“SHoF - CEPR European Conference on Household Finance 2025”

Keynote:

Blended Finance

Caroline Flammer
A. Barton Hepburn Professor of Economics
Columbia University
NBER, CEPR, and ECGI

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Grand Societal Challenges: Biodiversity Loss

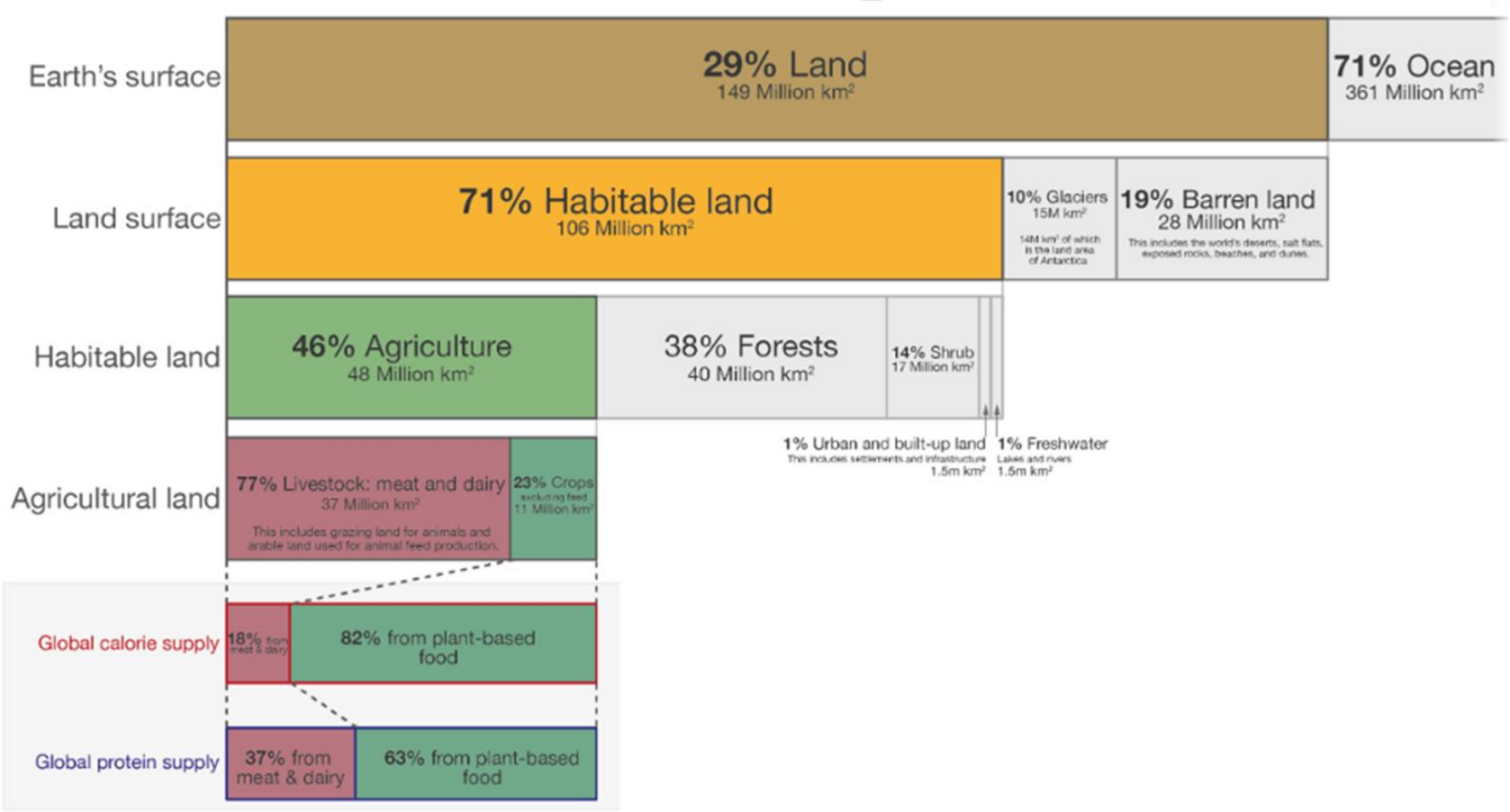
- Example: Biodiversity Loss

Protecting biodiversity is critically **important and urgent**—it is important for the planet, our health and well-being, as well as the world's economy

- **"Code Red" alert for humanity**: global populations of mammals, fish, birds, reptiles, and amphibians declined by 69% since 1970 (WWF, 2022)
- **Climate and biodiversity crises are deeply intertwined**: Meeting the Paris Climate Agreement goals depends on the successful conservation, restoration, and management of biodiversity (UN 2022)

Grand Societal Challenges: Biodiversity Loss

- Global land use for food production



Source: Steve Lydenberg (2014)

Grand Societal Challenges: Biodiversity Loss

- Example: Biodiversity Loss

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- **"Code Red" alert for humanity**: global populations of mammals, fish, birds, reptiles, and amphibians declined by 69% since 1970 (WWF, 2022)
- **Climate and biodiversity crises are deeply intertwined**: Meeting the Paris Climate Agreement goals depends on the successful conservation, restoration, and management of biodiversity (UN 2022)
- **Biodiversity crisis is deeply intertwined with other crises:** food security, poverty, conflict and forced migration, geopolitical tensions, etc.
- **Existential threat to global economy and financial stability**: over 50% of world's GDP is dependent on nature and the services it provides (UN 2022)

Natural Capital: A Public Good

- Biodiversity provides many services to humans
  - For example:
    - Stabilizes climate, food supplies, water, plants used for medicine, natural flood defenses, carbon storage, pollination of crops, recreational enjoyment, provides spiritual sustenance, etc. (e.g., Heal 2020)
  - These services are typically provided as **public good**
    - Their **consumption is non-rival**: available to everyone and those unwilling to pay cannot be excluded from consuming the public good
    - Long-standing literature in public economics: their **efficient provision is challenging** due to free-rider and preference revelation problems (e.g., Dasgupta 2021, Heal 2020, 2003, 2004)

➔ Implication: Biodiversity is likely **undervalued and underprovided**

Potential Solutions to Mitigate Challenge

- Potential solutions to enhance biodiversity protection
  1) **Intergovernmental measures**
     - E.g., Convention on Biological Diversity (CBD) and other global treaties
  2) **Government measures** that aim to regulate
     - **Quantity** of natural capital
       - E.g., establishing protected areas, technology standards, cap-and-trade programs
     - **Price** of natural capital
       - E.g., through tax incentives and subsidies that encourage more sustainable production or consumption patterns
  3) **Blended finance**
     - Relatively recent phenomenon gaining momentum in practice
     - Yet, not well understood

Important role, yet implementation challenging (Barrett 2022, Dasgupta 2021)

(Source: Flammer, Giroux, Heal, "Biodiversity Finance", *JFE* 2025)

Financing the Protection of Biodiversity

- **Evolution of biodiversity finance**
  - Historically, biodiversity protection financed through:
    - **Public funding**
      - E.g., debt-for-nature swaps, official development assistance (ODA), sovereign biodiversity bonds (e.g., sovereign ocean bonds, rhino bonds), payments for ecosystems services (PES), biodiversity offsets, etc.
    - **Philanthropic giving**
      - E.g., Environmental Defense Fund (EDF), The Nature Conservancy (TNC), World Wildlife Fund (WWF), etc.
  - **Financing gap**: Additional capital (estimated $722-967 bn/year) needed to address biodiversity crisis (TNC, 2021)
  - Relatively recent phenomena: **private investing in natural capital**
    - **Pure private capital investing**
    - **Blended finance** (i.e. blending concessionary funding with private capital)

Financing the Protection of Biodiversity

- Intriguing question: How can the **conservation and restoration** of biodiversity **yield financial returns** for investors?

Economic Value of Natural Capital – A New Asset Class

- Typical monetization mechanisms of natural capital
  - Include the **transformation** of natural capital (e.g., logging and mining)
- Monetization mechanisms in case of **biodiversity?**
  - Revenues need to be generated from **protecting as opposed to transforming** natural capital
  - Puzzling at first, yet generating financial returns from biodiversity conservation is feasible:
    - Monetization mechanisms of ecosystem services—**bundling** biodiversity with private goods whose value it enhances (Flammer, Giroux, & Heal, 2025; Heal 2003, 2004)

(Source: Flammer, Giroux, Heal, "Biodiversity Finance", *JFE* 2025)

Asset Types and Monetization Mechanisms

Natural capital asset types	Monetization mechanisms of ecosystem services
A. Land	
Agriculture: soil and pollinators	Agricultural productivity; price of farmland; certification as "biodiversity-friendly" agricultural products (higher prices); carbon credits; fire suppression; water quality
Forests	Ecotourism (hotel nights, tour guide services); carbon credits (carbon capture and storage); biodiversity credits; health; recreational value; bioprospecting for medicine; certification as "biodiversity-friendly" wood (higher prices); hydropower (pay for success)
Urban parks and other green infrastructures in urban areas	Value of real estate (proximity to park, green roofs provide heat isolation); prevention of flooding; carbon credits (carbon capture and storage); recreational value (e.g., birdwatching tours, sports activities, etc.)
Natural parks & wildlife protection	Ecotourism (hotel nights, tour guide services); value of real estate around the park; biodiversity credits
Genetic resources	Protection against diseases (humans, plants, food, animals); bioprospecting for medicine; biodiversity credits

(Source: Flammer, Giroux, Heal, "Biodiversity Finance", *JFE* 2025)

Asset Types and Monetization Mechanisms

Natural capital asset types	Monetization mechanisms of ecosystem services
B. Sea	
Watersheds	Green infrastructure services; water purification
Coastal ecosystems	Ecotourism (hotel nights, tour guide services); value of real estate (prevention of coastal flooding); carbon credit (carbon capture and storage); biodiversity credits; food production
Fisheries	Food production; certification as "biodiversity-friendly" seafood products (higher prices)
Oceans (incl. coral reef)	Ecotourism (hotel nights, tour guide services); carbon credits; biodiversity credits; value of real estate (prevention of hurricanes and coastal flooding)

(Source: Flammer, Giroux, Heal, "Biodiversity Finance", *JFE* 2025)

Blended Finance: Returns

- **Returns** of Blended Finance Investments
  - **Direct financial** returns
    - Generated through the monetization mechanisms
  - **Indirect financial** returns
    - Biodiversity credits
    - Carbon credits
  - **Impact** returns

Traditional investors

Impact investors

- For blended financing structures: Grants and concessional funding help
  - **Subsidize** investments from private capital investors
    - ➔ Increase their overall financial and impact returns
  - **De-risk** such investments

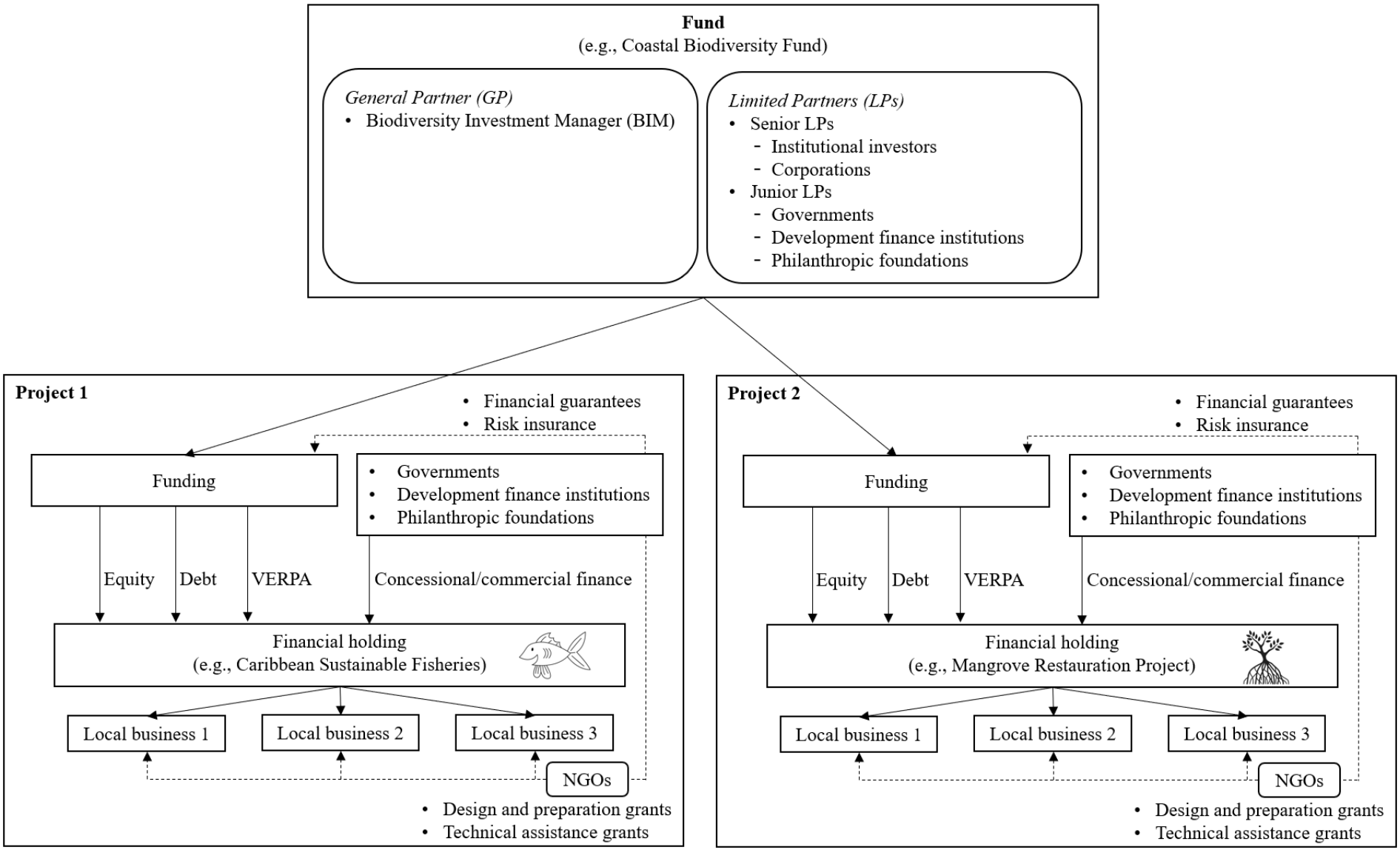
(Source: Flammer, Giroux, Heal, "Biodiversity Finance", *JFE* 2025)

Blended Finance: De-Risking Mechanisms

- **Various De-risking Mechanisms**
  - **Fund-level** de-risking mechanisms
    1) Seniority
    2) Preferred rate of return
    3) Financial guarantees
  - **Project-level** de-risking mechanisms
    1) Concessional finance
    2) Ex ante risk mitigation
       - Design and preparation grants
       - Technical assistance grants
    3) Ex post risk mitigation
       - Financial guarantees
       - Risk insurance

(Source: Flammer, Giroux, Heal, "Biodiversity Finance", *JFE* 2025)

Blended Finance Funds Structure



(Source: Flammer, Giroux, Heal, "Biodiversity Finance", *JFE* 2025)

Blended Finance:
A Conceptual Framework

Grand Societal Challenges and Financing Gap

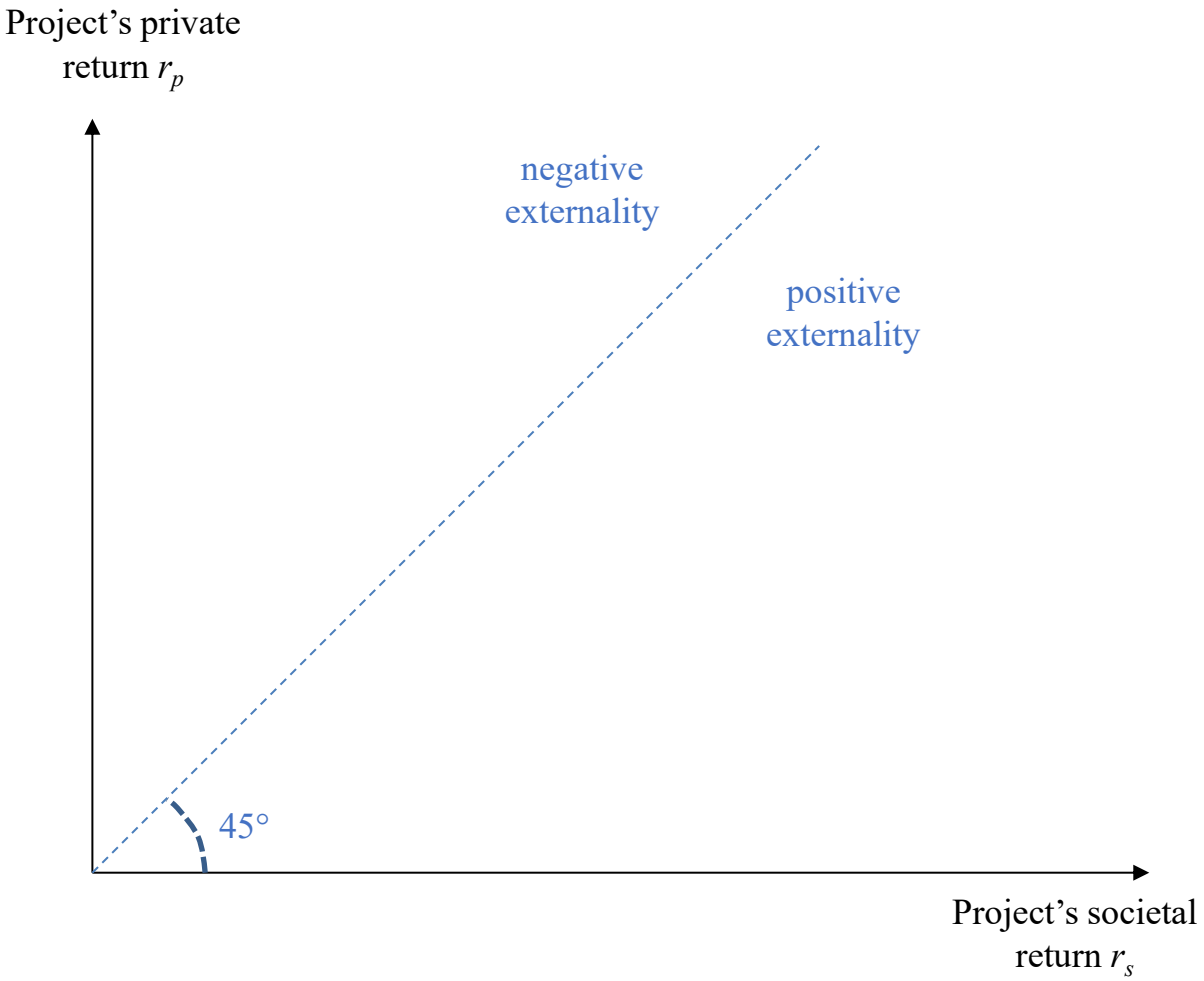
- **Financing gap**
  - Historically, the mitigation of climate change, biodiversity loss, poverty, and other grand societal challenges financed through **public funding** and private **philanthropic giving**
  - A **large financing gap** remains, especially in the Global South
  - The key question:
    - **How can we crowd in more private capital** to finance innovative solutions in climate tech, renewable energy, nature-based solutions, social inclusion, and others, especially in the Global South where capital is most needed?

Maximizing Sustainable Development Impact

- Conditions for Using Public Funds Efficiently
  - **Catalytic capital** subsidizes and re-risks private capital investments to crowd in more private capital towards the SDGs, without distorting markets.
  - **Reallocation of risks** from private to public (and philanthropic) investors raises important questions about
    - Allocation of risks among different (private, public, and philanthropic) investors
    - Efficient use of scarce public funding
  - To **maximize sustainable development impact**, it is critical to use scarce public (concessional) funds from DFIs efficiently
    - To do so, **multiple conditions** need to hold:
      - "**non-financial additionality**": sustainable development impact;
      - "**financial additionality**": market failure, the need for concessionality, and catalytic capital.

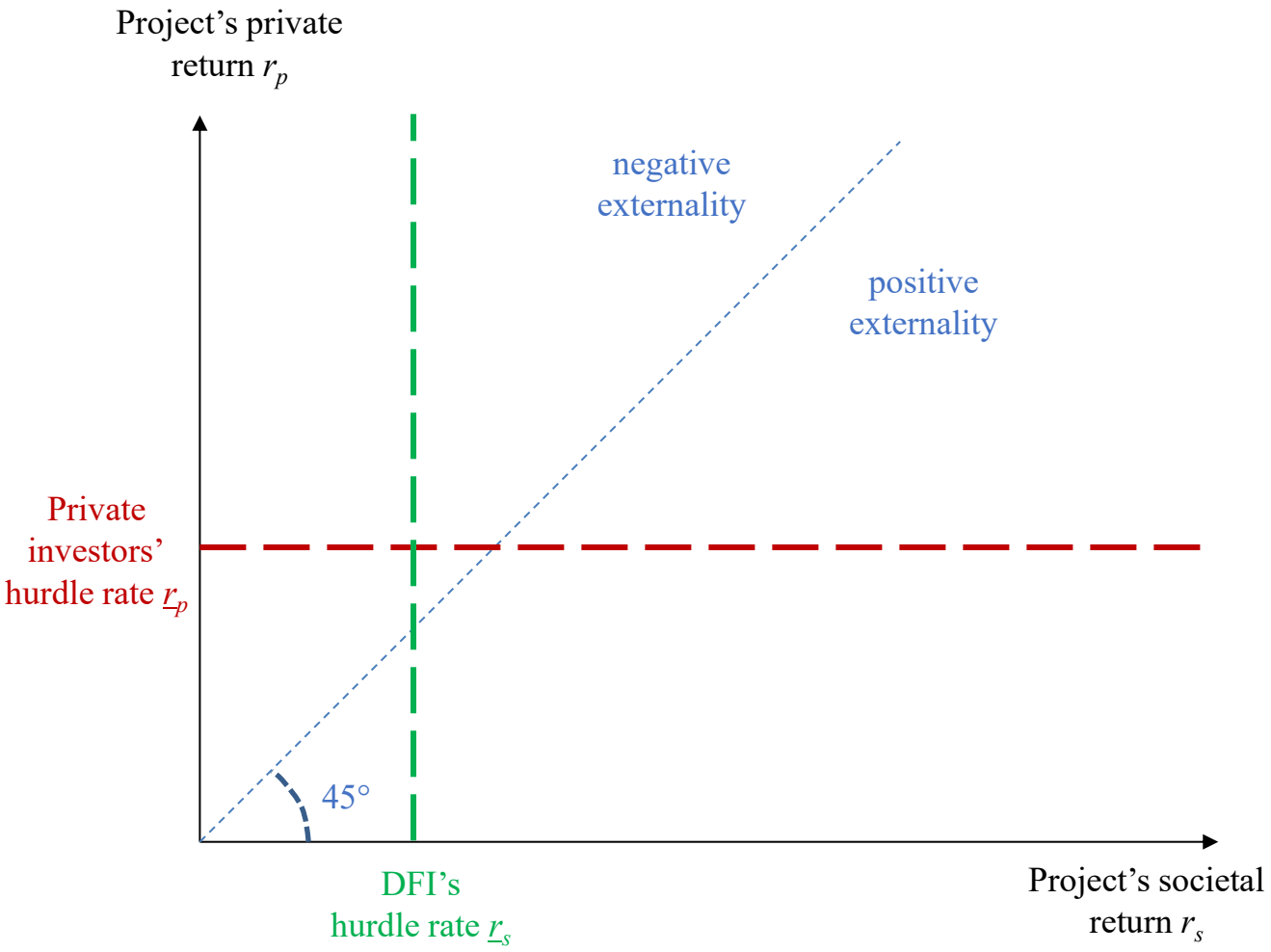
(Source: Flammer, Giroux, Heal, "Blended Finance", NBER 2025)

Condition: Positive Externalities



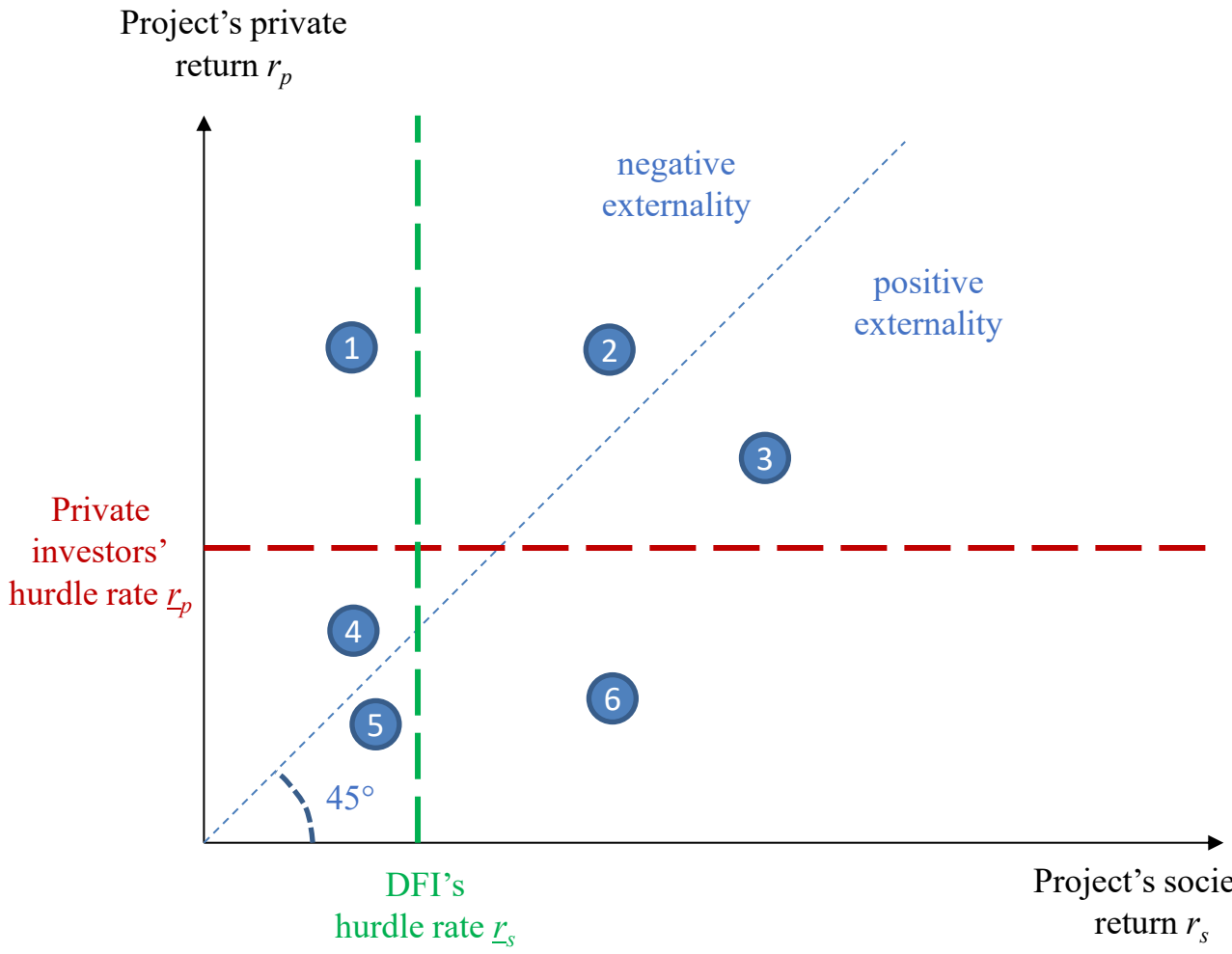
(Source: Flammer, Giroux, Heal, "Blended Finance", NBER 2025)

Condition: Hurdle Rate



(Source: Flammer, Giroux, Heal, "Blended Finance", NBER 2025)

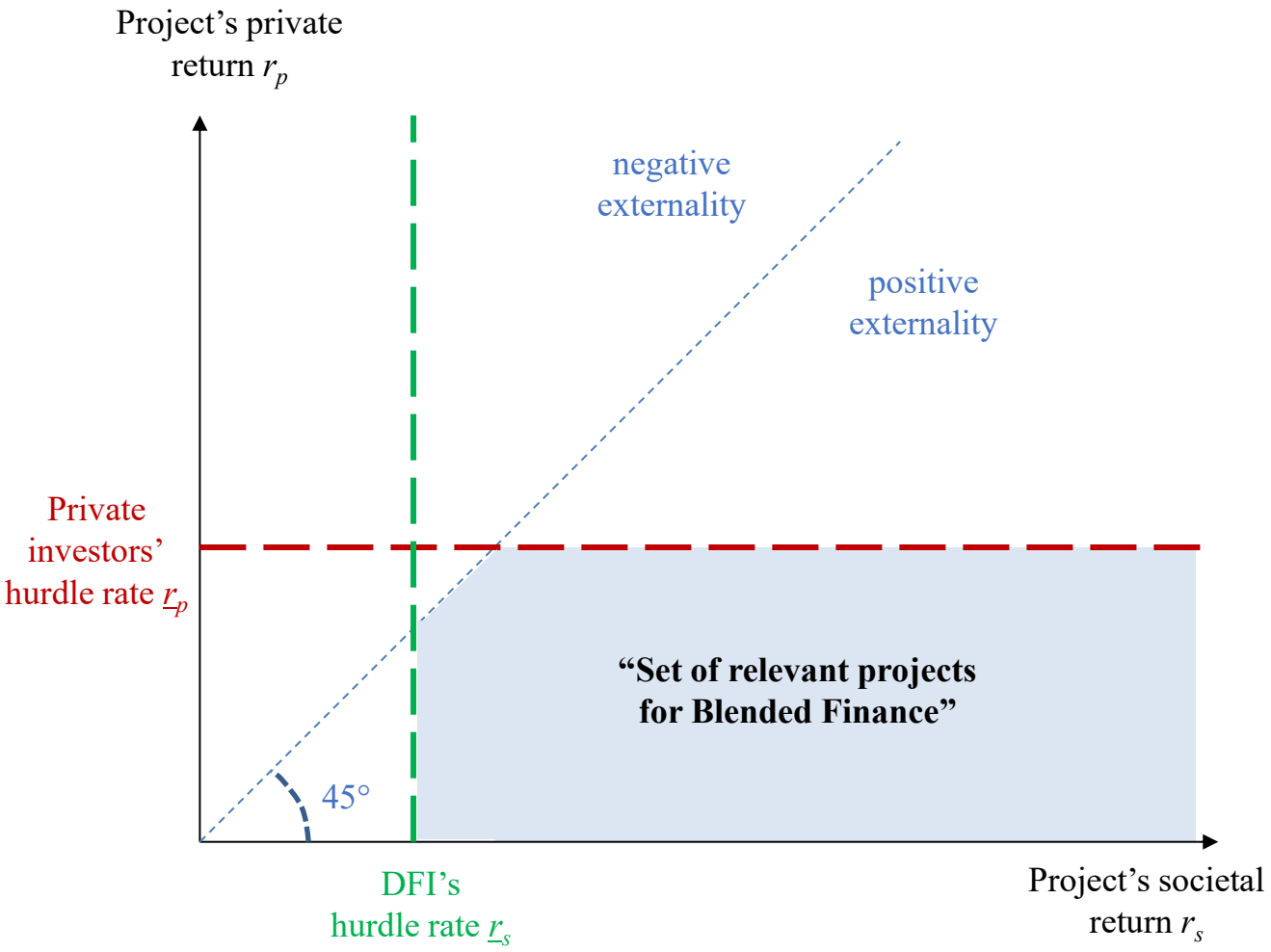
Condition: Market Failure



1. Financed by **private** investors ($r_p > \underline{r}_p$; $r_s < \underline{r}_s$)
2. Financed by **private** investors ($r_p > \underline{r}_p$; $r_s > \underline{r}_s$; neg. externality)
3. Financed by **private** investors ($r_p > \underline{r}_p$; $r_s > \underline{r}_s$; pos. externality)
4. **Not** financed ($r_p < \underline{r}_p$; $r_s < \underline{r}_s$; neg. externality)
5. **Not** financed ($r_p < \underline{r}_p$; $r_s < \underline{r}_s$; pos. externality)
6. Financed by **blended** finance ($r_p < \underline{r}_p$; $r_s > \underline{r}_s$; pos. externality)

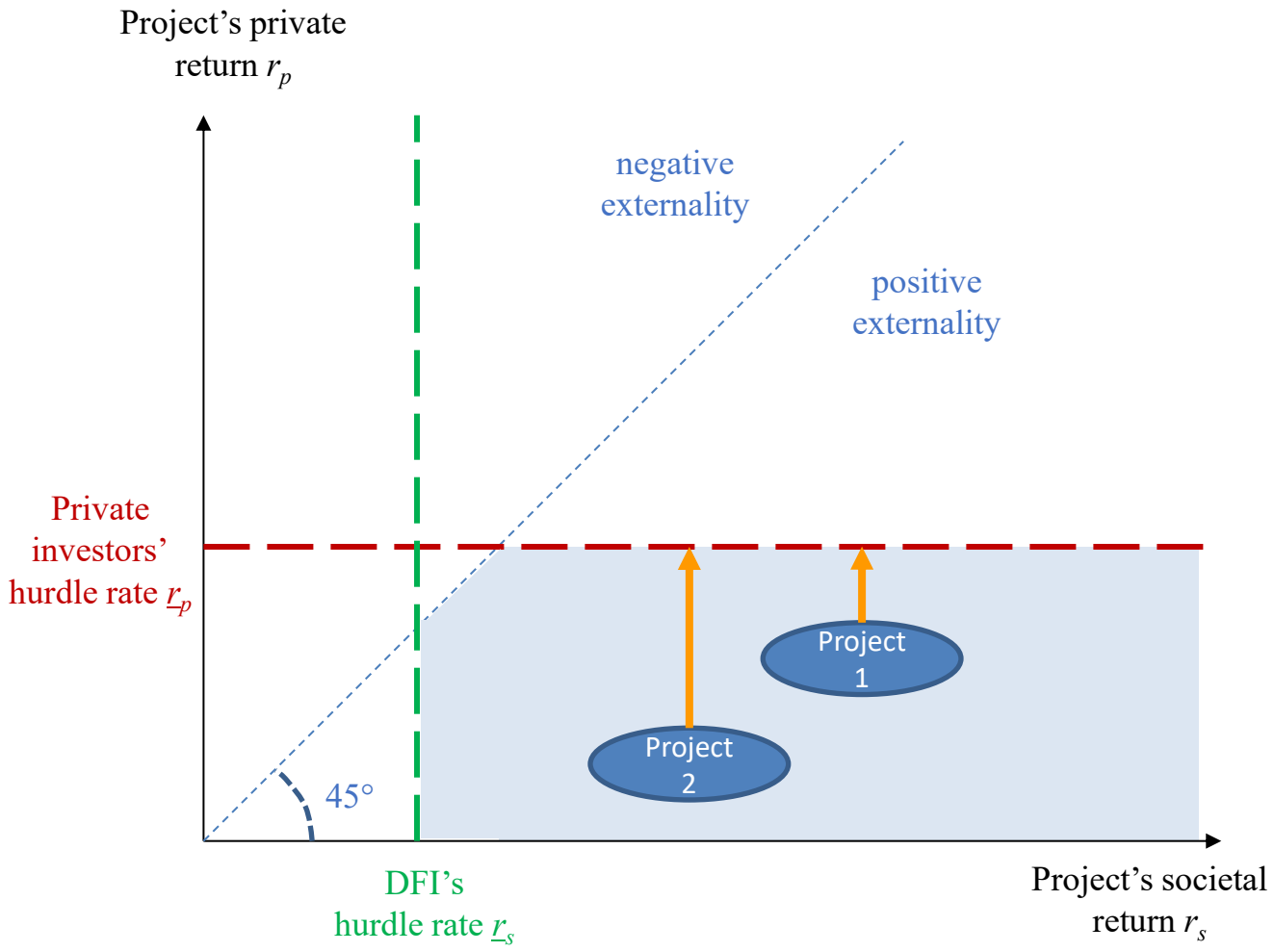
(Source: Flammer, Giroux, Heal, "Blended Finance", NBER 2025)

Set of Relevant Projects for Blending



(Source: Flammer, Giroux, Heal, "Blended Finance", NBER 2025)

Project Selection: Catalytic Capital and Budget Constraints



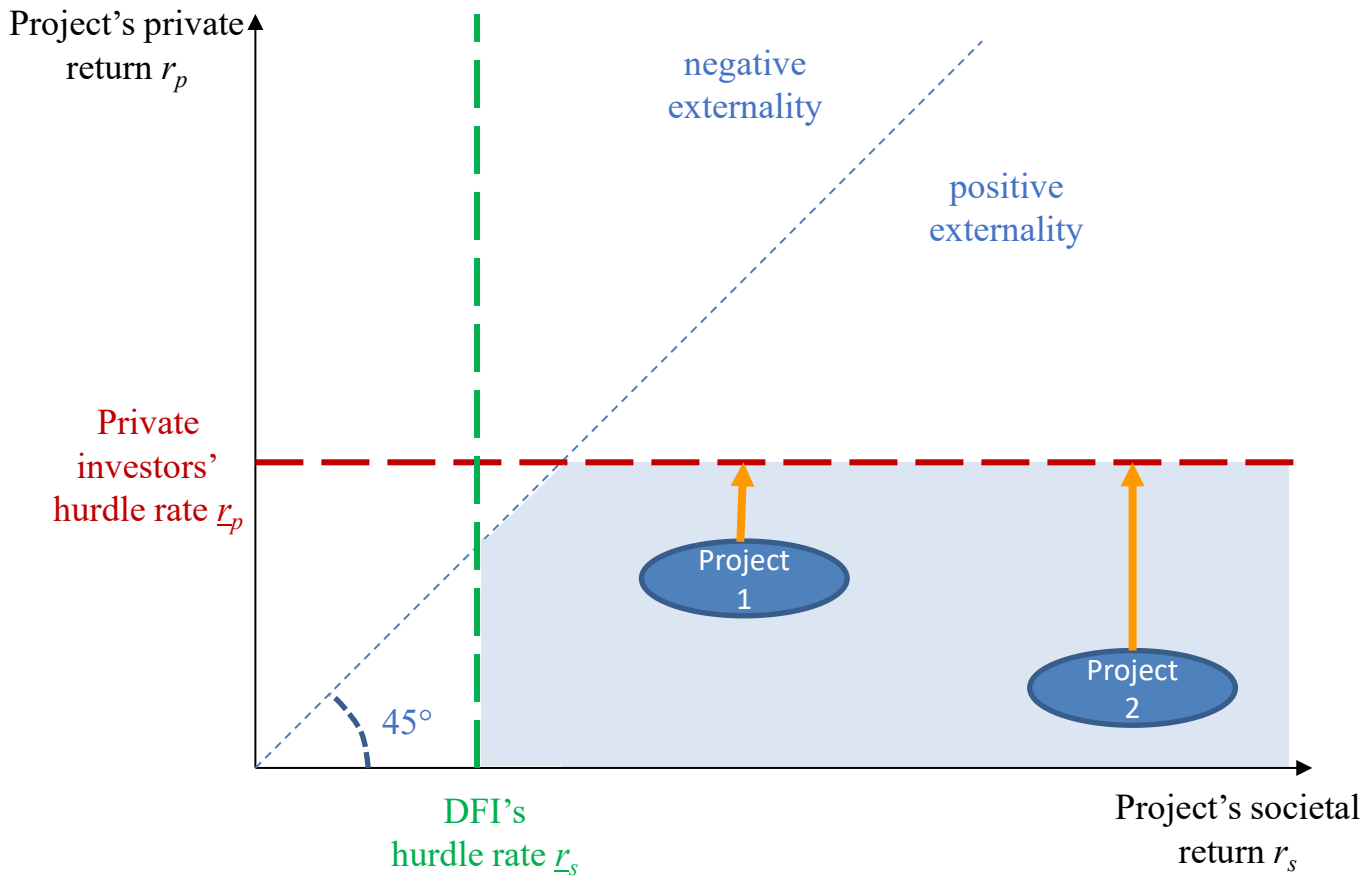
Extent of concessionality C needed until project commercially sustainable ($r_p \geq \underline{r}_p$)

Project 1 **dominates** project 2

- cheaper to improve its return to crowd-in private capital, and
- higher societal return

(Source: Flammer, Giroux, Heal, "Blended Finance", NBER 2025)

Trade-off Societal Impact vs. Concessionality



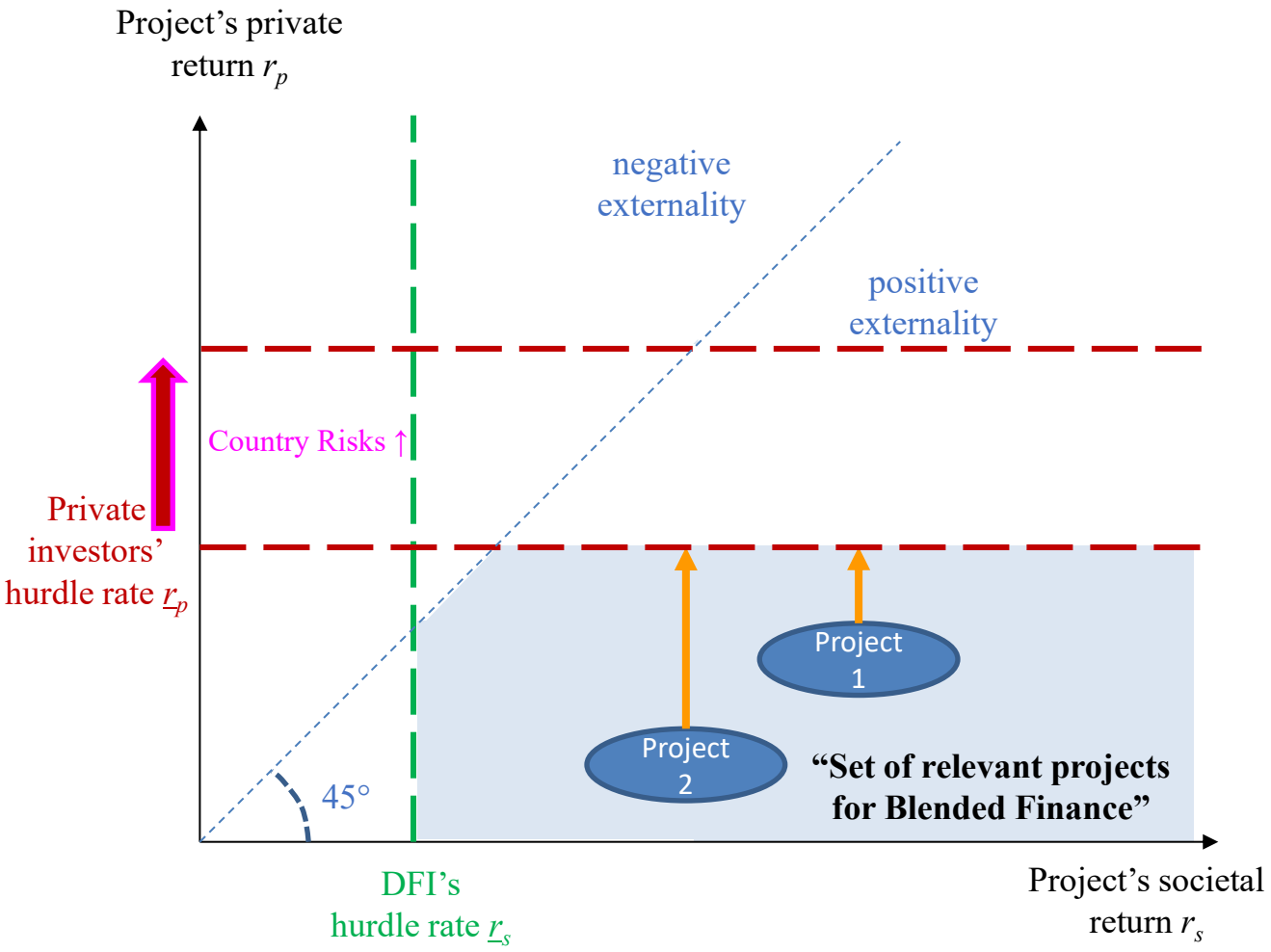
Extent of concessionality C needed until project commercially sustainable ($r_p \geq \underline{r}_p$)

A prior **unclear** which project dominates

Hypothesis: all else equal, DFIs provide a higher degree of concessionality for projects with higher sustainability impact

(Source: Flammer, Giroux, Heal, "Blended Finance", NBER 2025)

Extension: Increased Country Risks



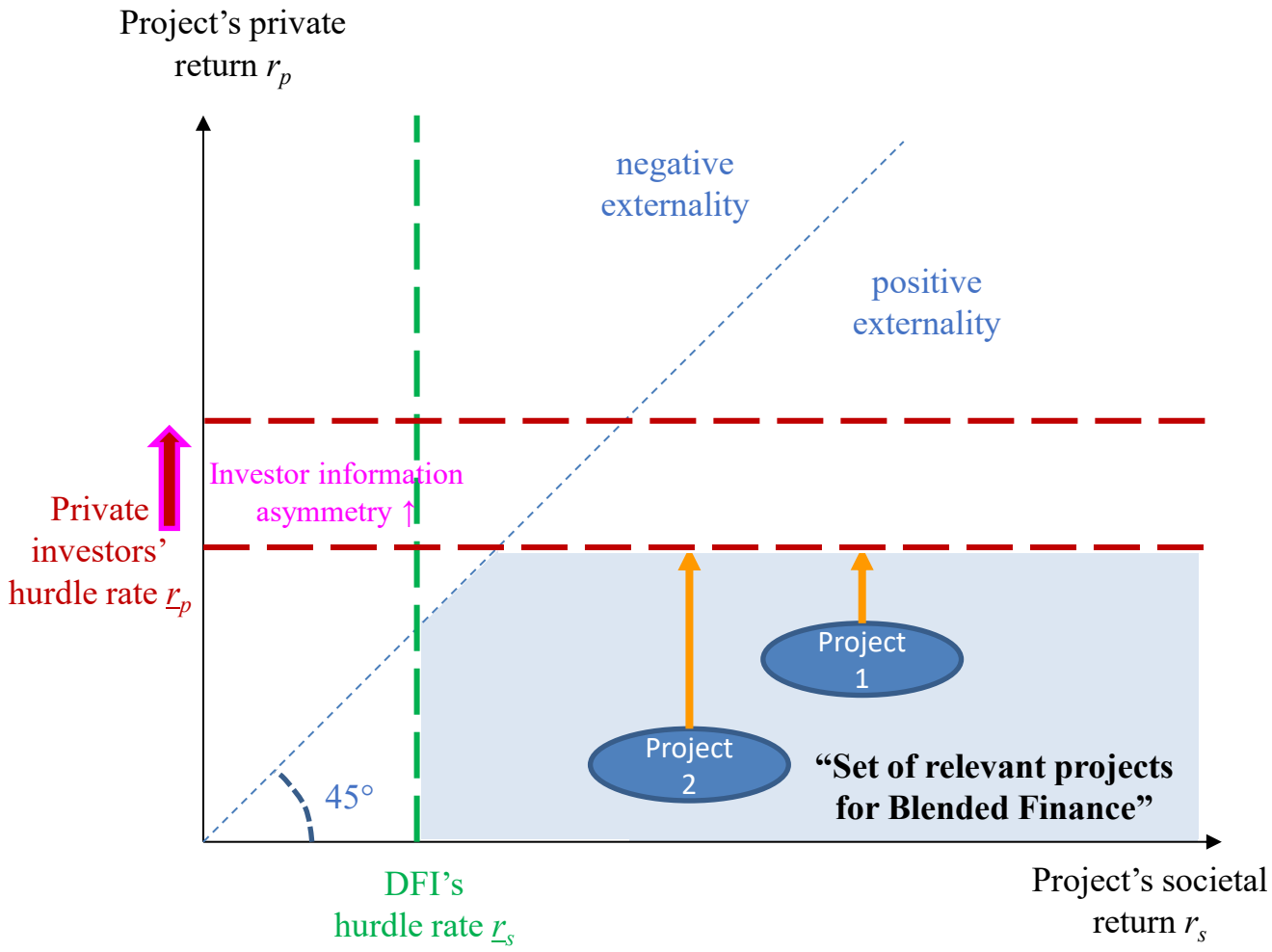
→ Extent of concessionality C needed until project commercially sustainable ($r_p \geq \underline{r}_p$)

Increased country risks (e.g., political risk)

- ➔ **shifts private investors' hurdle rate up**
- ➔ **increases set of relevant** projects for BG
- ➔ **increases extent of concessionality C needed**

(Source: Flammer, Giroux, Heal, "Blended Finance", NBER 2025)

Extension: Increased Information Asymmetry



→ Extent of concessionality C needed until project commercially sustainable ($r_p \geq \underline{r}_p$)

Increased information asymmetry (e.g., due to investors' lack of understanding of economic value of nature)

➔ **shifts private investors' hurdle rate up**

➔ **increases set of relevant** projects for BG

➔ **increases extent of concessionality C needed**

(Source: Flammer, Giroux, Heal, "Blended Finance", NBER 2025)

Concluding Remarks & Implications for Policy

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- SDGs, Financing Gap, and Blended Finance
  - A large financing gap remains, especially in the Global South, to effectively finance the mitigation of climate change, biodiversity loss, and other grand societal challenges.
  - **The question:**
    - How can we crowd in more private capital to finance innovative solutions in climate tech, renewable energy, nature-based solutions, social inclusion, and others, especially in the Global South?
  - **Blended finance**
    - Private capital blended with public or philanthropic capital, whose aim is to subsidize and de-risk private capital investments
    - As such, the blending can serve as a catalyst for private capital investments in projects that create societal value but would otherwise not be financed

Concluding Remarks and Implications for Policy

- Key factors to scale up private investments
  - Blended finance can help enhance the risk-return tradeoffs of such investments and serve as catalyst to crowd in more private capital
    - While blended finance is not novel, it is still in its infancy and not yet well-understood
  - Several hurdles are currently hampering the growth of this market:
    - **Information asymmetries** (and the corresponding information acquisition costs) are substantial for project holders ("sellers"), NGOs, international investors ("buyers"), etc.
    - **Lack of common metrics and frameworks** used to assess, e.g., biodiversity projects
    - **Lack of rigorous studies and understanding** of current practices
  - To overcome these hurdles and scale up private investments, we need to:
    - **Develop standardized metrics and frameworks** (to assess, e.g., biodiversity projects) that provide meaningful and decision-relevant information to investors
    - **Better understand the challenges and opportunities** that arise to:
      - identify and scale up investable projects, especially in the Global South
      - the characteristics of effective private-public partnerships (PPPs)
      - the balancing and allocation of risks across investors
      - how to improve financing structures, among others.

Thank You!

Contact: caroline.flammer@columbia.edu

Research papers: http://www.columbia.edu/~cf2870/

Sustainable Investing Research Initiative (SIRI): https://www.sipa.columbia.edu/global-research-impact/initiatives/sustainable-investing-research-initiative-siri