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Public Funding and Public Benefit: Balancing Commercialization and Equity in Health Innovation

Kaleem Ullah Khan
Email: Kaleem002@hotmail.com

Abstract
Public funding plays a critical role in advancing health innovation, particularly in high-risk areas such as vaccine development and pandemic preparedness. However, the relationship between public investment and public benefit remains contested, especially when commercialization processes prioritize private returns over equitable access. This paper examines the tension between public funding, commercial incentives, and public health outcomes, arguing that public benefit is not an automatic outcome of public investment but must be actively negotiated. Drawing on existing literature and recent global health experiences, including the COVID-19 pandemic, the study identifies key limitations in current funding models, particularly their emphasis on risk minimization and insufficient mechanisms for ensuring equitable access. The paper proposes a "Balanced Public Return Framework" that integrates risk-sharing, access conditions, commercial incentives, and accountability mechanisms to better align financial structures with public health goals. The findings highlight the importance of structured negotiation strategies and adaptive financing models to ensure that public investments generate meaningful and equitable health outcomes while sustaining innovation.

Keywords: Public Funding, Public Benefit, Health Innovation, Pandemic Preparedness, Global Health Financing, Equity in Healthcare, Commercialization, Public-Private Partnerships.

Introduction

The increasing reliance on public funding to drive health innovation has brought renewed attention to the question of how such investments translate into public benefit. Governments, multilateral institutions, and philanthropic organizations have played a pivotal role in financing research and development (R&D), particularly in areas characterized by high uncertainty and significant upfront costs, such as vaccine development and pandemic preparedness (World Health Organization, 2021). The COVID-19 pandemic demonstrated the critical importance of rapid innovation, but it also exposed significant inequities in access to life-saving technologies despite unprecedented levels of public investment (World Bank, 2022).

Public funding has historically been justified on the basis that it addresses market failures by de-risking early-stage innovation and enabling private sector participation

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(Mazzucato, 2018). However, while public investment reduces financial risk for private actors, the resulting benefits are not always equitably distributed. In many cases, publicly funded innovations are commercialized in ways that prioritize profitability over accessibility, raising concerns about the alignment between public investment and public health outcomes (Moon et al., 2015).

This tension highlights a fundamental challenge: how to balance the need for commercial incentives with the imperative to ensure equitable access and public benefit. Traditional financing models often emphasize accountability and risk minimization, relying on predefined deliverables and strict financial controls. While these mechanisms are essential for governance, they may limit flexibility and responsiveness in rapidly evolving health crises.

This paper argues that achieving public benefit from public funding requires a shift from risk-averse financing models to more balanced approaches that integrate commercial viability with public health objectives. It proposes a structured negotiation framework to align financial, commercial, and public health interests, thereby enhancing the effectiveness and equity of health innovation systems.

Literature Review

Public Funding and Innovation

Public funding is a key driver of innovation, particularly in sectors characterized by high uncertainty (Arrow, 1962; Mazzucato, 2018). The concept of mission-oriented innovation positions the state as a market shaper, directing innovation toward societal goals (Mazzucato, 2023).

Stiglitz (1999) further conceptualizes knowledge as a global public good, emphasizing the importance of accessibility. However, tensions arise when innovation systems operate within strong intellectual property regimes, particularly in vaccine development.

Commercialization and Market Incentives

Commercialization relies on private sector incentives, including profitability and intellectual property protection. While essential for innovation, these mechanisms can limit access in low- and middle-income countries (OECD, 2023).

The COVID-19 pandemic highlighted these issues, with limited technology transfer and unequal distribution (WHO, 2023; UNICEF, 2024).

Public Return on Investment

Public return extends beyond financial gains to include:

Health outcomes
Equity
Knowledge sharing
Capacity building

However, current systems lack mechanisms to ensure these returns (Moon et al., 2015).

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The Challenge of Balancing Public Benefit and Commercialization

The central challenge in publicly funded health innovation lies in balancing competing priorities:

Ensuring affordability and access

Maintaining incentives for private sector participation

Promoting global equity

Supporting sustainable innovation ecosystems

In practice, these objectives are often misaligned. Public funding reduces risk for private companies, but without clear conditions, it does not guarantee equitable outcomes. This has led to situations where publicly funded innovations are priced beyond the reach of vulnerable populations.

Negotiation as a Strategic Mechanism

Public benefit must be actively negotiated rather than assumed. Effective negotiation frameworks can help align the interests of funders, private companies, and public health stakeholders.

Key negotiation elements include:

Pricing models: tiered pricing, cost-plus approaches

Access commitments: allocation for LMICs

IP arrangements: non-exclusive licensing, patent pooling

Technology transfer: local manufacturing capacity

Accountability mechanisms: milestones, reporting requirements

A Balanced Public Return Framework

This paper proposes a Balanced Public Return Framework to address the structural misalignment between public investment and public health outcomes. The framework recognizes that public benefit is not an automatic consequence of funding, but rather the result of intentional design, negotiation, and governance mechanisms embedded within financing structures.

The framework consists of five interdependent components: risk sharing, access conditions, commercial incentives, accountability mechanisms, and adaptive financing. These components should not be treated in isolation but as a dynamic system, where trade-offs are continuously negotiated to balance innovation efficiency with equity outcomes.

Figure 1. Balanced Public Return Framework

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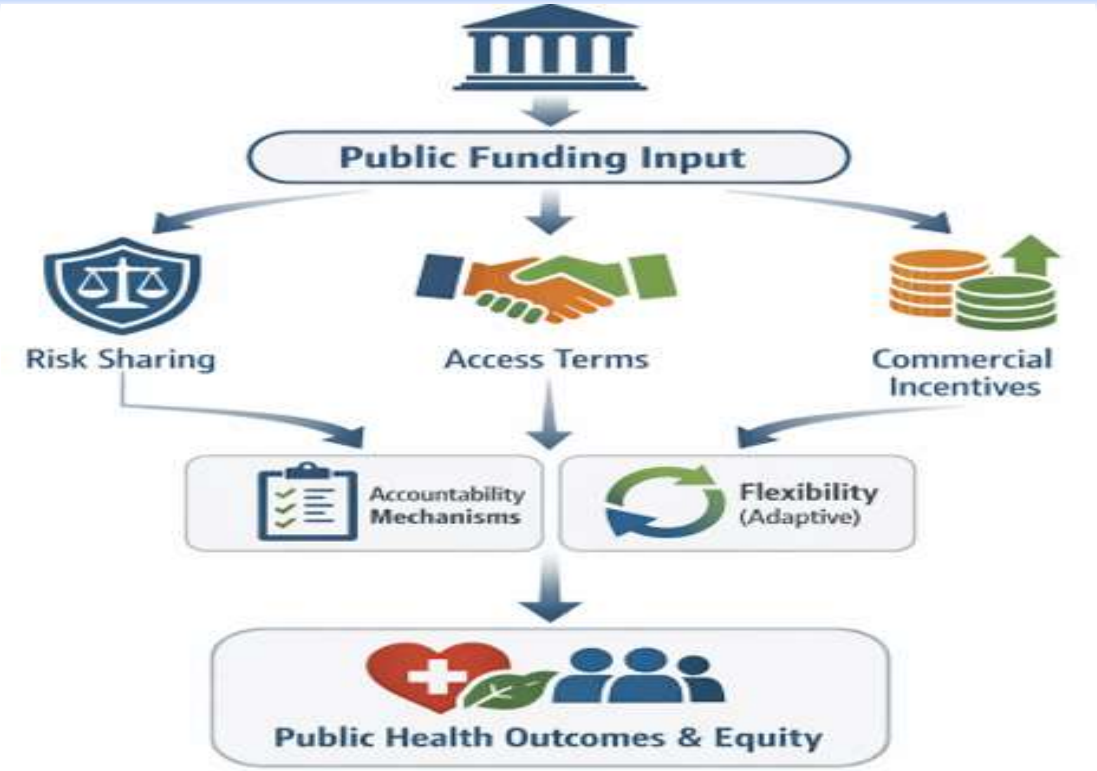
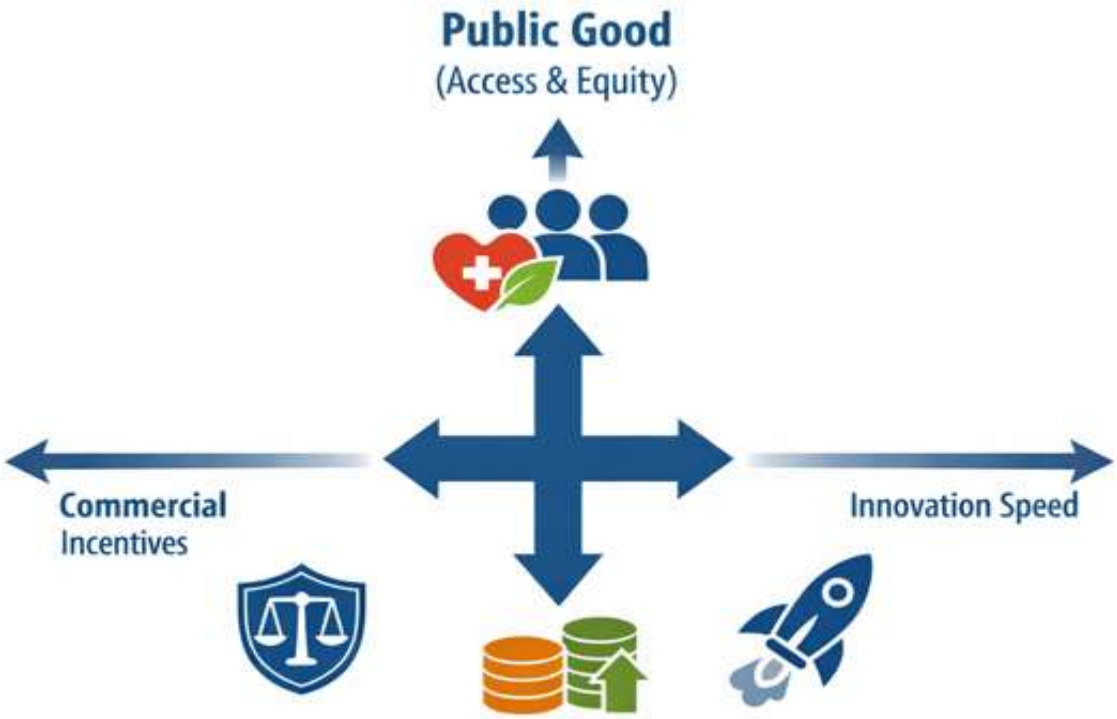


Figure 2. Tension Triangle



Message: You cannot maximize all three simultaneously; trade-offs must be negotiated.

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Risk Sharing

Risk sharing is foundational to public funding in health innovation. Public actors, governments, multilateral institutions, and philanthropic organizations, typically assume early-stage risks associated with research and development, particularly in areas where market incentives are weak or uncertain.

However, recent analyses highlight a persistent imbalance in risk allocation, where public entities absorb significant financial and scientific uncertainty, while private firms retain disproportionate control over downstream commercialization and pricing (Mazzucato & Li, 2023). This dynamic creates what has been described as a "socialization of risk and privatization of reward", undermining the legitimacy and effectiveness of public investment.

To address this, risk-sharing mechanisms must be explicitly linked to conditional returns, including access provisions, pricing commitments, and reinvestment obligations. Instruments such as advance market commitments (AMCs) and co-investment models can align incentives by distributing both risks and rewards more equitably (CEPI, 2024).

Access Conditions

Access conditions are central to ensuring that publicly funded innovations translate into equitable health outcomes. These conditions must be defined in advance, prior to funding disbursement, to preserve the bargaining power of public actors.

Recent evidence from the COVID-19 response demonstrates that the absence of enforceable access provisions led to significant disparities in vaccine distribution, particularly in low- and middle-income countries (LMICs) (WHO, 2023). While initiatives such as COVAX attempted to address these gaps, their effectiveness was limited by insufficient supply commitments and competing national interests.

Effective access conditions may include:

Tiered pricing structures
Volume guarantees for LMICs
Geographic allocation frameworks
Non-exclusive licensing agreements

Importantly, access should be conceptualized not only in terms of affordability but also availability, accessibility, and acceptability, reflecting a broader understanding of health equity (UNICEF, 2024).

Commercial Incentives

Sustaining innovation requires preserving adequate commercial incentives for private sector participation. Pharmaceutical and biotechnology firms operate within market-driven systems that depend on profitability, intellectual property protection, and predictable returns on investment.

However, recent policy debates emphasize that public funding fundamentally alters the risk profile of innovation, thereby justifying a recalibration of commercial expectations (OECD, 2023). Rather than undermining incentives, well-designed

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public funding agreements can create "conditional profitability", where firms achieve returns within frameworks that ensure public benefit.
Mechanisms to balance incentives include:

Time-limited exclusivity
Revenue-sharing agreements
Public equity stakes in funded innovations
Conditional licensing tied to access performance
This approach aligns with emerging models of mission-oriented innovation policy, which seek to direct private sector activity toward societal goals without eliminating market dynamics (Mazzucato, 2023).

Accountability Mechanisms
Accountability mechanisms are essential for translating commitments into enforceable outcomes. Traditional funding models rely heavily on financial reporting and compliance audits, which, while necessary, are insufficient to ensure alignment with public health objectives.
Recent reforms in global health financing emphasize the need for performance-based accountability, where funding is tied to measurable outcomes such as access, distribution, and health impact (World Bank, 2024). This requires the development of robust monitoring systems and transparent reporting frameworks.

Key accountability tools include:
Milestone-based funding disbursement
Independent verification of delivery commitments
Public disclosure of contracts and pricing
Enforcement clauses, including step-in rights
Transparency plays a critical role in this context, as it enhances trust and enables civil society and international organizations to hold stakeholders accountable (Transparency International, 2023).

Adaptive Financing
Adaptive financing represents a critical evolution from traditional risk-averse funding models. In the context of pandemics and emerging health threats, uncertainty is inherent, and rigid financial structures can hinder timely and effective responses.
Recent studies emphasize the importance of flexible, responsive funding mechanisms that can adapt to changing circumstances, including shifting epidemiological patterns, supply chain disruptions, and technological developments (Global Fund, 2023).
Adaptive financing may include:
Contingency funds for emergency deployment
Flexible budget reallocations
Rolling funding cycles
Dynamic pricing and procurement models

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Importantly, adaptive financing does not imply a lack of control. Rather, it requires a shift toward risk-tolerant governance, where flexibility is balanced with accountability through real-time monitoring and iterative decision-making.

Integrative Perspective

The strength of the Balanced Public Return Framework lies in its integrative approach. Each component interacts with the others, creating a system in which:

Risk sharing influences negotiation leverage

Access conditions shape commercial incentives

Accountability mechanisms enforce commitments

Adaptive financing enables responsiveness

This interconnected structure reflects the complexity of modern health innovation systems and underscores the need for holistic, rather than fragmented, policy design.

Methodology

This study adopts a qualitative analytical research design to examine the relationship between public funding, commercialization, and public health outcomes. The research is grounded in a theoretical and policy-oriented approach, combining literature synthesis with conceptual framework development.

Research Approach

The study uses a deductive approach, drawing on existing theories of public economics, innovation policy, and global health financing to identify structural gaps in current funding models. It then develops a conceptual framework, the Balanced Public Return Framework, to address these gaps.

Data Sources

The analysis is based on a comprehensive review of:

Peer-reviewed academic literature

Policy reports from global institutions (WHO, World Bank, OECD, CEPI)

Recent publications (2020–2025) on pandemic financing and vaccine equity

Case-specific data from COVID-19 vaccine development and distribution

This multi-source approach ensures both theoretical depth and practical relevance.

Literature Review Strategy

A structured literature review was conducted focusing on three key themes:

Public funding and innovation systems

Commercialization and intellectual property regimes

Equity and access in global health

Priority was given to recent studies (2023–2025) to capture evolving policy debates and post-pandemic insights.

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Case Study Approach

The COVID-19 vaccine response was selected as a critical case study due to:
The scale of public funding involved
The speed of innovation achieved
Documented inequities in global access
This case provides a real-world context to evaluate the effectiveness of existing funding and negotiation mechanisms.

Analytical Framework Development

The Balanced Public Return Framework was developed through:
Comparative analysis of existing financing models
Identification of recurring gaps (e.g., access, accountability, risk imbalance)
Synthesis of best practices from global health initiatives
The framework is conceptual rather than empirical, designed to provide a policy-oriented tool for decision-making.

Limitations

This study is limited by its reliance on secondary data and conceptual analysis. While the framework is grounded in real-world evidence, further empirical validation through case studies or quantitative analysis would strengthen its applicability.

Case Study: COVID-19 Vaccine Development

The COVID-19 pandemic provides a critical case study. While public funding accelerated vaccine development, access remained uneven. High-income countries secured early supplies, while many LMICs faced delays.
This highlights the limitations of existing funding and negotiation models and underscores the need for stronger access conditions and global coordination.

Discussion

The findings of this study highlight a fundamental structural weakness in current global health financing systems: the assumption that public funding will naturally translate into public benefit. In practice, this assumption is not supported by empirical evidence, particularly in the context of pandemic response.
The COVID-19 pandemic serves as a critical stress test for existing financing models. While unprecedented levels of public funding enabled rapid vaccine development, the distribution of benefits remained highly unequal. High-income countries secured early access through advance purchase agreements, while many low- and middle-income countries experienced significant delays. This disparity demonstrates that funding alone is insufficient to guarantee equitable outcomes.
A key issue lies in the misalignment of incentives. Public funders aim to maximize social welfare, while private firms are driven by profit maximization and shareholder value. Without structured negotiation mechanisms, private incentives tend to dominate, particularly in late-stage commercialization. This creates a “public risk–private reward” dynamic, where public actors absorb early-stage uncertainty while private entities capture a disproportionate share of downstream benefits.

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Furthermore, traditional funding models emphasize risk aversion and accountability, often through rigid contractual structures and predefined deliverables. While these mechanisms are essential for governance, they may reduce flexibility in high-uncertainty environments such as pandemics. This rigidity can delay decision-making, limit innovation, and constrain adaptive responses.

Another critical limitation is the timing of negotiations. In many cases, access and equity considerations are addressed after funding has been committed, significantly weakening the bargaining power of public actors. This suggests that negotiation must be integrated upstream, at the design stage of funding agreements, rather than treated as a secondary consideration.

The proposed Balanced Public Return Framework addresses these challenges by repositioning negotiation as a central mechanism for aligning incentives. By explicitly linking funding conditions to access, pricing, and accountability outcomes, the framework shifts the focus from passive funding to active governance of innovation systems.

Importantly, the framework does not seek to eliminate commercial incentives. Instead, it recognizes that sustainable innovation requires profitability and market participation. The objective is to create a mutually reinforcing relationship between public good and commercial success, rather than treating them as opposing forces.

Policy and Strategic Implications

The findings of this study have several important implications for policymakers, funders, and global health institutions.

First, public funding strategies must evolve from passive financing mechanisms to strategic instruments of governance. This requires embedding access conditions, pricing frameworks, and accountability measures directly into funding agreements.

Second, negotiation capacity must be strengthened within public institutions. Effective negotiation requires technical expertise in finance, law, and global health, as well as the ability to anticipate and manage complex trade-offs.

Third, there is a need for greater coordination among global health actors. Fragmented funding structures reduce bargaining power and create inconsistencies in access and pricing agreements. Collaborative platforms, such as pooled procurement mechanisms and multilateral partnerships, can enhance collective leverage.

Fourth, financing models must incorporate adaptive mechanisms that allow for flexibility in response to uncertainty. This includes dynamic pricing models, milestone-based funding, and contingency provisions for emergency scenarios.

Finally, transparency and data sharing should be prioritized to ensure accountability and enable evidence-based decision-making. Public disclosure of funding agreements, pricing structures, and access commitments can strengthen trust and improve outcomes.

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Conclusion

This paper has argued that public funding alone is insufficient to ensure public benefit in health innovation. While public investment plays a critical role in de-risking research and development, the distribution of resulting benefits depends on the structure of financing mechanisms and the effectiveness of negotiation processes.

The analysis demonstrates that current models are characterized by a misalignment between public objectives and private incentives, leading to suboptimal outcomes in terms of equity and access. Addressing this challenge requires a shift toward more integrated and strategic approaches that balance commercial viability with public health priorities.

The proposed Balanced Public Return Framework offers a practical tool for achieving this balance by aligning risk-sharing, access conditions, commercial incentives, accountability mechanisms, and adaptive financing strategies. By embedding these elements into funding agreements, public actors can enhance their ability to shape innovation outcomes and ensure that investments translate into meaningful public benefit.

Ultimately, the goal is not to choose between public good and commercial success, but to design systems in which they are mutually reinforcing. Achieving this balance is essential for building resilient and equitable health systems capable of responding to future global health challenges.

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