



UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

Master thesis
Graduate school

Bridging the financing gap for biodiversity in emerging and developing markets
– A case study on Brazil

Hanna Kyséla
Jennie Utterberg

Supervisor: Viktor Elliot

Master's Thesis in Finance

Spring 2025

Graduate School of Business, Economics and Law, University of Gothenburg, Sweden



By Jennie Utterberg, Atlantic Forest, Brazil. Februari 2025.

Abstract

Biodiversity loss is one of the greatest long term threats to humanity with 55% of the global GDP being directly linked to nature and its essential services. Despite its critical importance, a substantial biodiversity financing gap persists. The public sector provides most funding, but it is insufficient to close the gap alone, highlighting the need for private sector investment. Blended finance, through combining public, philanthropic sources, serves as a catalytic mechanism to mobilize private capital through de-risking and improving risk-return profiles. Blended finance requires a clear understanding of context-specific market failures to be applied effectively. Therefore, through a five-week in-depth case study in Brazil, we identified barriers and persistent market failures for private sector participation in biodiversity conservation and restoration. We identify weak collective action, asymmetric information, institutional failure, country risk, and misalignment between private investors and biodiversity projects. Taking this into consideration our thesis explores the Environmental Kuznets Curve (EKC) and finds a correlation where the early stage of economic growth leads to biodiversity degradation in emerging and developing countries, further reinforcing the need for innovative financial mechanisms.

Acknowledgment

We would like to express our sincere gratitude to our supervisor, Viktor Elliot, for his invaluable guidance and discussions, consistently steering us in the right direction throughout this thesis. We extend a special thanks to Alexandre Antonelli and Hannes Dempewolf for facilitating connections with several key respondents and for their continued support during the research process. We are also deeply grateful to all the respondents, without whom this study would not have been possible. Lastly, we extend our appreciation to the staff of Project A for their generous hospitality and for allowing us to observe their operations firsthand.

1. Background	4
1.1 Problem Statement	6
2. Theory	10
2.1 Market Failure	10
2.2 Environmental Kuznet Curve	11
2.3 Optimizing Biodiversity Investments: Risk-Management and Blended Finance	12
3. Data and Methodology	15
3.1 Biodiversity Intactness and Economic Growth	15
3.2 Interviews	20
3.3 Project A	22
4. Results	24
4.1 Econometric Regression	24
4.2 Interviews	26
4.2.1 Blended Finance	26
4.2.2 Time Horizon, Risk Perception, & Investment Pipelines	27
4.2.3 Policy & Regulatory Challenges	29
4.2.4 No One Way Fits All	31
4.2.5 Conservation vs Economic Interests	32
4.3 Project A	33
5. Discussion	35
5.1 Collective Action	35
5.2 Valuation Methods and Metrics	37
5.3 Environmental Kuznet Curve	38
5.4 Country Risk	40
5.5 Environmental- Development Dilemma	40
5.6 International Capital	42
5.7 Long vs Short Time Horizon	42
6. Conclusions	44
6.1 Further Research	45
7. References	46
Appendix - A	52
Appendix - B	54

1. Background

The global economy is intricately linked to nature and its essential services, with an estimated 55% of the world's GDP, valued at \$58 trillion, being moderately or highly dependent on ecological services (PWC, 2023). However, the planet is experiencing a significant biodiversity loss, with species abundance having decreased by 73% over the past 50 years (WWF, 2024; Cowie et al., 2022). This decline is primarily driven by human activities such as agriculture, infrastructure development, extractive industries, and deforestation (European Parliament, 2020; UNEP, 2023). The consequences of biodiversity loss are profound, including an estimated annual loss of \$217 billion in agricultural output due to the decline of pollinators (Heal, 2020; Hudson, 2024). Additionally it increases vulnerability to zoonotic diseases, which may contribute to the emergence of future pandemics (Deutz et al., 2020; Lawler et al., 2021). According to the World Economic Forum's Global risk report (2025) biodiversity loss and ecosystem collapse is ranked as the second largest long term risk for humanity.

Despite the critical importance of ecosystem services, there is a substantial annual biodiversity financing gap of approximately \$700 billion (McKinsey et al., 2023). Emerging and developing countries, which hold about 90% of the investment opportunities for biodiversity conservation, receive approximately 20% of the needed funding (GFANZ, 2024). Currently, most nature-related financing comes from public sources, with less than a fifth from private investments (UNDP-FI, 2024; Beverdam et al., 2025). Counterproductively governments and financial institutions also contribute to the degradation by spending significantly more on environmentally harmful industries than on biodiversity protection (Deutz, 2020).

While many of the world's top companies have climate-related targets, only a small fraction recognize biodiversity loss as a critical issue and even fewer, only 5 %, have set specific biodiversity targets (McKinsey et al., 2023). To reverse the current trend, corporations must take action even in the absence of immediate financial returns, as their long-term viability ultimately depends on a stable and functional ecosystem (Österblom et al., 2022). The financial sector's risk management frameworks often fail to account for the significant risks posed by biodiversity loss, not only the direct physical risks to business operations but also the transitional risks arising from increasing regulation and growing public awareness (PWC,

2020). What was once viewed as a simple choice between profit-driven business objectives and protecting nature is now increasingly recognized as deeply interconnected. Urging the need for systemic changes in societal structure and business models, where biodiversity is considered (Österblom et al., 2022).

International efforts to strengthen the work on biodiversity conservation and restoration such as the Kunming-Montreal Global Biodiversity Framework (GBF), emphasize the need for new economic models that integrate conservation into business strategies. The GBF aims to protect 30% of the world's nature by 2030, from the current protected area of 17% (UN, 2025). However, progress is hindered by a lack of data and inconsistent reporting, highlighting the need for clear guidelines and impact reporting metrics to better integrate nature-based solutions across sectors (Hackmann, 2024; Dasgupta, 2021). Edwards and Abivardi (1998) argue that biodiversity's true economic value is often overlooked due to limited understanding of its complexity. As a result, policymaking tends to prioritize easily quantifiable uses of biodiversity, which can underestimate its broader economic importance. Hanley and Barbier (2009) highlight the inherent challenges of expressing biodiversity in economic terms, which in turn affects individuals' willingness to pay for its preservation. It contributes to asymmetric information, as decision-makers and investors lack comprehensive insight into the full benefits and costs associated with biodiversity. Dasgupta (2021) agrees that natural resources are being overexploited since the economic systems fail to value nature properly, causing negative externalities.

Hudson (2024) and Hackmann (2024) both also criticize the financial sector's current approach, pointing to the lack of standardized frameworks for assessing biodiversity-related risks, warning that biodiversity loss poses systematic threats comparable to those posed by climate change which should be accounted for. Hackmann (2024) notes that the lack of standardized metrics for valuation and insufficient data hinders investors from making informed decisions, resulting in adverse selection in mobilization of the needed private capital for biodiversity conservation. Fenichel and Deans (2024) add that although important global frameworks like the GBF exist, they remain limited by the absence of enforceable financial mechanisms, further weakening policy implementation.

Transnational corporations dominate global supply chains, giving them considerable influence over how natural resources are extracted and used worldwide. As such, they play a central role in either accelerating or mitigating biodiversity loss (Österblom et al., 2022). There is a growing literature on the private sector's potential to close the biodiversity financing gap (Barbier et al., 2018). A key challenge lies in the collective action problem, biodiversity is a common good, which often leads to underinvestment due to free-rider dynamics (Fenichel & Deans, 2024). In the past civil society organisations (CSO) have had some success in mobilizing corporate action through tactics like public shaming, especially among consumer-facing companies concerned about reputational risks. For these firms, biodiversity efforts can be framed as part of risk management and brand differentiation. In contrast, extractive industries, which are more removed from consumers but at the same time generate significant environmental externalities, often lack such incentives, particularly when the long-term benefits of conservation are difficult to measure (Österblom et al., 2022).

In addition to voluntary collective actions governments can incentivise the private sector participation. National governments, especially in developing regions, tend to underfund biodiversity protection, anticipating that others should also bear the cost, especially when the benefits are shared globally (Barbier et al., 2018). While both the global North and South show political commitment (Pearce & Moran, 2013), governments face challenges in regulating corporations operating across borders (Österblom et al., 2022). This limits the effectiveness of voluntary corporate commitments and exposes a lack of enforceable global standards. To address this, Österblom et al., (2022) suggest that governments must actively incentivize private engagement through a mix of financial mechanisms, partnerships, and blended governance models. Without aligning business incentives with biodiversity stewardship, lasting progress on biodiversity is unlikely (Dasgupta, 2021; Österblom et al., 2022).

1.1 Problem Statement

As biodiversity approaches a critical tipping point, scholars are increasingly focused on innovative financial mechanisms as potential solutions (Cosma et al., 2023; Fenichel & Deans, 2024). The finance sector has a key role in creating demand by directing financial flows into nature positive economic activities (Dasgupta, 2021). There is a strong consensus among scholars on the need for cross-sector collaboration between businesses, governments,

civil society and science to drive transformative change to close the financing gap for biodiversity (Jonäll et al., 2025; Arjaliès & Gibassier, 2022; Rode et al., 2019; Fenichel & Deans, 2024; Österblom et al., 2022). Currently biodiversity investments are often seen as risky due to long time horizons and low expected returns, compounded by higher country risks in emerging and developing markets (PRI, 2024). Blended finance, which combines private, public, and philanthropic capital, is a promising strategy where collaborating actions can de-risk investments and therefore attract private sector involvement (Flammer et al., 2025; Hackmann, 2024).

The OECD's guidance on blended finance emphasizes the importance of identifying the underlying causes of market failure that such mechanisms aim to address. Since market failures can hinder the development of self-sustaining financial markets, blended finance can be used to overcome these barriers and unlock private investment. For blended finance to be effective, the public and philanthropic sources must understand the specific causes of market failure in a given context and align blended finance efforts accordingly, likely in combination with policy reforms and stakeholder dialogue to ensure a comprehensive approach (OECD, 2021). Flammer et al. (2025) investigate the effectiveness of blended finance structures for biodiversity investments. Their findings suggest that high-return, low-impact projects attract private capital alone, while high-impact projects with greater risk often require blended finance. Thus, blended finance models could be used for scaling conservation projects with significant biodiversity benefits. Hackmann (2024) and Dasgupta (2021) align with Flammer et al. (2025) in identifying blended finance as a key innovative financial mechanism; by de-risking investments, it has the potential to attract a significantly larger share of private capital to biodiversity-related projects.

Understanding the relationship between economic development and biodiversity intactness is essential, particularly since emerging and developing countries have high biodiversity and limited funding. Several studies have examined this relationship using the Environmental Kuznets Curve (EKC) framework first tested by Grossman and Krueger (1995), which suggests an inverted U-shaped relationship between economic growth and environmental degradation. This approach has also been applied to biodiversity loss, though findings remain mixed. Li. X et al. (2024) and Tan et al. (2022) find strong empirical support for the EKC, whereas Dietz and Adger (2003), whose findings were later re-evaluated by Mills and Waite (2009), report no such relationship. Highlighting that relying solely on economic growth to

explain biodiversity loss may oversimplify the issue (Leal & Marques, 2022; Dietz & Adger, 2003; Mills & Waite, 2009; Li. X et al., 2024; Acheampong, 2019).

This thesis focuses on the emerging country Brazil, a biodiversity hotspot with the world's most diverse flora and fauna, and will serve as the local context for exploring challenges in adopting blended finance initiatives within biodiversity. Brazil's biodiversity is vital for regional sustainability and global food security, as it is the largest net exporter of agricultural products (WWF, 2024). In Brazil, biodiversity loss and ecosystem collapse are identified as the most significant long-term risks, while Latin America as a whole has experienced a 95% decline in species abundance over the past five decades (WEF, 2025; WWF, 2024). The country has a history of environmental leadership, hosting the 1992 Earth Summit and the upcoming UN Conference of the Parties (COP) in 2025, where biodiversity financing will be a central topic. Brazil has implemented several regulations to protect its nature, such as the first Forest Code law in 1965, that limits land use for owners (TNC, n.d).

Given this challenging landscape and the urgent need to increase private funding for biodiversity this thesis set out to explore the following research question:

How can blended finance be effectively used to de-risk and attract private sector investment for biodiversity conservation and restoration in Brazil?

To address this question, the thesis combines a broader overview of linkages between economic growth and biodiversity degradation, with a particular focus on emerging and developing countries, like Brazil. The findings reveal a correlation of an inverted U-shaped EKC where early-stage development negatively impacts biodiversity, indicating a need for innovative financial mechanisms. To deepen our understanding of the underlying drivers, not captured by EKC, of limited private fundings in biodiversity conservation and restoration we conducted a five-week research visit to Brazil, including cross-sector interviews and a site visit to a conservation and restoration project in the Atlantic Rainforest.

The findings reveal barrier and persistent market failure with weak collective action, asymmetric information, institutional failure, specific country risk, and misalignment between private investor preferences and biodiversity project setups. Blended finance with a combination of public, philanthropic and private capital can help solve market failures and barriers by de-risking investments, signaling credibility, building trust, providing grants, and

guarantees. Through mobilizing private capital blended finance has the potential to scale biodiversity initiatives and close the financing gap.

Positioned alongside emerging studies (e.g., Flammer et al., 2025), our thesis contributes new empirical insights to a largely underexplored field in economic and financial literature (Cosma et al., 2023). Offering one of few field-based studies on biodiversity finance (Jonäll et al., 2025), and to our knowledge, a unique empirical case study with insights from cross-sectoral interviews and a project visit in Brazil.

The remainder of the thesis is organized as follows: a theoretical framework, explanation of the mixed methodology approach used, result findings, discussion and conclusion with suggestion for further research.

2. Theory

This section introduces the theoretical framework guiding the analysis of biodiversity investment in Brazil. It covers market failures, the Environmental Kuznets Curve (EKC), risk management strategies and blended finance to contextualize biodiversity loss effects on the financial system and possible solutions. Together, these concepts help assess how to attract private capital while addressing long-term environmental goals.

2.1 Market Failure

Market failure in biodiversity conservation and restoration arises when markets fail to account for the full social costs and benefits of biodiversity, leading to inefficient resource allocation and reduced overall social welfare (Goolsbee et al., 2020).

Biodiversity can be viewed as a common good, which are resources that are non-excludable and free to all yet rivalrous often leading to overexploitation. This is a situation described as the tragedy of the commons. Freely accessible natural resources, such as forests, often face degradation in the absence of effective regulation or clearly defined property rights. Without designated ownership, no single actor bears responsibility for conservation causing free-riding, leading to overuse and underinvestment in protection efforts (Dasgupta, 2021). The difficulty in assigning a monetary value to biodiversity further complicates market-based solutions (Goolsbee et al., 2020; Dasgupta, 2021). Additionally, the absence of accountability generates negative externalities, costs imposed on third parties not involved in the original transaction. These externalities distort market prices, as the full social cost of environmental degradation is not borne by those who cause it, but rather by society, including future generations, thereby contributing to ongoing biodiversity loss (Janvry & Sadoulet, 2021; Dasgupta, 2021).

Asymmetric information in particular adverse selection represents another form of market failure, occurring when one party in a transaction holds more or better information than the other. In the context of biodiversity, the lack of standardized data and transparency regarding financial performance and ecological impact creates uncertainty for potential private investors (Hudson, 2024; Hackmann, 2024). This information gap is a major barrier to mobilizing private finance for nature-based solutions, as it can lead to adverse selection or risk aversion (Dasgupta, 2021). Without reliable knowledge about biodiversity and its

benefits, incentives to invest in its conservation and restoration remain limited (Goolsbee et al., 2020; Dasgupta, 2021).

The market failures mentioned above stand in the way of creating a well functioning market for biodiversity. Alternative mechanisms must be considered to create an enabling environment for biodiversity investment. Governments can play a pivotal role by leveraging tax revenues and regulatory tools to stimulate initial investment and create demand. Additionally, voluntary collective action, where communities co-finance or support biodiversity-positive initiatives and share the resulting benefits, has emerged as a complementary approach (Goolsbee et al., 2020; Österblom et al., 2022). According to Janvry and Sadoulet (2021), four key conditions are necessary for successful collective action: observable personal benefits, effective monitoring, sanctioning of non-cooperation, and sufficient time to build trust. However, such efforts often face the free-rider problem (Goolsbee et al., 2020), where individuals enjoy the benefits of biodiversity without contributing to its preservation (Dasgupta, 2021). For a concluding note for the context of biodiversity, the absence of trust-building mechanisms and enforceable agreements perpetuates overexploitation and reinforces the tragedy of the commons.

2.2 Environmental Kuznet Curve

The EKC, first mentioned by the World Bank (1992) and later tested by Grossman and Krueger (1995), suggests an inverted U-shaped relationship between economic growth and environmental degradation (Dasgupta, 2021). In the early stages of development, environmental harm typically increases as economies prioritize for example industrial output and resource extraction. However, beyond a certain income threshold, further growth is associated with improved environmental outcomes, often due to structural economic shifts, stronger environmental regulations, and increased public demand for sustainability (Dasgupta, 2021; Grossman & Krueger, 1995). While the EKC was initially applied to indicators like air and water pollution, its framework can be extended to explore the relationship between economic growth and biodiversity loss, a dimension of environmental degradation. Previous studies such as Li. X et al. (2024), Tan et al. (2022), Mills and Waite (2009) and Dietz and Adger (2003) have investigated this potential nonlinear relationship. However their results are divided, suggesting more complex and context-specific drivers are causing the change for bioverity. Therefore a more nuanced empirical analysis should be complemented with the regression (Li. X et al., 2024; Mills & Waite, 2009; Dietz & Adger,

2003). Nevertheless, determining whether a similar non-linear relationship exists in the Brazilian context can offer valuable insights for designing systematic changes or policies that balance economic growth with biodiversity.

When addressing conservation and restoration of biodiversity, it is essential to consider the environmental-development dilemma faced by emerging and developing countries. In such contexts, both individuals and governments may prioritize short-term economic gains over long-term environmental nature-based solutions, particularly when immediate income is needed to meet basic needs. However, this short-term focus can create a vicious cycle, as environmental degradation may enhance poverty. Many low-income populations depend directly on natural resources for their livelihoods, and sectors such as agriculture, forestry, and fisheries are especially vulnerable to biodiversity loss. This highlights the importance of protecting natural capital, which serves not only as an economic resource but also as a foundation for long-term development. As Janvry and Sadoulet (2021) emphasize, safeguarding these income-generating ecosystems is crucial for sustaining the well-being of communities in emerging and developing countries like Brazil.

2.3 Optimizing Biodiversity Investments: Risk-Management and Blended Finance

The issue of understanding and addressing biodiversity risk is gaining importance in the financial sector, where risk management is currently lacking despite 55% of the world's GDP being directly dependent on ecological services (PWC, 2020; PWC, 2023). Biodiversity loss can impose financial risks through physical and transitional risk. The former is related to the aspect of physical impacts of biodiversity risks that directly cause economic and/or financial losses for corporations and other private investors, such as the loss of pollinators that threatens agriculture production (PWC, 2020; Heal, 2020; Hudson, 2024). These risks can either be acute or materialize over time and lead to credit risk and bank sector exposures. The latter relates to transition in the market when it is adopting a more biodiversity sustainable economy. For example increasing regulation and legal liabilities can lead to compliance risk. Additionally, a rise in stakeholder (e.g. consumer and NGOs) awareness can lead to reputational and liability risk. These risks can lead to higher capital cost, asset devaluation, rising insurance claims and premiums, negative public perception and reputational damage for the affected corporations, causing financial losses or even bankruptcy (PWC, 2020;

Mistra, 2021). This points at the importance for the financial sector to account for biodiversity loss in their risk assessment, including both physical and transitional risk.

The risk-return tradeoff, suggests that higher risk should be rewarded with higher return for private investors (Markowitz, 1991). Within biodiversity investments this is not necessarily always the case. In recent years, blended finance has become a widely discussed topic, with various definitions emerging as a tool to de-risk investments and thus improve the risk-return profile (Flammer et al., 2025). The introduction highlighted the importance of biodiversity, the major financial gap and the role of the private sector addressing its shortfall. Emerging as an innovative financial mechanism, blended finance is designed to mobilize private capital towards impact projects that benefit society, while also offering financial returns (OECD, 2021). This is through the strategic combination of public, philanthropic, and private capital in areas with high development impact, in accordance with Mutambatsere and Schellekens (2020) and OECD (2021).

OECD (2021) has established *The Blended Finance Guidance* to support policy recommendation and implementation of blended finance incentives with several aspects to consider. Blended finance should target specific market failures in order to attract private investments. Blended finance can only work in the long run if the underlying market fundamentals are put in place, such as policy and regulatory frameworks that ensure that private sector investments recover their costs and earn returns that justify the risk taken. These enabling conditions must be developed before or along with the blended finance project (OECD, 2021). In the context of Brazil, blended finance should be strategically used to address specific identified market failures that hinder private investment in biodiversity and conservation efforts in order to mobilize private capital.

Furthermore, a central challenge is aligning the interests of public and private sectors due to differing objectives. Thus, effective blended finance requires balancing development goals with financial returns to encourage private sector participation (OECD, 2021). In the context of biodiversity projects, the financial returns from conservation and restoration efforts are often not immediately visible or easily quantifiable. This lack of short-term financial incentives can pose a significant barrier to private sector participation (PRI, 2024).

Blended finance transactions must be anchored in clearly defined development objectives and carefully adapted to the local context as we do for Brazil. This contextual tailoring is

particularly important in sectors and regions where commercial capital is limited (OECD, 2021), such as biodiversity conservation in emerging- and developing countries, like Brazil (Barbier et al., 2018; GFANZ, 2024). Giving blended finance the potential to deliver high additionality by crowding in private investment that would not otherwise occur.

Blended finance should also allocate different risks such as country-, context-, and sector-specific risks and target them at various levels (OECD, 2021). Emerging and developing countries, like Brazil possess most of the world's biodiversity but also suffer from higher country risk (PRI, 2024). Sectors with proven track records tend to reduce perceived risks (OECD, 2021). Targeted risk-sharing mechanisms, such as grants for early-stage support or guarantees to absorb first losses, can incentivize private investment by reducing perceived risk and creating initial market track records (Dasgupta, 2021; Mutambatsere & Schellekens, 2020). Blended finance can be used as a signal that demonstrates a project's viability to investors by reducing risk and enabling innovation, thereby attracting investors seeking higher returns with lower overall risk (Dasgupta, 2021).

To conclude the theory section, hyperbolic discounting refers to the tendency to prefer immediate or short term payoff instead of long term payoff despite receiving a greater return in the future. Making investments with long time horizons less desirable (Goolsbee et al., 2020). Nature-related risks tend to emerge over much longer timeframes than those financial actors typically consider. As a result, the most severe and potentially irreversible impacts may lie beyond their usual planning horizons, despite their significant long-term economic consequences (Dasgupta, 2021). The misalignment in time-horizons between impact and financial returns of biodiversity investments could therefore be a reason for lack of private capital.

Building on these theoretical insights, the following methodology section outlines how the identified market failures, risk management strategies, and the role of blended finance lay the foundations for the design of stakeholder interviews and field observations. Applied to the Brazilian context, the empirical approach examines practical barriers and opportunities for mobilizing private capital for biodiversity. Additionally, the EKC theory, which offers valuable insights for designing systems and policies that balance economic growth with biodiversity conservation, underpins the regression analysis examining the relationship between economic development and biodiversity loss in emerging and developing economies.

3. Data and Methodology

To examine how blended finance can help de-risk and attract private investment in biodiversity conservation and restoration in Brazil, this thesis uses a mixed-methods approach. With a quantitative component exploring the EKC theory in countries comparable to Brazil. This is complemented by two qualitative components, the first part includes interviews with key stakeholders active in the biodiversity market, both in the Brazilian and global context, while the second part is an in-depth field study of a specific conservation and restoration initiative in Brazil, Project A. The latter aims to capture on ground barriers and challenges with attracting capital to biodiversity initiatives.

3.1 Biodiversity Intactness and Economic Growth

The aim of the quantitative approach is to examine whether a relationship exists between biodiversity intactness and a country's economic growth, while controlling for other influencing factors. Ideally the focus would be to look at how private and public financial flows for biodiversity affect biodiversity intactness. However, due to the lack of data for tracking these flows on a national level, it was not feasible to conduct an econometric regression. Instead we conducted an EKC analysis which provides a broader perspective but still gives valuable insights since development is needed for emerging and developing countries. As they possess the largest share of biodiversity it is important to know how economic growth affects biodiversity and whether structural changes are required to align economic development with long-term biodiversity conservation.

Given that these countries possess a substantial proportion of global biodiversity, it is essential to examine how economic growth influences biodiversity. This analysis is critical in determining whether structural adjustments are required to ensure that economic development can proceed in a manner that is compatible with biodiversity conservation.

Instead, we conducted an EKC analysis, offering a broader perspective while providing valuable insights into the relationship between economic growth and biodiversity. Given that emerging and developing countries hold the majority of the world's biodiversity, understanding this dynamic is essential to determine whether systemic changes are needed to reconcile economic development with biodiversity conservation

Therefore the regression model used in the thesis tests the EKC theory, taking on a wider perspective for emerging and developing markets since they, like Brazil, are more vulnerable to biodiversity loss and host a significant share of the world's biodiversity (GFANZ, 2024).

In our model, 113 emerging and developing countries were selected (IMF, 2023). Other emerging and developing countries on the IMF list had to be dropped due to missing data because of non existing observations on either the dependent variable or multiple control variables. In total, there are 2,010 observations. All data were collected from the following open data sources; World Bank, International Monetary Funds (IMF), International Union for Conservation of Nature (IUCN), and Natural History Data Portal. The observations are between the years 2002 to 2020, with this timespan being determined by the availability of values for the dependent variable. The model used is a multiple OLS regression model, and statistical tests have been conducted to support its robustness, as presented in appendix A.

The following regression model has been used:

$$\begin{aligned} \text{Biodiversity Intactness Index} = & \beta_0 + \beta_1 \ln(\text{GDP per capita}) + \beta_2 (\ln(\text{GDP per capita}))^2 \\ & + \beta_3 \text{Government Effectiveness} + \beta_4 \text{Forest Area (\% land)} \\ & + \beta_5 \text{Natural Resource Rent} + \beta_6 \text{Population Density} \\ & + \beta_7 \text{Corruption} + \beta_8 \text{Red-Listed Species} \\ & + \beta_9 \text{Financial Development} + \beta_{10} \text{Temperature} \\ & + \beta_{11} \text{Latin America} + \beta_{12} \text{Foreign Direct Investment} + \varepsilon \end{aligned}$$

The table below provides an overview of the selected variables. Followed by a discussion of the hypotheses formulated, along with their expected effects on Biodiversity Intactness Index (BII).

Variable	Description	Calculations	Unit	Source
Dependent variable				
Biodiversity Intactness Index (BII)	Estimation of how much biodiversity remains in a region	-	%	Natural History Data Portal
Independent Variables				
$\ln GDP$	Gross domestic production per capita (logged transformed)	Natural log of GDP per capita	%	World Bank
$\ln GDP^2$	Squared term of $\ln GDP$ per capita	$(\ln GDP)^2$	%	World Bank
Control Variables				
Government Effectiveness	Perceived effectiveness of public institutions	Scaled 0-1	%	World Bank
Forest Area (% of Land)	Share of total land area covered by forest	Scaled 0-1	%	World Bank
Natural Resource Rent	Economic rent from extraction of natural resources (eg. oil)	Scaled 0-1	%	World Bank
Population Density	Population per square kilometer of land area	-	Per/ km^2	World Bank
Corruption	Perception of public power used for private gain	Scaled 0-1	%	World Bank
Red-Listed Species	Share of species listed as threatened	Scaled 0-1	%	IUCN
Financial Development	Development of financial institutions and markets	Scaled 0-1	%	IMF
Temperature	Average temperature deviated from 1951-1980 baseline	-	-	IMF
Latin America	Dummy variable: 1= country in latin america, 0= otherwise	Dummy	0 or 1	-
Foreign Direct Investments (FDI)	Net inflows as % of GDP	Scaled 0-1	%	World Bank

Table 1: Variable description

The dependent variable *BII* measures the average combining data on land use, ecosystem extent, total native species and population abundance in a specific area despite human impact

relative to undisturbed ecosystems, placing all countries on a standardized scale from 0% (entirely depleted) to 100% (intact ecosystem). This makes it possible to conduct meaningful comparisons between countries with different ecological systems (Scholes & Biggs, 2005). Through looking at intactness it contrasts with other abundance indicators that may be misleading showing stable or improving species trends because of the lack of inclusion of historical biodiversity loss. BII also captures the combined effects of land use changes and climate impacts which allows for further projections and can therefore be used to lay the ground for policy frameworks, as it has done for post-2020 GBF (Natural History Museum, n.d.). The width unlike other data makes it a useful indicator for ecosystem resilience (Dasgupta, 2021).

Natural logarithm of GDP per capita and natural logarithm GDP per capita squared is added to test the EKC theory's inverted U-shaped relationship between economic growth and biodiversity degradation (Grossman & Krueger, 1995). GDP values are log-transformed to express relative changes in percentage terms making them comparable between countries.

Government effectiveness is included in the model as a proxy for institutional quality, with 0 % being the lowest level of effectiveness and 100% the highest. In the context of biodiversity, effective governance is necessary, enforcing environmental regulations, managing protected areas, and implementing conservation policies. Governments play a vital role in eliminating environmental damage in their countries (Al-Mulali, 2022). Consequently, an effective government would hypothetically increase BII.

Deforestation has previously been included as a control variable in regressions testing the EKC hypothesis, as seen in studies by Mills and Waite (2009) and more recently by Tan et al. (2022). Forest is the major habitat for biodiversity on land, if deforestation increases it is therefore likely that the biodiversity intactness will decrease.

Natural resource rent could be due to increasing heavy extractions from environmentally harmful industries that can often cause ecological degradation (Ulucak & Ozcan 2020), which leads to biodiversity loss. On the other hand Li. X et al. (2024) found that natural resource rent can help mitigate environmental degradation. This may be due to its relation to economic growth and enabling a green transition. The mixed results from the previous scholars showcase the importance of examining it further. Thus, natural resource rent can affect BII in two ways.

The increasing population growth and human activities are one of the main drivers for biodiversity loss (European Parliament, 2020; UNEP, 2023). Population growth poses a significant threat to biocapacity, as it increases the demand for natural resources and ecosystem services, often beyond what the environment can sustainably provide (Dietz & Adger, 2003; Mills & Waite, 2009; Dasgupta, 2021). In addition, urbanization is a key driver of regional biodiversity loss (Li. R et al., 2024; Arslan et al., 2022). Therefore *population density* is added and believed to have a negative effect on BII.

Overall *FDI inflows* can have both positive and negative effects on biodiversity loss. It can channel technology transfer and capital inflows potentially reducing environmental harm (Ekeocha, 2021), but it can also intensify resource exploitation in countries with weak environmental regulations (Al-Mulali et al., 2022). Therefore, hypothetically FDI can influence BII in both positive and negative directions.

A *corruption* variable is added, as Dasgupta (2021) states that corruption undermines biodiversity by enabling the unchecked exploitation of natural resources. When officials are unaccountable and control resource use, it encourages rent-seeking and weakens environmental protections, making conservation efforts ineffective. Tan et al. (2022) agrees and means that corruption undermines environmental regulations by weakening enforcement, ultimately accelerating species loss. Hypothetically, greater corruption could affect BII negatively.

The *red-listed species* variable were collected as a complementary factor to BII as it captures the number of threatened species, an aspect not directly reflected in the BII (Scholes & Biggs, 2005). The two measurements reflect two different dimensions of biodiversity, Scholes and Biggs (2005) therefore argue they should be complementary in calculations. BII captures the ecosystem level while red-listed species highlight specific species extinctions (Dasgupta, 2021). Including the latter helps control for underlying species specific pressure that might influence national biodiversity intactness. Lower values means that there are more threatened species which would hypothetically indicate a lower BII.

Financial development index was included, with higher values indicating a more developed financial market. In emerging and developing countries, where high borrowing costs often limit access to capital, a more developed financial sector can lower these barriers and facilitate investment in environmentally sustainable businesses. This can support

climate-smart initiatives, improve access to green financing, and help accelerate the ecological transition. On the other hand, increased financial activity might also enable expansion in sectors that contribute to environmental degradation (Arslan et al., 2022; Acheampong, 2019). Therefore, the effect of financial development on BII could go both ways.

Temperature is included in the model as a proxy for climate change. Rising temperatures can have direct and indirect negative effects on biodiversity, including habitat loss, change migration patterns, and increased species extinction risks (Dasgupta, 2021). As such, temperature increase is expected to be negatively associated with BII.

Finally, a dummy for *Latin America* was added given that biodiversity is ranked as the number one long term risk and in light of this study's focus on Brazil (WEF, 2025). The dummy control for potential unobserved regional effects on biodiversity intactness, as Latin American countries often share similar historical backgrounds, cultural ties, and geopolitical characteristics. There are 24 out of 33 Latin American countries in the dataset that is included in the variable.

3.2 Interviews

To gain a deeper understanding of the challenges and barriers biodiversity conservation and restoration face, interviews with key stakeholders as well as a five weeks case visit was conducted in Brazil. Since the topic is complex and cross- sectoral the wide range of different respondents ensures an overview of the problem. In total 16 semi-structured interviews were conducted, each lasting between 45 and 120 minutes. The interviews were informational in nature, capturing the institutional perspective of the organization or entity the respondent represented (Backman, 2016; Andersson & Johansson, 2024).

The table below provides an overview of the conducted interviews.

Respondent	Organisation	Time	Date	Place
R1	Non Governmental Organization (NGO)	95 minutes	14/2-25	São Paulo, Brazil
R2	Non Governmental Organization (NGO)	60 minutes	7/2-25	Indonesia (Online)
R3	Non Governmental Organization (NGO)	60 minutes	7/2-25	Singapore (Online)
R4	Non Governmental Organization (NGO)	45 minutes	5/5-25	Singapore (Online)
R5	Project A	120 minutes	18-21/2-25	Nova Friburgo, Brazil
R6	Project A	60 minutes	3/4 -25	Gothenburg, Sweden
R7	Project A	60 minutes	3/4-25	Gothenburg, Sweden
R8	Think Tank	75 minutes	17/2-25	Rio de Janeiro, Brazil
R9	Investment Entity	60 minutes	6/3-25	Rio de Janeiro, Brazil
R10	Investment Entity	45 minutes	3/2-25	Stockholm, Sweden (Online)
R11	Investment Entity	55 minutes	7/2-25	Stockholm, Sweden (Online)
R12	Investment Entity	50 minutes	10/2-25	Barcelona, Spain (Online)
R13	Private Company	60 minutes	13/2-25	São Paulo, Brazil
R14	Private Company	60 minutes	13/2-25	São Paulo, Brazil
R15	Intergovernmental Organisation (IGO)	60 minutes	5/2-25	Genev�, Switzerland (online)
R16	Government	45 minutes	14/2-25	Bras�lia, Brazil (Online)

Table 2: Interviews schedule

The interviews followed a similar structure, beginning with the respondent describing their background and the core mission of their organization. General themes tailored to their position and expertise within the field were introduced. While allowing each respondent to speak freely and explore topics in their own way, a set of core themes across all interviews were used to ensure consistency without imposing a specific narrative (Backman, 2016). The core themes discussed are barriers in conservation and restoration biodiversity, and the challenges of getting private sector involvement.

The majority of the respondents are active in forest conservation and restoration in Brazil or have experience from it with four exceptions active outside of Brazil in which case a general perception of the field has been discussed. They still provide great insights of the challenges within conservation and restoration of biodiversity. In this paper, all respondents will be referred to by R1-16, in order to protect their privacy and avoid unnecessary exposure.

The interviews were conducted in person when possible otherwise they were held online. If the respondent gave permission, the meeting was recorded. In cases where recording was not allowed, notes were taken instead, which were expanded and formalized immediately after the meeting to ensure accuracy. A reflective thematic analysis was applied following the approach outlined by Braun and Clarke (2006). The process began with a thorough reading of the interview material, followed by an identification and organization of preliminary codes and themes. This enabled us to trace recurring patterns and perspectives across respondents.

3.3 Project A

The final component of the methodology consists of a field study focused on a specific newly formed conservation and restoration initiative, referred to in this thesis as Project A. The field study was on site for 4 days. The project is situated within the Atlantic Forest biome, a rainforest where only 8% of its original state is intact making it a great location for a conservation and restoration initiative. Project A is located close to Nova Friburgo in the state of Rio de Janeiro in Brazil. Project A is a non-profit organisation that wants to become self-sufficient. It is actively exploring different innovative financial mechanisms within biodiversity, including blended finance making them relevant for this thesis. The purpose of the field study is to get a deeper understanding of the complexity of the current real life setting for a conservation and restoration project in Brazil (Backman, 2016).

To gather data, three semi-structured interviews were conducted with key actors involved in the daily operation and financial coordination of Project A. These respondents included the on-site project manager, a global manager, and one of the founders of the project. The interviews focused on the project's financial structure, challenges in getting funding, business goals, perceived barriers to scaling or long-term viability. The semi-structured interviews are included in the 16 interviews above. In addition to the interviews, observational data was collected through field visits to the project site. This contextualized the challenges and risks involved with conservation and restoration of biodiversity locally in Brazil.

4. Results

In the following section the results from our qualitative and quantitative components will be presented. The results will be presented in the same chronological order as the methodology section.

4.1 Econometric Regression

After running the multiple OLS regression the following econometric result was found.

Variable	Biodiversity Intactness Index (BII)
$\ln GDP$	-0.1051*** (0.0291)
$\ln GDP^2$	0.0070*** (0.0019)
Government effectiveness	0.0060 (0.0225)
Forest area	0.2156*** (0.0137)
Natural resource rent	0.1744*** (0.0328)
Population density	-0.0002*** (0.0000)
Corruption	0.0856*** (0.0201)
Red-listed species	0.1004*** (0.0358)
Financial development	-0.0477* (0.0255)
Temperature	-0.01467*** (0.0054)
Latin America	-0.0146* (0.0079)
FDI	-0.1409*** (0.0307)
Observation	2010
R^2	0.3254

Table 3 - Multiple Regression Model

lnGDP, lnGDP2, forest area, natural resource rent, population density, corruption, red-listed species, temperature and FDI are statistically significant on a 1% significance level, as shown in table 3.

First, a 1% increase in logged GDP per capita (lnGDP) is associated with an approximate 0.1050 percentage point decrease in BII, indicating a negative correlation between income per capita and biodiversity intactness. On the other hand, a 1% increase in logged GDP per capita squared (lnGDP2) suggests a 0.0070 percentage point increase in BII. This confirms the EKC inverted U-shaped relationship between BII and economic growth.

Forest area shows that a one percentage point increase in forest area is associated with a 0.2156 percentage point increase in BII. As predicted, the correlation indicated that increased forest will lead to more intact biodiversity. Total natural resources rent also has a positive relation with BII. One percentage point increase of natural resource rent measured in % of GDP, leads to a 0.1744 percentage point increase in BII. This means that the more capital received from oil, natural gas, coal, minerals and forest rent the better intact the biodiversity is. Population density on the other hand has a negative relation with BII, a one unit (Person/ km^2) increase in population density leads to a 0.0002 percentage point decrease in BII. An increased population density is as hypothesized causing biodiversity loss.

Holding all other variables constant, a one percentage point increase in the corruption index, where higher values indicate lower levels of corruption, is associated with a 0.0856 percentage point increase in BII. Therefore corruption as hypothesized is negatively affecting BII. An increase of one percentage point in the red-listed species index is associated with a 0.1004 percentage point increase in BII. Since higher values of red-listed species means less threatened species, it is affecting BII positively as predicted. The regression results indicate a negative relationship between FDI and BII, where a one percentage point increase in FDI inflows is associated with a 0.1409 percentage point decrease in BII, suggesting that FDI inflows will cause biodiversity loss. The last variable significant on 1% is temperature. A one-degree Celsius increase in average temperature is associated with a 0.0140 percentage point decrease in the BII. Higher temperatures are associated with lower levels of biodiversity intactness.

Both the financial development index and the Latin American dummy are significant on a 10% significance level. The interpretation should therefore be done with caution and we will

not comment on it. The variable government effectiveness is statistically insignificant and therefore cannot be reliably interpreted in the context of its relationship to BII.

4.2 Interviews

The following subsection draws on qualitative insights from the interviews, highlighting key investment barriers and systemic challenges in the Brazilian landscape.

4.2.1 Blended Finance

All respondents emphasized the need to scale efforts to reach a greater impact for biodiversity. NGO (R4) states that the private sector is a key part when discussing financing for biodiversity. In relation to scaling and when asked how to get the private sector involved, blended finance structures were directly or indirectly suggested. A private company (R14) admits using blended finance mechanisms to increase the scale of their impact investments. Representatives from both an IGO (R15) and a private investment entity (R12) noted that nature-based solutions in emerging and developing countries are often perceived as high-risk and low-return, especially in regions with large country risk such as corruption, regulatory uncertainty, or currency volatility. R15 states;

“The only way a private investor would engage is if the projects were heavily de-risked or if they were ultra-wealthy individuals willing to take on losses.”

R12 goes on with adding;

“[...] in order to cover some of these challenges, blended finance may be required, reducing the risk and in some cases, possibly also helping build capacities through technical assistance and whatever is needed there.”

Both private company (R13) and investment entity (R12) stated that they currently use blended financial setups. R12 described two different ways blended finance could be used as a de-risking mechanism. First a first-loss mechanism, where a de-risking partner absorbs initial losses in case of default, reducing financial exposure for private investors and encouraging participation in high-risk or emerging sectors. Second, the de-risking party can

provide guarantees for part of the investments from the beginning, one example is covering parts of the interest bank loans to nature-friendly farmers making financing more accessible.

Finally, the investment entity (R9) respondent stated that the most effective blended finance approach for Brazil is to combine philanthropic and commercial capital. However, the investment entity (R12) states, aligning incentives between public and private actors remains a challenge as they operate under different priorities: public goods versus profit, this creates communication and coordination barriers. To further add to this IGO (R15) emphasized that scaling restoration efforts require more than private capital. A systemic change through market regulation and consumer demand is ultimately more effective as well as creating stable markets. A final note is the statement from R12 suggesting that de-risking through blended finance is more of an expectation and NGO (R4) suggests it is just intuitively reasonable.

4.2.2 Time Horizon, Risk Perception, & Investment Pipelines

One of the most consistently cited challenges across all respondents (R1-16) is the long time horizon required for biodiversity projects to yield both financial returns and measurable ecological outcomes. An IGO representative (R15) highlighted that the challenge in attracting private investors is that they typically seek shorter time horizons for their returns;

“Traditional private equity models with 10 to 12 year timeframes simply do not align with the reality of forestry investments.”

Investment entity (R12) agrees and continues by saying that conservation and restoration efforts are inherently long-term, which clashes with most investors' preference for short payback periods, making it harder to attract private capital. An NGO (R1) respondent emphasized the challenge of opportunity cost, noting that investors may prefer more profitable, short-term options like cattle ranching or agriculture over biodiversity projects.

In order to sustain long term conservation and restoration efforts NGO (R3) states that it is crucial to engage the local communities. R3 goes on highlighting the importance of understanding the local community's willingness to pay for nature, as this is crucial for effectively offsetting environmentally harmful activities. Several respondents mentioned that they work closely with the local communities (R1, R2, R3, R5, R13 and R16) as a private company (R13) states;

“It’s not about doing things for the communities, it is about doing things with them.”

Two investment entities (R11 & R12) emphasized the challenge with limited existent or unclear impact measurement. As R11 explained, despite the existence of high-potential projects, engagement is unlikely unless there is clear evidence of return, either financial or measurable impact on biodiversity. The measurement difficulty for biodiversity impacts is also brought up by NGO (R1 & R4), and think tank (R8) respondents. Both R8 and R1 suggest the need for standardized definitions and frameworks that will help investors make informed responsible decisions. R9 adds that investors do not know;

”How to analyze a project like that [...] So they are looking for positive cash flow, financials, indicators, KPIs, and suddenly there comes a project in hand that they must measure the level of the social outcomes”

R9 goes on claiming that the main barrier for involving the private sector is the lack of knowledge regarding the risk perception. In connection, there is an overall perception from respondents that the lack of investments are linked to the risk-return tradeoff being high risk in relation to low proven financial return. IGO (R15) and investment entity (R12) respondents state that high country risk and uncertain returns discourages private sector engagement.

The investment entities (R12 & R10), private company (R14) and NGO (R4) representatives highlight the different motivators for private sector engagements. R4 states that there are two motivators; private sectors act purely on reputational risks or they engage due to regulations. The reputational risk opinion is shared by R12 & R14.

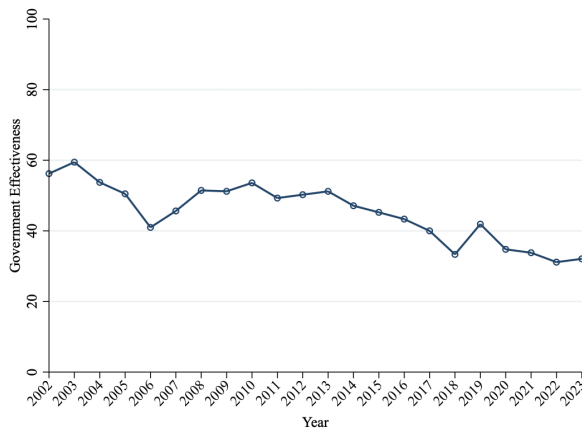
When asked why there are not more investments in biodiversity today, two perspectives emerged regarding capital availability. One view, shared by think tank (R8), NGOs (R1&R2), and investment entities (R9 & R12), is that capital exists but lacks an efficient pipeline to reach viable projects. R2 and R9 claim that it is not the lack of capital, but rather a shortage of sufficiently large and investable projects. Additionally, the IGO (R15) noted that many impact funds are too small to attract serious private investors. R8 noted that after meetings with developing banks, the banks reported;

“We put together a fund for bioeconomy, and we could not find the projects to invest in.”

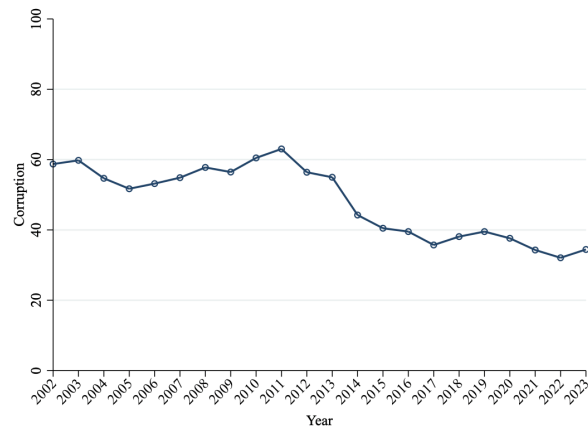
Another view from NGO (R3) representatives and those working on Project A (R6, R7 & R5) is rather that the core issue is the lack of available capital. From their perspective, the challenge is not distribution, but the limited financial resources being directed toward nature-based solutions.

4.2.3 Policy & Regulatory Challenges

Another recurring theme in the interviews was the political and regulatory challenges in Brazil. Several interrelated barriers were identified, including weak enforcement, legislative delays, and regulatory instability.



Graph 1. Government Effectiveness in Brazil 2002-2023
Source: World Bank



Graph 2. Corruption in Brazil 2002-2023
Source: World Bank

To get an overview of the current institutional quality in Brazil graph 1 and 2 illustrate government effectiveness and corruption between 2002 to 2023. Government effectiveness illustrates an overall decrease with certain fluctuation over the years, where lower values indicate less effectiveness. Corruption perceptions index, indicating a decline in perceived corruption in Brazil since 2010. However, as of 2024, Brazil is ranked 107th out of 180 countries (Transparency International, 2024).

While Brazil has strong environmental legislation noted by (R1, R5, R8, R9 and R16), NGO (R1) and government (R16) representatives mentioned a significant gap between policy creation and implementation. The Forest Code brought up in the introduction was cited as an example of good intentions hindered by bureaucratic inefficiencies and lack of monitoring. Furthered explained by R16;

“Projects often take a long time to get off the ground, and the financial mechanisms in place [...], are not as effective as they could be.”

The think tank representative (R8) continues and points out that “foreign investors, in particular, struggle to navigate Brazil’s complex regulatory landscape”, which further limits financial support for conservation initiatives.

A key issue raised by NGO (R2), think tank (R8), investment entity (R12) and Project A (R5) respondents was land tenure insecurity, where R2 emphasises the difficulties working with local communities without property rights. R8 goes on saying that there is particularly a lack of property rights in remote regions like the Amazon making monitoring and enforcement difficult, stating that;

“This legal uncertainty discourages investment in conservation and restoration projects, as property rights are unclear and costly legal battles can arise.”

An NGO (R3) representative noted that governments often subsidize environmentally harmful sectors such as oil, gas, and industrial agriculture. R3 emphasized the potential to "change the equation" by instead subsidizing nature and penalizing destructive activities. Both NGO (R1 & R3) and private sector (R13) representatives underscored the need for regulatory frameworks to align better with economic incentives, highlighting the persistent dilemma between short-term poverty reduction and long-term environmental sustainability. R13 states the risk in overtrusting the public sector since their actions can be unpredictable. R3 further proposed that financial institutions, such as banks, could play a key role by restricting favorable lending terms to environmentally damaging industries.

The sheer size and ecological diversity of Brazil pose additional governance challenges. Brazil is the home of six terrestrial biomes including Amazonas Rainforest (tropical), Carrado (savanna), Atlantic Forest (tropical), Caatinga (desert), Pampas (grassland) and Pantanal (flooded savanna) (IBGE, 2019). Government (R16) and think tank (R8) representatives noted that Brazil’s diverse ecosystems makes it difficult to establish and enforce cohesive national conservation strategies that are suitable in all settings.

Political cycles further destabilize efforts for investments in conservation and restoration noted by R8 and R13. The contrast between the environmental agendas of presidents Bolsonaro (2019-2022) and Lula (2023- current) was frequently cited with Brazil's environmental agency (R1, R5, R8 & R16), IBAMA, experiencing significant disruption under Bolsonaro's administration (R5 & R16). Given the vulnerability of environmental agendas to shift with the political cycles, R8 suggested framing biodiversity in relation to other political issues to foster broader, cross-partisan support and ensure greater policy continuity.

NGO (R1) reported distancing themselves from the Brazilian government collaboration due to reputational risks. However, R1 goes on with stating they are getting international governmental funding. Another NGO (R4) and government (R16) representative, like R1, emphasized the critical role of international funding. R4 explained that you cannot rely on public funding from emerging and developing countries as their governments face;

“[...] hard pressure to fund their own social needs, health care, education and increasingly, defense.”

Therefore, R4 stressed the need for philanthropic and private sector involvement. However, R16 argued that the Global North must step up, but also pointed to a deeper issue: an imbalance in global discussion representation, where;

“Countries from the Global South, such as those in Latin America and Africa, are underrepresented compared to Europe.”

Indicating that their individual interests may not be prioritized within international agreements.

4.2.4 No One Way Fits All

A private company (R13) representative noted that there is no single solution to the environmental crisis, every initiative requires significant effort and tailor-made approaches. Similarly, an investment entity (R9) and NGO (R1) representative emphasized the importance of identifying and addressing the specific barriers faced by each project, highlighting that there is no “one-way-fits-all” approach. The think tank (R8) and government (R16) representatives underscore the need for context-specific strategies and solutions, due to Brazil's diverse environmental and socio-political landscape. However, as R13 states;

“Some might say that there is no time left to wait for perfect solutions. We need to move forward with things that are strong and robust enough. We cannot not afford to wait any longer.”

Emphasizing the need for initiating investment efforts, even if current solutions are not yet perfect.

4.2.5 Conservation vs Economic Interests

The majority of respondents highlighted that companies in the private sector are not actively investing in biodiversity issues due to two reasons. A representative from a private company (R14) and NGO (R4) claims it is because companies do not recognize their dependence on nature. Project A (R5) and NGO (R1) representatives suggest companies choose not to acknowledge it. R1 noted that some companies, especially those with business models reliant on natural resources, are aware of their dependency and more likely to invest in biodiversity conservation within their own value chains to protect their operations. To deepen this R1 and R4 states that the challenge lies in their limited understanding of how ecosystem restoration should be implemented in a way that supports broader systemic resilience.

R1 continues, “there is an education process to convince companies”

emphasizing the need to build capacity and awareness within the private sector.

The financial returns for biodiversity projects are not currently generating revenues keeping the regular commercial investor away, states the private company (R13) representative. R13 and R14 explain that they invest in projects through their companies private foundations making it in theory philanthropic capital. Overall, responses suggest that the main source of funding for biodiversity in Brazil comes from philanthropic and public capital. R14 added;

“Unfortunately, in the end [...] We are still operating within capitalism, and money and revenues are still the top of a business’s priorities.”

In connection to this many respondents proposed regulatory enforcement as a necessary solution to shift the focus from solely monetary return. Several suggested that mandating investment through legislation could significantly improve private sector engagement.

Project A (R5), NGO (R1 & R4) and government (R16) representatives pointed out legal frameworks where heavy extractive industries such as oil and mining are required to reinvest in environmentally friendly projects in Brazil. However, opinions were divided on the effectiveness of collaborating and getting funding from these sectors. Some respondents R4, R5 and R6 expressed skepticism, arguing that extractive industries are working in opposition to environmental goals due to the inherent environmental damage caused by their operations. On the other hand, R1, R2 and R13 emphasized the importance of increasing capital and would be willing to receive capital from all sectors, including those with high environmental footprints, in order to drive systemic change.

In order to increase the private sector participation, financial return is needed. R1 described an initiative where landowners were financially compensated for forest preservation through a local payment for ecosystem services scheme, which assigned economic value to nature, providing a financial incentive to protect their land.

4.3 Project A

In this section a deeper understanding of the barriers and challenges faced by Project A will be presented. Project A aims to further diversify its income streams primarily through a blended finance structure through increasing private capital, as its main funding currently comes from a Swedish philanthropic source. Plans are in place to develop ecotourism as well as biodiversity- and carbon credits. Biodiversity- and carbon credits is a way to increase the private participation in nature finance by creating a market where private investors and/or companies can compensate for their impacts elsewhere (Dasgupta, 2021). However, Project A (R6 & R7) representatives mentioned that while carbon and biodiversity credits are being considered, these markets are still in early stages, and they are not sure the Brazilian market is ready for implementing it broadly yet.

A major challenge for Project A according to all Project A respondents is the difficulties in securing funding. R6 goes on to explain that, due to bureaucratic hurdles, funds often get held up at higher political levels. As mentioned in the interview results above, another issue emphasized by Project A (R6 & R7) is that being a relatively young initiative, operating for less than two years, has also made investors more hesitant in investing in the project seeking a long track record. R6 and R7 notes the importance of having credible names and previous experience within the field in overcoming the maturity issue in attracting investments. This is

something the IGO (R15) respondent states as their initial evaluation before investing in projects.

Project A's mission is to expand their conservation and restoration efforts in the Atlantic Forest, however this creates the challenge of convincing the local communities to change their ways of living. R6 highlights the importance of ensuring that local communities understand what they stand to gain from preserving the forest and their land. R5 mentions that education is one of the key solutions to increase participation of local communities in restoration efforts. Another challenge is the long time horizon of conservation and restoration efforts of biodiversity, including a tropical rainforest. R5 mentions that with some help if the conditions are right an earlier degraded plot of forest can be restored in 25-30 years which is fast compared to other forests around the world.

R6 and R7 goes on emphasizing the importance of reputation in this field, noting that reputational damage can deter future investors and therefore they are currently not receiving philanthropic capital from harmful industries.

R7 points to a clear mismatch between investors and biologists, explaining that investors often express frustration over biodiversity being too complex or difficult to quantify in a way that supports clear investment metrics. However, R7 challenges this view, arguing that while it may be complex, it is entirely possible to develop meaningful and measurable indicators for biodiversity-related investments.

Furthermore, they all continue stating that 70% of Brazil's population is living in the Atlantic Forest biome and therefore creates a different challenge compared to for example the Amazons biome. The dense population in the area puts significant pressure on local biodiversity. R5 also suggests that there is a strong desire to restore forest but a conflict of interest arises between conservation efforts and industries like for example cattle farming. There is also a lack of communication and coordinated common actions between the sectors leaving room for misunderstanding.

5. Discussion

In this section the result will be discussed in order to answer the research question; How can blended finance be effectively used to de-risk and attract private sector investment for biodiversity conservation and restoration in Brazil?

Throughout the interviews and the analysis of the Brazilian case study it becomes evident that biodiversity conservation and restoration suffers from a persistent market failure deterring private sector investors. Both earlier literature and interview findings indicate that private sector involvement is essential to close the biodiversity financing gap (Hackmann, 2024; Beverdam et al., 2025; Flammer et al., 2025). In addition, Dasgupta (2021) states it is an institutional failure stemming from a lack of acknowledgement of both dependence and the economic opportunities in preserving nature. The findings from the regression, indicate a correlation between biodiversity degradation and economic growth, reinforce the need for innovative financial solutions to simultaneously protect biodiversity as well as economic development.

Blended finance with a combination of private, public and philanthropic capital, could be used to solve different types of market failures but in order to solve them they first need to be identified (OECD, 2021). The same applies to risk, as effective de-risking requires a clear understanding of the underlying risk factors. Then blended finance could be used as a tool to scale high impact private investments (Flammer et al., 2025). Below follows the identified market failures and risk barriers found within the context of biodiversity financing and Brazil.

5.1 Collective Action

The findings of this study highlights a significant challenge in mobilizing collective action towards biodiversity conservation within the Brazilian context. A recurring theme across the data indicates that insufficient integration of biodiversity considerations into business strategies persists, despite the recognition that over 55% of global GDP depends on ecosystem services (PWC, 2023; McKinsey et al., 2023). This points to a broader issue of limited awareness and understanding among private sector actors, as suggested by respondents R1 and R4, who attribute this gap primarily to informational asymmetries in the market.

However, insights from respondents R5 and R14 reveal that some firms may engage in a form of free riding, neglecting their externalities without regard for broader environmental impacts, aligning with theoretical notions of negative externalities outlined by Janvry and Sadoulet (2021) and Dasgupta (2021). Notably, industries with substantial environmental externalities tend to be less exposed to consumer-driven reputational risks, diminishing the incentives to engage in conservation efforts, as noted by Österblom et al. (2022). This creates a classic tragedy of the common dynamic, where private interests undermine collective social welfare due to insufficient incentives for cooperation.

The theoretical framework of Janvry and Sadoulet (2021) delineates four key conditions necessary for overcoming the tragedy of the commons. The first, awareness of biodiversity's benefits, appears to be lacking or deliberately disregarded by many private actors, despite the ecosystem's critical importance in the Brazilian context, where biodiversity loss is the greatest long-term risk for humanity (WEF, 2025).

The second condition involves the implementation of effective monitoring mechanisms to ensure compliance and accountability. Interviews indicate that, although the Brazilian government has initiated promising measures, there remains a substantial gap in enforcement and consistency, attributable in part to the country's vast geographical scale and heterogeneous landscape. Respondents R1, R5, R8, R9, and R16 emphasize these enforcement challenges and the role of weak governance, further compounded by high levels of corruption (Transparency International, 2024), which undermine the efficacy of regulatory frameworks. The regression analysis corroborates this, revealing a significant negative correlation between corruption levels and biodiversity intactness.

For the third condition, credible enforcement of sanctions, similar obstacles emerge due to governance deficiencies and corruption. These factors weaken the deterrent effect of sanctions, thereby reducing compliance likelihood. Österblom et al. (2022) underscore that the global operations of transnational corporations further complicated enforcement, necessitating stronger international regulatory frameworks.

The final condition pertains to the building of trust among stakeholders to foster long-term cooperation. The data suggest that pervasive corruption and inconsistent law enforcement erode trust, complicating collaboration efforts. R8 points to unclear property rights as a

barrier, which hampers monitoring and could lead to costly legal disputes, fostering mistrust in legal and regulatory institutions. Respondents R1, R2, and R5 highlight the importance of establishing trust with local communities to sustain effective conservation initiatives.

In summary, the limited private sector participation in collective action within Brazil appears rooted in a combination of low awareness, weak governance, and diminished trust, factors intensified by corruption. These systemic issues elevate perceived investment risks, thereby discouraging private engagement in biodiversity preservation. Nonetheless, structured interventions that leverage blended finance, combining public and philanthropic capital, not only provide necessary funding but also serve as credibility signals that can attract private investors by fostering trust and reducing perceived risks (Dasgupta, 2021). Addressing these structural barriers is essential for creating an enabling environment for effective collective action in biodiversity conservation.

5.2 Valuation Methods and Metrics

Another form of market failure lies in the significant gap in valuation methods and metrics for biodiversity investments, both financially and environmentally resulting in adverse selection. According to R9 and R12, a major barrier to private sector involvement is the limited understanding of the actual risks associated with the investments. R9 and R11 point out the presence of high-potential projects, but without demonstrable KPIs of financial returns or measurable ecological outcomes, investor engagement remains limited (Dietz, 2020; Hackmann, 2024; Edwards & Abivardi, 1998; Dasgupta, 2021). This is fundamental for establishing blended finance initiatives (OECD, 2021).

R9 emphasized the need for clear business models that communicate the value and structure of biodiversity projects for potential investors. R8, mentions that even major institutions like development banks struggle to identify pipelines for suitable projects, often due to unclear project designs. This is an area Project A is currently investigating by examining a range of potential income streams, including ecotourism, academic research visits, biodiversity and carbon credits.

Without a clear understanding of nature's true economic value the willingness to pay for it will be underestimated (Edwards & Abivardi, 1998; Barbier & Hanley, 2009). In particular

R1 and R3 points out the importance of understanding the local communities willingness to pay for offsetting harmful activities. The absence of standardized market frameworks creates further uncertainty. While initiatives like GBF mark progress, their impact remains limited due to the absence of binding financial mechanisms (Fenichel & Deans, 2024). Investors need clear, consistent, and comparable structures to evaluate biodiversity-related investments, yet as R1, R8 and R1 states the current fragmentation in methodologies and reporting undermines their ability to assess risks, returns, and impact (Hudson, 2024; Hackmann, 2024; Hanley & Barbier, 2009). However, one of the project A respondents R7 challenges this view and argues that developing suitable metrics is feasible, suggesting a mismatch in perceptions of how such metrics should be designed.

If investors are provided with clear guidance on frameworks they must follow, along with transparent assessments of financial risks, expected returns, and environmental impact, they are significantly more likely to engage. A critical step in this direction is the development and adoption of standardized metrics that speak the language of private investors, metrics that enable comparability, performance tracking, and risk assessment.

At the same time, as R13 emphasizes, there is no time to wait for a perfect solution. This is where blended finance can act as a catalytic tool, by lowering initial risk barriers and encouraging early private sector investments. If public or philanthropic capital agrees to take on a larger share of default or performance risk, it can incentivize private investors to participate, even in the absence of full certainty around risk, return and impact.

5.3 Environmental Kuznet Curve

Similar to Li. X et al. (2024) and Tan et al. (2022), our regression model finds a significant correlation between biodiversity degradation and early-stage economic development. However, Dietz and Adger (2003) and Mills and Waite (2009) suggest that the problem is more complicated than claiming that countries' economic growth is the sole source for biodiversity loss. This is also evident from the variety of barriers and market failures mentioned in the interviews, thus explaining their relevance in order to understand the complexity in financing biodiversity. As R13 mentioned, there is not one single solution, and every initiative needs to be tailored. Regardless, it is essential that emerging and developing economies are given the space to grow. However, most biodiversity investment opportunities,

and needs, are located in emerging and developing markets (GFANZ, 2024). Therefore, there is a need for innovative financial structures that can support sustainable growth while minimizing degradation of ecosystem services. Blended finance emerges as a promising mechanism (Flammer et al., 2025; Dasgupta, 2021; Hackmann, 2024).

Regarding the other findings from the regression, the FDI inflow suggests that increased activity by international corporations in emerging and developing markets corresponds with greater biodiversity degradation. This trend may be attributed to corporations operating in regions with weak environmental regulations or engaging in extractive industries that directly harm ecosystems (Al-Mulali et al., 2022). However, natural resource rent had a positive effect on BII aligning with Li. R et al. (2024). Since natural resource extraction tends to cause biodiversity loss, this correlation may be due to market price increases for natural resources rather than heavy extraction of the goods. This could be explained by the channeling of profits from resource extraction into biodiversity-related initiatives, as observed in the establishment of biodiversity programs linked to oil and mining operations in Brazil stated by R1, R4, R5, and R16.

As hypothesized, population density is found to have a negative effect on BII. This finding aligns with the statements from respondents R5–R7, who emphasized that population pressure has a major impact on biodiversity loss of the Atlantic Forest. In the context of Project A, this is particularly relevant, as it is situated in a region where approximately 70% of Brazil's population resides, a reason for why only about 8% of the original forest cover remains. Additionally, the regression results indicate that deforestation has a negative impact on the BII, further underscoring the need for careful consideration in both conservation planning and project implementation in the region.

As expected, corruption has a negative effect on BII, highlighting the importance of addressing underlying structural weaknesses in governance and institutional frameworks as discussed above. The number of red-listed species, included as a complementary indicator to the BII (Scholes & Biggs, 2005), also showed a negative correlation, reinforcing the observed pattern. Lastly, temperature emerged as a significant variable in the regression, with increases in temperature associated with further biodiversity loss pointing towards the importance of mitigating climate change (Dasgupta, 2021).

5.4 Country Risk

Approximately 90% of the world's biodiversity investments is concentrated in emerging and developing countries (GFANZ, 2024), regions that often present elevated levels of country risk (PRI, 2024). These risks can include political instability, economic volatility and corruption. To scale restoration efforts R15 emphasized it requires more than solely private capital, systematic changes through market regulation and consumer demand is needed in order to create a stable market. Something challenging in the Brazilian context with lack of property rights (R2, R5, R8 & R12), corruption and weak government effectiveness.

A sector specific risk within biodiversity, as R12 notes, is that the traditional risk-return tradeoff often fails, discouraging private investment when financial returns do not justify the associated risks (Markowitz, 1991). For instance, given Brazil's relatively high levels of corruption compared to other countries, investors may be deterred from investing, especially when lower-risk opportunities exist elsewhere. Flammer et al. (2025) and OECD (2021) suggest blended finance can through risk sharing improve the risk-return trade-off for the private investor. This would increase the attractiveness of biodiversity investments. Another important factor in overcoming specific risk and attracting private capital to blended finance projects is proven track records on the market (OECD 2021). Project A is a relatively newly started initiative without proven track records, R7 therefore stressed the importance of building credibility through strong reputational signals as well as having previous experience and credible names.

5.5 Environmental- Development Dilemma

In addition to the collective action strategies discussed above, enhancing governmental responsibility represents a critical pathway for addressing the market failure, tragedy of the common.

In Brazil the public sector is highly involved in international agreements and national laws are continuously explored. However, this commitment is undermined by inconsistent policy signals, such as the continued provision of subsidies for environmentally harmful activities. This could be understood through the lens of the development-environmental dilemma. Natural resources are central to the economy, particularly agriculture, a major source of employment and growth (European Parliament, 2020; UNEP, 2023; WWF, 2024). As the

world's largest net exporter of agricultural products, Brazil is crucial for regional stability and global food security (WWF, 2024). This same sector is highly exposed to physical biodiversity risks, a risk that current risk management strategies often fail to adequately address (Heal, 2020; Hudson, 2024).

Currently, most biodiversity projects do not yield immediate financial returns for the public nor private sector, rather it is about investing in the future generations or long term viability of operations (Janvry & Sadoulet, 2021; Dasgupta, 2021; Österblom et al., 2022). This conflicts with the prevalent tendency toward hyperbolic discounting, which prioritizes short-term gains over future benefits. Consequently, Brazil faces a difficult trade-off, the immediate economic benefits from resource extraction or the long term gains of sustainable practice.

While R1 and R3 advocate for systemic change through stronger regulations and penalties on harmful industries, a more effective long-term strategy may lie in transforming these systems from within, given the economic and social benefits that are provided by these sectors remain crucial to Brazilian society. R12 and Dasgupta (2021) highlight the role of blended finance in providing grants and guarantees, such as covering interest rates. This could support the green transition by for example encouraging more sustainable alternatives to environmentally harmful agricultural practices. Furthermore, R8 and R5 emphasize education and capacity-building for workers to support transitions to more sustainable practices.

Another hinder for long term biodiversity implementation is political cycles which can undermine policy implementations. R8 proposes framing environmental protection as a cross-political issue, integrating it into broader development agendas to ensure sustained engagement across political cycles and party lines.

Recognizing the limitations of public funding due to competing political demands, R4 underscores the critical role of private and philanthropic capital in driving and sustaining these efforts. As echoed by R9, the most effective blended finance source for Brazil is a combination of private and philanthropic capital.

5.6 International Capital

Interviews with R1, R4, and R16 highlight the importance of international public investment in catalyzing private sector participation. Public funding from more developed countries with

more effective governments and less corruption can help de-risk biodiversity projects and signal credibility to private investors. This aligns with Pearce and Moran's (2013) argument that the Global North should support conservation efforts in the Global South, a view shared by R16. Given the global nature of biodiversity loss as emphasized in the GBF, international cooperation is essential.

Project A illustrates the potential of this approach, as its financial model relies heavily on international public and philanthropic funding. However, precautions should be taken as R8 mentions that foreign investors often face barriers due to Brazil's complex regulatory environment and country-specific risks making local partnership central.

5.7 Long vs Short Time Horizon

The most frequently mentioned barrier from the interviewees is the time frame mismatch. A mismatch between the long-time horizons of biodiversity investments and the shorter-term return expectations of the private sector appears to hinder private investment engagement in biodiversity. Hackmann (2024) and all interviewees indicated that biodiversity-related investments typically require long-time commitments, from project initiation to measurable outcomes. This often conflicts with the preferences of private investors, who tend to favor shorter time horizons and quicker returns, a tendency explained by the concept of hyperbolic discounting. This is a key challenge for Project A, as their work in forest conservation and restoration may take 25-30 years before showing results, under optimal conditions. Although biodiversity protection may yield substantial long-time benefits, including improved ecosystem services and enhanced resilience, such outcomes are frequently undervalued in traditional investment decisions (Edwards & Abivardi, 1998). As noted by R1, in Brazil investors often opt for more immediately profitable ventures such as cattle ranching or large-scale agriculture, despite these activities contributing to biodiversity loss. Yet, as discussed above these harmful sectors value chains are most affected by continuous biodiversity degradation. The risk management in the financial sector continues to underestimate or not consider the risk associated with biodiversity loss (PWC, 2020). As physical and transition risks grow, investors accounting for these factors are likely to gain competitive advantages.

Yet another challenge mentioned by R1, R2, R9, R12, R15 and Dasgupta (2021) is the absence of sufficiently large and investable biodiversity conservation and restoration projects

to attract financial investment. As R15 stated, many impact funds are too small to attract serious private investors, hindering willing investors to allocate their capital.

While blended finance does not directly address the issue of hyperbolic discounting among investors, it is a factor that should be considered when designing such financial mechanisms. However, R4, R12 and R14 mentioned that private companies can be willing to invest in such projects despite the unfavorable environment due to reputational gains, avoidance of transitional risk. As R12 highlights, blended finance has the potential to mobilize larger pools of private capital as it plays a critical role in de-risking the long time horizons. This can be done through example public and philanthropic sources taking a first loss position in case of default and/or through subsidizing interest on bank loans. It is reasonable to suggest, as Flammer et al. (2025) argue, that blended finance can enhance the scale of viable projects and help establish a pipeline attractive to investors seeking larger capital allocations.

To summarize the discussion, effective blended finance must be tailored to specific development goals and local contexts (OECD, 2020). This study highlights that in Brazil, home to the world's most biodiversity, no one-way-fits-all approach exists. The overall market failures and barriers that need to be addressed for Brazil are, weak collective action, asymmetric information through limited awareness and lack of standardized frameworks and metrics, institutional failure, country risk, short term profit over long term sustainable gains, and misalignment in time preference between private investor and biodiversity project maturity.

Blended finance can help solve market failures and barriers by de-risking investments, signaling credibility, building trust, providing grants, and guarantees. Through mobilizing private capital in a combination with philanthropy and public sources blended finance can scale biodiversity initiatives. However, their success depends on cross-sectoral collaboration and the implementation of effective policy frameworks that provide an enabling environment for biodiversity investment.

6. Conclusions

This study set out to explore how blended finance can increase private investments within biodiversity through identifying market failures and barriers. Biodiversity loss is considered the most critical long-term risk for Brazil, however the economic and political incentives to continue exploiting nature remain strong. Despite existing laws and frameworks, environmental degradation continues. Thus, several challenges remain in mobilizing private capital and addressing the persistent market failure in biodiversity finance for Brazil.

First, their weak collective action is affected by corruption and weak government effectiveness, causing institutional failures inducing a lack of trust. Secondly, the absence of assigned economic value of nature and standardized frameworks and metrics give rise to asymmetric information, undermining their ability to assess risks, returns, and biodiversity impact. Additionally, the lack of understanding of economic dependency of ecological services, points to a broader issue of limited awareness and understanding among private sector actors. Thirdly, the elevated country risk and sector specific risk regarding biodiversity investments further deter private sector investments. Including the misalignment between investment time horizons and measurable biodiversity outcomes connected with the preferred immediate financial return over long term sustainable viability.

Blended finance, a strategic combination of public, philanthropic and private capital is an important tool improving biodiversity investments risk-return profile. It has the potential to mitigate risks associated with uncertain returns, and high country risk by lowering initial risk barriers and encouraging early private sector involvement. In addition, using public and philanthropic sources, can signal credibility and build trust that will increase the incentives for private sector engagement. Furthermore, through grants and guarantees blended finance can reduce green transition costs, making the shift more broadly accessible. Regarding long project timeframes, blended finance can de-risk through taking on first-loss positions. Therefore, blended finance tailored to local context with targeted public and philanthropic support, combined with clear business models, improved valuation metrics and awareness, can help shift biodiversity investment from a perceived liability to a viable opportunity. Our regression result revealed a negative correlation between early-stage economic growth and biodiversity intactness, consistent with the EKC. This further demonstrates the need for

alternative paths that promotes economic growth and preserves biodiversity at the same time. Pointing at the need of financial innovative mechanisms such as blended finance.

In conclusion, although reputational gains and risk mitigation may encourage private sector engagement, the absence of clear and predictable financial returns continues to hinder large-scale private capital mobilization. However, as the economic system's fundamental dependence on nature becomes more apparent, as both physical and transitional risks associated with biodiversity loss intensifies, the urgency to redirect capital towards biodiversity-positive investments grows. In this context, blended finance plays a critical role in scaling capital for biodiversity conservation and restoration through mobilizing private capital by lowering initial risk thresholds, enhancing the attractiveness of biodiversity investments.

6.1 Further Research

Our thesis does not empirically evaluate the effectiveness of blended finance in practice which is also lacking in earlier literature apart from Flammer et al. (2025). As new data becomes available and improves, particularly on real-world blended finance operations, future research should aim to conduct data-driven assessments that test how specific risk-sharing models influence investment outcomes.

Given the context-specific solutions for blended finance in biodiversity conservation and restoration, future research should also explore regional and project-specific differences. Moreover, since biodiversity loss is still difficult to measure, due to knowledge gaps and underexplored ecosystems, alternative indicators should be tested to further assess the validity of the EKC theory.

The interviews conducted may be subject to individual bias. This could lead to a degree of self-representation or sector-specific framing in their responses. Future studies should seek to mitigate potential bias by expanding the range of stakeholders. In addition, several interviewees mention other potential innovative financial mechanisms such as biodiversity and carbon credits. We recognize that there is not a unique solution and believe these instruments hold potential for future use and should therefore be researched further.

7. References

- Acheampong, A. O. (2019). Modelling for insight: does financial development improve environmental quality?. *Energy Economics*, 83, 156-179.
- Al-Mulali, U., Gholipour, H. F., & Solarin, S. A. (2022). Investigating the environmental Kuznets curve (EKC) hypothesis: does government effectiveness matter? Evidence from 170 countries. *Environment, Development and Sustainability*, 1-16.
- Andersson, J. & Johansson, T. (2024). *Handbok för uppsatsskrivande*. 1st ed. Lund: Studentlitteratur.
- Arslan, H. M., Khan, I., Latif, M. I., Komal, B., & Chen, S. (2022). Understanding the dynamics of natural resources rents, environmental sustainability, and sustainable economic growth: new insights from China. *Environmental Science and Pollution Research*, 29(39), 58746-58761.
- Arjaliès, D. L., & Gibassier, D. (2023). Can financialization save nature? The case of endangered species. *Contemporary Accounting Research*, 40(1), 488-525.
- Backman, J. (2016). *Rapporter och uppsatser*. 3rd edition. Lund: Studentlitteratur.
- Barbier, E. B., Burgess, J. C., & Dean, T. J. (2018). How to pay for saving biodiversity. *Science*, 360(6388), 486-488.
- Beverdam, J., Hubacek, K., Scholtens, B., & Sijtsma, F. (2025). Improving biodiversity resilience requires both public and private finance: A life-cycle analysis of biodiversity finance. *Ecological Economics*, 234, 108607.
- Braun, V. & Clarke, V. (2006). Using thematic analysis in psychology. *Quantitative researcher in psychology*, 3.
- Cowie, R. H., Bouchet, P., & Fontaine, B. (2022). The Sixth Mass Extinction: fact, fiction or speculation?. *Biological Reviews*, 97(2), 640-663.
- Cosma, S., Rimo, G., & Cosma, S. (2023). Conservation finance: What are we not doing? A review and research agenda. *Journal of Environmental Management*, 336, 117649.

Dasgupta, P. (2021), *The Economics of Biodiversity: The Dasgupta Review*. London: HM Treasury.

Dietz, S., & Adger, W. N. (2003). Economic growth, biodiversity loss and conservation effort. *Journal of environmental management*, 68(1), 23-35.

De Janvry, A. & Sadoulet, E. (2021). *Development economics. Theory and Practice*. 3rd edition. Routledge.

Deutz, A., Heal, G. M., Niu, R., Swanson, E., Townshend, T., Zhu, L., ... & Tobin-de la Puente, J. (2020). Financing nature: Closing the global biodiversity financing gap. *The Paulson Institute, The Nature Conservancy, and the Cornell Atkinson Center for Sustainability*, 256.

Edwards, P. J., & Abivardi, C. (1998). The value of biodiversity: where ecology and economy blend. *Biological conservation*, 83(3), 239-246.

Ekeocha, D. O. (2021). Urbanization, inequality, economic development and ecological footprint: Searching for turning points and regional homogeneity in Africa. *Journal of Cleaner Production*, 291, 125244.

European parliament. (2020). *Biodiversity loss: what is causing it and why is it a concern?*

Available at:

<https://www.europarl.europa.eu/topics/en/article/20200109STO69929/biodiversity-loss-what-is-causing-it-and-why-is-it-a-concern> (Accessed at: 22/02/2025)

Fenichel, E. P., & Dean, M. F. (2024). Blended academic insights for biodiversity and conservation finance. *Ecological Economics*, 223, 108258.

Flammer, C., Giroux, T., & Heal, G. M. (2025). Biodiversity finance. *Journal of Financial Economics*, 164, 103987.

GFANZ. (2024). *The oppertunities for investors in Brazil and beyond*. Available at:

<https://cdn.prod.website-files.com/63f583127e9706bf18363927/66f155beb03a367d266d774b>

[_Scaling%20nature%20finance%20now_%20The%20opportunity%20for%20investors%20in%20Brazil%20and%20beyond_final.pdf](#) (Accessed at: 26/03/2025)

Goolsbee, A., Levitt, S., & Syverson, C. (2020). *Microeconomics*. 3rd edition. McMillan learning.

Grossman, G. M., & Krueger, A. B. (1995). Economic growth and the environment. *Nber Working Papers* 110. *Quarterly Journal of Economics*, 110(2), 353–377.

Hackmann, A. (2024). Bridging the biodiversity financing gap (No. 103). *SAFE White Paper*

Hancock, Lorin. (N.D) What is the Atlantic Forest and why do we need to save it?. *WWF*
Available at:

<https://www.worldwildlife.org/stories/what-is-the-atlantic-forest-and-why-do-we-need-to-save-it>.(Accessed at: 24/02/2025)

Hanley, N., & Barbier, E. B. (2009). *Pricing Nature: Cost-Benefit Analysis and Environmental Policy*. Edward Elgar Publishing.

Heal, G. (2020). The economic case for protecting biodiversity (No. w27963). *National Bureau of Economic Research*.

Hudson, Robert. (2024). *Biodiversity and risk in the financial sector*. Journal of Sustainable Finance and Accounting.

IBGE. (2019). *launches unprecedented map of Biomes and Coastal-Marine System*.

Available at:

<https://agenciadenoticias.ibge.gov.br/en/agencia-press-room/2185-news-agency/releases-en/25812-ibge-lanca-mapa-inedito-de-biomas-e-sistema-costeiro-marinho-2> (Accessed at: 25/02/2025)

International Monetary Fund (IMF). (2023). *World Economic Outlook Database: Groups and Aggregates – April 2023*. Retrieved from Available at:

<https://www.imf.org/en/Publications/WEO/weo-database/2023/April/groups-and-aggregates>
(Accessed at: 25/02/2025)

Jonäll, K., Arvidsson, S., Baeckström, Y., & Elliot, V. (2025). The biodiversity–finance nexus: a future research agenda. *Current Opinion in Environmental Sustainability*, 72, 101504.

Leal, P. H., & Marques, A. C. (2022). The evolution of the environmental Kuznets curve hypothesis assessment: A literature review under a critical analysis perspective. *Heliyon*, 8(11).

Lawler, O. K., Allan, H. L., Baxter, P. W., Castagnino, R., Tor, M. C., Dann, L. E., ... & Kark, S. (2021). The COVID-19 pandemic is intricately linked to biodiversity loss and ecosystem health. *The Lancet Planetary Health*, 5(11), e840-e850.

Li, R., Wang, Q., & Guo, J. (2024). Revisiting the environmental Kuznets curve (EKC) hypothesis of carbon emissions: exploring the impact of geopolitical risks, natural resource rents, corrupt governance, and energy intensity. *Journal of Environmental Management*, 351, 119663.

Li, X., Chen, S., & Wang, S. (2024). Economic growth, government efficiency, and biodiversity loss: an international trade perspective. *Environment, Development and Sustainability*, 26(12), 30901-30927.

Mills, J. H., & Waite, T. A. (2009). Economic prosperity, biodiversity conservation, and the environmental Kuznets curve. *Ecological Economics*, 68(7), 2087-2095.

Mistra. (2021). Aligning markets with biodiversity: A report on the role of the financial sector in biodiversity conservation. *Mistra*.

<https://mistra.org/wp-content/uploads/2022/07/mistra-bp-aligning-markets-with-biodiversity-2021.pdf> (Accessed at: 25/05/2025)

Mutambatsere, E., & Schellekens, P. (2020). The why and how of blended finance. *International Finance Corporation World Bank Group*.

Natural History Museum. (n.d.). *Biodiversity intactness index*.

<https://www.nhm.ac.uk/our-science/services/data/biodiversity-intactness-index.html>

(Accessed at: 28/05/2025)

OECD. (2021). *The OECD DAC blended finance guidance*. OECD Publishing. Available at: https://www.oecd.org/en/publications/the-oecd-dac-blended-finance-guidance_ded656b4-en.html (Accessed at: 21/03/2025)

Pearce, D., & Moran, D. (2013). *The economic value of biodiversity*. Routledge.

PRI. (2024). *An introduction to responsible investment: Biodiversity for asset owners*. Available at: <https://www.unpri.org/introductory-guides-to-responsible-investment/an-introduction-to-responsible-investment-biodiversity-for-asset-owners/12202.article> (Accessed at: 11/03/2025)

PWC. (2023). *More than half of global GDP is exposed to material nature risk without immediate action, finds PwC*. Available at: <https://www.pwc.co.uk/press-room/press-releases/corporate-news/more-than-half-of-global-gdp-is-exposed-to-material-nature-risk-.html> (Accessed at: 28/04/2025)

PWC. (2020). *Managing biodiversity risks and opportunities: A point of view*. PricewaterhouseCoopers GmbH. <https://www.pwc.de/en/sustainability/pwc-point-of-view-managing-biodiversity-risks-and-opportunities.pdf> (Accessed at: 22/02/2025)

Rode, J., Pinzon, A., Stabile, M. C., Pirker, J., Bauch, S., Iribarrem, A., ... & Wittmer, H. (2019). Why 'blended finance could help transitions to sustainable landscapes: Lessons from the Unlocking Forest Finance project. *Ecosystem Services*, 37, 100917.

Scholes, R. J., & Biggs, R. (2005). A biodiversity intactness index. *Nature*, 434(7029), 45-49.

Tan, Y. L., Yiew, T. H., Lau, L. S., & Tan, A. L. (2022). Environmental Kuznets curve for biodiversity loss: evidence from South and Southeast Asian countries. *Environmental Science and Pollution Research*, 29(42), 64004-64021.

The Nature conservation (TNC). (n.d). *Brazil's Forest Code*. Available at: <https://www.nature.org/en-us/about-us/where-we-work/latin-america/brazil/stories-in-brazil/brazils-forest-code/> (Accessed at: 21/02/2025)

Transparency international. (2024). *Corruption perception index 2024*. Available at: <https://www.transparency.org/en/cpi/2024/index/bra> (Accessed at: 11/02/2025)

Ulucak, R., & Ozcan, B. (2020). Relationship between energy consumption and environmental sustainability in OECD countries: the role of natural resources rents. *Resources Policy*, 69, 101803.

UN. (2025). Global biodiversity agreement mobilises \$200 billion boost for nature Available at: <https://news.un.org/en/story/2025/02/1160676> (Accessed at: 13/03/2025)

United Nation Environmental Program, UNEP. (2023). *Five drivers of the nature crisis*. Available at: <https://www.unep.org/news-and-stories/story/five-drivers-nature-crisis> (Accessed at: 20/02/2025)

World Economic Forum (WEF). (2025). *Global Risks Report 2025*. Available at: <https://www.weforum.org/publications/global-risks-report-2025/> (Accessed at: 20/01/2024)

WWF. (2024). Living Planet Report 2024 – A System in Peril. *WWF*, Gland, Switzerland.

Österblom, H., Bebbington, J., Blasiak, R., Sobkowiak, M., & Folke, C. (2022). Transnational corporations, biosphere stewardship, and sustainable futures. *Annual Review of Environment and Resources*, 47(1), 609-635.

Appendix - A

Several diagnostic tests have been conducted to ensure the validity and robustness of the multiple regression model used in this paper.

Variable	VIF	1/VIF
<i>lnGDP</i>	159.43	0.0062
<i>lnGDP²</i>	166.07	0.0060
<i>Government effectiveness</i>	5.15	0.1942
<i>Forest area</i>	1.22	0.8194
<i>Natural resource rent</i>	1.60	0.6260
<i>Population density</i>	1.32	0.7549
<i>Corruption</i>	3.16	0.3164
<i>Red – listed species</i>	1.57	0.6353
<i>Financial development</i>	2.72	0.3671
<i>Temperature</i>	1.21	0.8238
<i>Latin America</i>	1.44	0.6929
<i>FDI</i>	1.02	0.9824
Mean VIF	28.83	

Tabell 4 - VIF- test

Source: Authors' calculation

Since both logged GDP per capita and its squared term are derived from the same underlying variable, some degree of multicollinearity is expected. However, this is not problematic in our case, as it is a common and accepted feature when estimating Environmental Kuznets Curve models.

Breusch–Pagan/Cook–Weisberg test

H0: Constant variance

chi2(1) = 15.81

Prob > chi2 = 0.0001

Tabell 5 - Breusch–Pagan/Cook–Weisberg test

Source: Authors' calculation

As the test statistic suggests heteroskedasticity, we use robust standard errors in our regression to improve the reliability of the results.

Ramsey RESET test

H0: Model has no omitted variables

F(3, 1994) = 4.14

Prob > F = 0.0061

Tabell 6 - Ramsey RESET test

Source: Authors' calculation

Since the p-value is statistically significant, this may indicate model misspecification, such as omitted variable bias or an incorrect functional form. There could be other important factors influencing the Biodiversity Intactness Index (BII) that are not included in the model.

Appendix - B

Interview material is available on request from authors.