investments to be established.

The relationship between the weighted average cost of capital (WACC) and net present value (NPV) is examined conceptually to explain the financing channel. No project-specific WACC or NPV estimates are produced. The standard WACC expression provides the analytical basis:

$$WACC = \frac{E}{D+E} R_e + \frac{D}{D+E} R_d (1 - T), \quad (1)$$

where E is the amount of equity capital, D is the amount of debt financing, R_e is the cost of equity, R_d is the cost of debt, and T is the corporate income tax rate. Using WACC as the discount rate accounts for both the financing structure and the risks incorporated by investors and creditors into the cost of capital. The discount rate is particularly important for capital-intensive green projects characterised by substantial initial expenditure, lengthy implementation periods, and economic and environmental outcomes that materialise over an extended time horizon [16, 17].

The corresponding analytical expression for project net present value is:

$$NPV = \sum_{t=0}^n \frac{CF_t}{(1+WACC)^t}, \quad (2)$$

where CF_t denotes the project's free cash flow before financing in period t , CF_0 includes the initial investment outflow, and n is the appraisal horizon. Cash flows and the discount rate must be consistent in currency, price basis, and tax treatment. For a conventional investment with an initial outflow followed by non-negative operating cash flows, a lower WACC increases NPV, all else being equal. This relationship is not an automatic consequence of a PPP arrangement: financing costs fall only if relevant risks or financing conditions improve.

The investment effect of PPPs is assessed using the investment leverage ratio:

$$L = \frac{I_{tot}}{B}, \quad (3)$$

where I_{tot} is total capital investment in the illustrative PPP portfolio, B is the public capital contribution included in that investment, and L is the dimensionless aggregate investment leverage ratio. In these scenarios, B excludes guarantee face values, future availability payments, and other contingent obligations. Non-government capital equals I_{tot} minus B ; its mobilisation ratio, denoted L_m , equals L minus one, and its share of total investment equals $(L \text{ minus one})$ divided by L . Non-government capital is not necessarily exclusively private: it may include external concessional financing. The ratios describe the assumed financing structure and do not establish additionality or causal mobilisation.

The environmental effect is considered an outcome of green infrastructure investment, whose financial feasibility depends on the cost of capital and the volume of resources mobilised. Its assessment encompasses anticipated reductions in greenhouse gas emissions, decreases in the energy and resource intensity of infrastructure, reductions in resource losses, the deployment of low-carbon technologies, and improvements in climate resilience. The specific set of indicators should reflect the sectoral affiliation and technical characteristics of each project. Because the sources used do not provide standardised project-level data, environmental outcomes are not aggregated into a single quantitative measure. Instead, they are analysed as anticipated effects arising from an expansion in the volume of financially viable green investment.

Quantitative scenario analysis is limited to investment leverage. Three illustrative combinations of public capital contributions and aggregate leverage ratios are compared. The accounting horizon is one common, unspecified portfolio investment period; B and I_{tot} refer to capital contributions and investment over that same period. Both are normalised by the same reference-year nominal GDP, treated as an index of 100. No calendar year, actual GDP estimate, disbursement schedule, or annual investment forecast is assumed. The values therefore describe a scale illustration rather than a time-calibrated reconstruction programme. A project-level application would require a defined investment period and a consistent valuation basis. Guarantees, availability payments, and compensation mechanisms require a separate assessment of explicit and contingent fiscal exposure, consistent with the purpose of PFRAM [3, 15]; no PFRAM simulation is performed here.

The institutional and financial analysis explains potential transmission channels rather than estimating causal effects. The numerical scenarios illustrate the arithmetic of capital contributions and leverage; they do not quantify changes in WACC, NPV, fiscal risk, or environmental performance. Environmental outcomes are examined qualitatively as conditional effects that require project-specific evidence for verification.

6. Research Results.

6.1. The Effect of PPP Institutional Parameters on the Cost of Capital. The analysis indicates that public-private partnerships affect the financial viability of green infrastructure projects through the institutional mechanism governing the formation of the cost of capital. Regulatory predictability, procedural transparency, the protection of investor rights, and appropriate risk allocation reduce uncertainty surrounding future cash flows, as well as the costs of project preparation and financing. Where the institutional environment is deficient, creditors and investors incorporate the

corresponding risks into the cost of debt and equity, thereby increasing the weighted average cost of capital and reducing project net present value [6–12].

The principal channels through which the institutional parameters of PPPs affect the financial viability and anticipated environmental outcomes of infrastructure projects are systematised in Table 1.

Table 1. The Effect of PPP Institutional Parameters on the Financial Viability of Green Infrastructure Projects

Institutional parameters	Direct economic outcome	Effect on financial parameters	Significance for the environmental effect
Regulatory predictability	Reduced regulatory uncertainty	Lower risk premium and WACC	Greater scope for financing long-term green projects
Transparent and standardised procedures	Lower transaction costs and shorter preparation periods	Reduced pre-investment costs	Accelerated implementation of environmentally oriented investments
Efficient risk allocation	Allocation of each risk to the party capable of managing it at the lowest cost	Greater predictability of cash flows and improved project creditworthiness	Reduced likelihood of abandoning capital-intensive low-carbon solutions
Investor and creditor protection	Greater confidence in the fulfilment of contractual obligations	Lower cost of debt and equity	Mobilisation of long-term finance for green infrastructure
Public support	Reduced revenue risk and stabilised cash flows	Higher NPV and improved financial viability	Implementation of projects generating substantial environmental benefits for society but offering insufficient commercial returns
Oversight of fiscal commitments	Recognition of direct and contingent public expenditure	Containment of hidden fiscal risks	Long-term sustainability of financing for environmental modernisation

Source: developed by the author based on [6–15].

The results presented in Table 1 show that public support does not necessarily eliminate project risks. Guaranteed payments, government guarantees, and compensation mechanisms may improve project creditworthiness and reduce financing costs, but they simultaneously create long-term or contingent government liabilities. The economic effect of PPPs cannot therefore be assessed solely in terms of the amount of capital mobilised or the reduction in WACC. A positive financial outcome must be weighed against the cost of public support and the potential fiscal consequences of risk materialisation. This consideration is particularly important for Ukraine, where infrastructure reconstruction must proceed without undermining debt and fiscal sustainability.

Risk allocation should likewise not be understood as the maximum possible transfer of risk to the private partner. Assigning demand, currency, political, or regulatory risks to a party unable to manage them effectively increases the risk premium and may render PPP financing more expensive than direct public financing [9, 10]. Economically appropriate risk allocation generally assigns construction and operational risks to the private partner, while regulatory and political risks remain under public-sector control. Depending on the sector and the project's financial structure, demand and currency risks may require shared allocation or dedicated compensation mechanisms.

A reduction in WACC improves the financial viability of green infrastructure projects by increasing the present value of their future cash flows. This effect is particularly pronounced for capital-intensive investments with lengthy payback periods, including railway electrification, energy-network development, low-carbon public transport, port infrastructure modernisation, and renewable

energy facilities. An improvement in the institutional environment may therefore expand the range of projects with a positive NPV without requiring a proportionate increase in direct public financing.

The magnitude of the financial effect depends on the structure, timing, and risk profile of project cash flows. In the absence of project-specific data, this study does not quantify the change in NPV resulting from a reduction in WACC. The relationship is used conceptually to explain why institutional improvements may enhance project financial viability; it is not used to calibrate the leverage ratios in Table 2.

6.2. Scenario Assessment of PPP Investment Leverage.

Table 2 presents three illustrative financing scenarios that differ in the assumed public capital contribution and aggregate investment leverage ratio. The institutional descriptions indicate hypothetical enabling conditions, not empirically estimated relationships between institutional quality and leverage. B and I_{tot} are expressed as percentages of the common reference GDP defined in Section 5; L and L_m are dimensionless. The volume of non-government capital is the difference between I_{tot} and B , while its financing share is calculated relative to I_{tot} .

Table 2. Scenario Parameters of PPP Investment Leverage

Scenario	B , % GDP	L	L_m	I_{tot} , % GDP	Economic interpretation
High institutional risk	1.0	3	2	3.0	Limited mobilisation of non-government capital under conditions of high institutional and country risk
Partial institutional improvement	1.0	4	3	4.0	Greater regulatory predictability and the participation of international financial institutions
Integrated PPP financing	1.5	5	4	7.5	Substantial mobilisation of non-government finance supported by a pipeline of well-prepared projects and appropriate risk management

Note: B is the public capital contribution included in total investment; L is the aggregate investment leverage ratio; L_m is the non-government capital mobilisation ratio; and I_{tot} is total investment. L_m equals L minus one under the financing identity specified in Section 5. GDP-normalised amounts refer to a common illustrative investment period and reference GDP, not to annual forecasts. The assumed inputs are B and L ; L_m and I_{tot} are derived arithmetically.

Source: author's illustrative assumptions and calculations.

In the high-institutional-risk illustration, B equals 1.0 % of reference GDP and L is assumed to equal 3. Non-government capital therefore amounts to 2.0 % of reference GDP and represents 66.7 % of aggregate financing. The institutional description reflects regulatory uncertainty and limited creditor protection but does not provide an empirical estimate of their effect on leverage.

The partial-institutional-improvement illustration assumes standardised procedures, stronger creditor protection, and access to blended finance. With B unchanged at 1.0 % of reference GDP and L assumed to equal 4, non-government capital amounts to 3.0 % of reference GDP and represents 75.0 % of total investment.

The integrated-PPP-financing illustration combines a pipeline of well-prepared projects, appropriate risk allocation, creditor protection, and fiscal oversight. With B assumed at 1.5 % of reference GDP and L at 5, non-government capital amounts to 6.0 % of reference GDP, or 80.0 % of total investment. These institutional conditions motivate the illustrative scenario but do not demonstrate that such leverage will be achieved.

The results indicate that the economic effect of PPPs is determined not only by the amount of public support but also by its capacity to mobilise additional capital. At the same time, increases in L and L_m do not in themselves demonstrate the effectiveness of a partnership. They must be assessed in conjunction with WACC, NPV, the cost of public support, explicit and contingent fiscal commitments, and the anticipated environmental outcomes of the projects.

The scenarios are illustrative rather than predictive. Neither the assumed public capital contributions nor the leverage ratios are recommended policy targets for Ukraine. Their selection is not based on statistical calibration to an observed PPP portfolio.

6.3. The Environmental Effect of Mobilising Infrastructure Investment. An environmental effect arises only when the capital mobilised is directed towards projects that demonstrably reduce emissions, lower the energy and resource intensity of infrastructure, or strengthen its climate resilience. An increase in investment is therefore a necessary but insufficient condition for green reconstruction. Environmental outcomes depend on the sectoral composition of the PPP portfolio, the technologies selected, project-specific baseline conditions, and the incorporation of measurable environmental indicators into tender documentation and PPP agreements.

The study identifies three interrelated components of the environmental effect of PPPs. The first is a direct effect arising from the deployment of low-carbon technologies, improvements in energy efficiency, and reductions in resource losses. The second is a systemic effect generated through the integration of transport, energy, municipal, and digital infrastructure. The third comprises a long-term adaptation effect associated with strengthening the resilience of infrastructure assets to climate-related risks. Quantifying these outcomes requires project-specific technical and financial data. Accordingly, they are treated in this study as anticipated effects whose achievement depends on the financial viability and effective implementation of the relevant investments.

The analysis substantiates a sequential relationship between the institutional, financial, and environmental outcomes of PPPs. Improvements in the institutional environment reduce uncertainty and financing costs; a lower cost of capital increases the NPV and financial viability of long-term green projects; and an expansion in the number and scale of investments implemented creates opportunities to reduce emissions, improve energy and resource efficiency, and strengthen infrastructure climate resilience.

The realisation of this relationship requires environmental criteria to be incorporated into project-selection procedures, PPP agreements, and performance-monitoring systems. The use of PPPs does not therefore generate environmental benefits automatically, but it can establish the financial and organisational conditions necessary for their achievement.

6.4. Institutional Conditions for Applying PPPs to Ukraine's Green Reconstruction. The practical application of the findings in Ukraine is associated with the emergence of a new regulatory environment for PPPs. The Law of Ukraine "On Public-Private Partnership" No 4510-IX, which entered into force on 31 October 2025, provides for full or partial private financing, the use of budgetary resources and grants, the conclusion of financing agreements and direct agreements with creditors, and a mechanism for replacing the private partner [4]. These provisions bring the financial architecture of Ukrainian PPPs closer to established project-finance practice and create the conditions for mitigating certain institutional and contractual risks.

A direct agreement between the public partner, the private partner, and creditors may reduce the risk of premature project termination by establishing procedures for fulfilling financial obligations and replacing the private partner. The creditor's statutory right to assume the rights and obligations of the private partner strengthen the protection afforded to debt financing. All else being equal, this may contribute to a lower risk premium, a reduction in the cost of debt, and improved project creditworthiness. Nevertheless, the statutory recognition of these instruments does not in itself guarantee a reduction in WACC. Its actual level will depend on the consistency of law enforcement, the quality of contracts, the independence and effectiveness of dispute resolution, and the government's capacity to honour its commitments.

The possibility of combining private capital with budgetary, grant, and debt financing provides a basis for employing blended finance in green reconstruction. Grants and concessional resources provided by international financial institutions can cover part of the capital expenditure or risks that private investors are unwilling to assume on market terms. This is particularly important for projects generating substantial social and environmental benefits but offering insufficient commercial returns. Such projects may include the modernisation of public transport, railway electrification,

improvements in the energy efficiency of municipal infrastructure, the development of distributed energy systems, and the adaptation of infrastructure assets to climate-related risks.

Public support should, however, be limited to the amount required to ensure project financial viability. Excessive guarantees, compensation, or availability payments may formally reduce the risks borne by the private partner while transferring them to the public budget. Decision-making should therefore consider not only project NPV and the volume of private capital mobilised but also the present value of all explicit and contingent government commitments. These commitments should be incorporated into medium-term budgetary planning and assessed under baseline and adverse macro-financial scenarios in accordance with the PFRAM approach [3, 15].

The first condition for the effective application of PPPs is the establishment of a pipeline of well-prepared projects. Rather than constituting a general list of infrastructure needs, this pipeline should comprise projects supported by feasibility studies, clearly defined revenue models and risk allocations, preliminary WACC and NPV estimates, identified sources of public support, and measurable environmental outcomes. Inadequate preparation increases pre-investment costs, prolongs negotiations, and reduces the interest of potential investors.

The second condition is the establishment of an integrated PPP information system. It should contain data on the stages of project preparation and implementation, financing structures, guarantees provided, actual government payments, changes in project costs and schedules, and the achievement of economic and environmental indicators. The availability of standardised data would reduce information asymmetry, facilitate comparisons of project performance, and enable more robust assessments of the risks associated with new investments.

The third condition is the integration of PPPs into the public investment management system. The choice of a partnership model should be based on a comparison of its full cost with that of conventional budgetary financing, rather than solely on its capacity to shift initial expenditure to the private partner. PPPs are appropriate where the benefits of life-cycle management, innovation, risk allocation, and timely delivery outweigh the additional cost of private financing [5, 9, 10].

The fourth condition is the incorporation of environmental performance into the contractual framework of PPPs. Indicators relating to reductions in emissions, energy consumption, and resource losses, the share of low-carbon energy, or improvements in climate resilience should be established at the project-selection stage rather than after financing has been secured. These indicators should be linked to performance-based payments, monitoring arrangements, and the responsibilities of the parties. This would help distinguish genuine financing for green transformation from the merely nominal environmental labelling of infrastructure projects.

Accordingly, Law No 4510-IX [4] establishes the regulatory foundations for wider use of PPPs in Ukraine's reconstruction, but its economic and environmental effects will depend on the quality of its practical implementation. The decisive conditions include the preparation of investment-ready projects, transparent risk allocation, oversight of government commitments, the availability of project-level data, and the incorporation of measurable environmental indicators into PPP agreements. Only where these conditions are jointly satisfied can institutional reform contribute to reducing the cost of capital, mobilising private investment, and achieving the anticipated outcomes of green reconstruction.

7. Prospects for Further Research. Further research should focus on the empirical testing of the proposed approach using data from specific infrastructure projects. This would enable the quantitative assessment of how individual institutional parameters affect risk premiums, WACC, NPV, the volume of private capital mobilised, and contingent government liabilities. A further promising direction would be to incorporate indicators of emission reductions, energy and resource efficiency, and climate resilience into the financial model, thereby enabling comparisons between the economic and environmental outcomes of alternative financing structures.

8. Conclusions. The study substantiates the institutional mechanism through which PPPs affect the financial viability of green infrastructure projects under fiscal constraints. Regulatory predictability, procedural transparency, creditor protection, and economically appropriate risk

allocation were found to have the potential to reduce risk premiums and transaction costs, thereby influencing the WACC and NPV of long-term investments.

The illustrative scenario assessment shows that public capital contributions equivalent to 1.0–1.5 % of a common reference GDP, combined with assumed aggregate investment leverage ratios of 3–5, correspond arithmetically to total investment of 3.0–7.5 % of reference GDP. These are conditional financing illustrations, not forecasts or recommended PPP portfolio sizes. Public capital contributions must be distinguished from guarantees and future contractual payments, and partnership decisions require separate assessments of value for money, fiscal exposure, and actual project outcomes.

The environmental effect of PPPs does not arise automatically from the mobilisation of private capital. Its achievement requires resources to be directed towards low-carbon and climate-resilient projects and measurable environmental indicators to be incorporated into project-selection procedures, contracts, and monitoring systems. In Ukraine, the effective realisation of the potential of PPPs depends on establishing a pipeline of well-prepared projects, ensuring transparent accounting for government commitments, developing an integrated information system, and aligning partnership mechanisms with the broader public investment management framework.

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