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TO FINANCE OR NOT TO FINANCE: A LARGE SCALE FOREST RESTORATION PROBLEM

Financiar ou Não Financiar: um Problema de Restauração Florestal em Larga Escala

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RESUMO

A restauração de ecossistemas florestais é uma estratégia crucial para enfrentar desafios ambientais, como as mudanças climáticas, a perda de biodiversidade e a degradação do solo, ao mesmo tempo em que promove o desenvolvimento socioeconômico. Este artigo examina as estruturas financeiras e de governança necessárias para ampliar os investimentos em restauração, enfatizando seu papel na obtenção de um uso sustentável da terra. Ao integrar uma perspectiva Pós-Keynesiana, destaca os desafios impostos pelas incertezas, altas taxas de desconto e iliquidez nos investimentos florestais. O estudo explora mecanismos como o financiamento misto para mobilizar recursos e superar falhas de mercado, apresentando uma análise abrangente de instrumentos financeiros e políticas. As conclusões ressaltam a importância de alinhar objetivos ecológicos, econômicos e sociais para garantir a viabilidade e escalabilidade das iniciativas de restauração florestal, com a coordenação de políticas emergindo como um facilitador crítico.

Palavras-chave: restauração florestal; blended finance; finanças sustentáveis; economia pós-keynesiana.

JEL:. Q23; Q56; Q58; G14; O13.

ABSTRACT

The restoration of forest ecosystems is a pivotal strategy for addressing environmental challenges such as climate change, biodiversity loss, and land degradation while fostering socioeconomic development. This paper examines the financial and governance frameworks necessary to scale up restoration investments, emphasizing their role in achieving sustainable land use. By integrating a Post-Keynesian perspective, it highlights the challenges posed by uncertainties, high discount rates, and illiquidity in forest investments. The study explores mechanisms like blended finance to mobilize resources and overcome market failures, presenting a comprehensive analysis of financial instruments and policies. The findings underscore the importance of aligning ecological, economic, and social objectives to ensure the viability and scalability of forest restoration initiatives, with policy coordination emerging as a critical enabler.

Keywords: Forest restoration;blended finance; sustainable finance; post Keynesian economics.

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1. Introduction

The restoration of ecosystems has emerged as a critical strategy to combat environmental degradation and address pressing global challenges, including climate change mitigation, biodiversity conservation, and water security. Forest ecosystems, in particular, play a vital role in providing essential services such as nutrient recycling, water regulation, soil quality enhancement, and carbon storage, making their preservation and recovery an urgent priority (OECD/FAO, 2023; STERNER; CORIA, 2012). However, deforestation and degradation threaten these benefits, leading to diminished ecosystem functionality, biodiversity loss, and increased socioeconomic vulnerabilities (STERNER; CORIA, 2012).

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On a global scale, initiatives like the Bonn Challenge have galvanized efforts, with over 60 countries pledging to restore 200 million hectares of forest landscapes by 2030. These commitments, supported by international organizations and multi-stakeholder coalitions, underscore the growing recognition of restoration as a "silver bullet" for environmental and social challenges (BRANCALION; HOLL, 2020; GANN et al., 2019). In Brazil, over 35 million hectares of land are estimated to suffer from severe degradation, emphasizing the need for immediate interventions to restore ecological, social, and economic balance in these areas (BRANCALION et al., 2017; INSTITUTO ESCOLHAS, 2023; LOPES; CHIAVARI, 2024).

However, data from the Restoration and Reforestation Observatory1 show that progress in reforestation and natural regeneration in Brazil is far below the climate targets, accounting for approximately 153 thousand hectares under ecological restoration – far from the 12 million hectares of the National Native Vegetation Recovery Plan (Planaveg) goal. Also, these areas are concentrated in the biomes of the states that offer the best infrastructure for the restoration production chain, such as the Atlantic Forest and the Cerrado in the Southeast of the country.

Restoration programs are increasingly viewed not only through the lens of ecological recovery but also as catalysts for economic development. Governments and organizations recognize the potential for job creation, to attract returns on investment, and to enhance livelihoods in local communities. For instance, restoration activities often yield high initial job creation rates while promising long-term benefits, including improved resilience to climate change and sustainable land use practices (BENDOR et al., 2015; MANSUY; MACAFEE, 2019). These dynamics have been further amplified by the United Nations Decade on Ecosystem Restoration (UNDER 2021–2030), which seeks to mainstream restoration initiatives globally and promote integrated, landscape-level approaches (ARONSON et al., 2020).

[1] https://observatoriodarestauracao.org.br./dashboard

Therefore, given the multifaceted benefits of restoration, integrating ecological, social, and economic considerations into program planning and implementation is critical. This study explores the financial and governance frameworks that underpin successful restoration efforts, highlighting the importance of inclusive strategies that balance environmental and socioeconomic priorities.

2 A Post-Keynesian Perspective for the Land Use Allocation Problem

Land is not only a factor of production[2] that provides important services for the production process but also constitutes a kind of asset, compounding the stock of financial wealth for those who own it (GEORGESCU-ROEGEN, 1981; JANVRY; SADOULET, 2018; KLEMPERER, 2003; MUELLER, 2012; PERMAN et al., 2011). Because it is a natural asset, its use affects the environment's quality level, causing sorts of degradation, such as soil erosion, whilst its productivity is affected by environmental conditions, such as water supply and climate stability (JANVRY; SADOULET, 2018). Since forests are providers of these ecosystem/environmental services, a range of investments in forest systems must be made to guarantee the sustainable productivity of the land over time, embracing forest restoration models (Table 1).

Table 1. Types of Forest Restoration

Type	Concept	Sample Models
Ecological Restoration	The process and practice of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed through intentional human activity in order to contribute to or accelerate its recovery in terms of its health, integrity, and sustainability.	• Direct seeding; • Planting native/biodiverse seedlings; • Conducting natural regeneration.
Productive Restoration (or Productive Rehabilitation)	Restoration and expansion of natural capital, in terms of interventions and investments to improve the sustainability of natural and human-managed ecosystems, including contributing to people's socioeconomic well-being through the provision of ecosystem goods and services.	• Agroforestry systems; • Forest integration systems; • Sustainable forest management; • Native forestry.

Source: adapted based on information from Instituto Escolhas (2023).

Since the land has an opportunity cost due to competition among alternative uses, including forestry, its allocation in a region is determined by the forestland's value compared to all feasible competing uses (BARBIER; BURGESS; GRAINGER, 2010; KLEMPERER, 2003). For forest use to be chosen, its return must exceed that of agriculture or other alternatives; otherwise, forest lands

[2] Land is characterized as a fund factor of production, which constitutes the material basis of the production process as elements that provide services in transforming inputs into products, however, without physically incorporating themselves (GEORGESCU-ROEGEN, 1981; MUELLER, 2012). In this sense, the Ricardian land (corresponding to the physical space where the production takes) is an inert element, as a net catches fish even if left by itself in the sea, the land catches rainfall, solar radiation and nutrients (GEORGESCU-ROEGEN, 1981).

will be converted or not restored. Post Keynesian Economics emphasizes the impact of expectations and uncertainty on decision-making and its effects on monetary production economies, rejecting orthodox assumptions (CARVALHO, 2020; HOLT; SPASH, 2010; OREIRO, 2011; ROMERO, 2014), such as the optimum amount of forest and agriculture (BARBIER; DELACOTE; WOLFERSBERGER, 2017). Thus, agents' animal spirits influence investment decisions and guide land use allocation, similar to selecting assets for an investor's portfolio within an economy, where specific land uses aim for wealth accumulation (CARVALHO, 2020; HOLT; SPASH, 2010; KEYNES, 1936; OREIRO, 2024).

The Keynesian asset choice model, developed in Chapter 17 of the General Theory of Employment, Interest and Money, provides a framework for understanding allocation in general, and land use specifically. This model is based on the forward-looking nature of decisions regarding the trade of different assets, which depend on the expected future returns of each asset over a given period (ROMERO, 2014). In a monetary production economy, the divergence between spot and forward prices of any asset class reflects expectations of gains from holding the asset from the present to a future date. Excess demand drives spot prices above supply prices, signaling scarcity and prompting resource reallocation to increase production (CARVALHO, 2020; OREIRO, 2024). This implies that the relation between these prices induces changes in the supply flows of assets to meet demand.

Since spot (current price for current delivery) and forward (current price for delivery at a specified future date) prices vary across asset classes, asset choice in a monetary production economy must consider the total yield, including earnings, convenience of possession, and potential capital gains (CARVALHO, 2020; KEYNES, 1936; OREIRO, 2024). Keynes' concept of Own-Rates of Interest measures asset yields in monetary terms, encompassing explicit monetary rewards and implicit values like the liquidity premium, thus allowing comparisons of different assets to select those with higher returns (CARVALHO, 2020; OREIRO, 2024; ROMERO, 2014).

Each asset class has attributes that determine its own-rate of interest in monetary terms: expected appreciation (a), expected yield or quasi-rents (q), carrying cost (c), and liquidity premium (l), which can also be expressed as risk (r). The sum of these attributes gives the asset's own-rate of interest, corresponding to its total expected return: $a + q – c + l$, emphasizing the liquidity premium, or $a + q – c – r$, emphasizing the risk (CARVALHO, 2020; KEYNES, 1936; OREIRO, 2024; ROMERO, 2014). Important assumptions include a one-period investment horizon for all assets, avoiding present value calculations, and the use of an exogenous interest rate to determine spot prices. This does not ignore the time dimension but embeds it in the liquidity premium, meaning that greater asset liquidity shortens the effective holding period for the wealth owner (CARVALHO, 2020; OREIRO, 2024). All the attributes are measured in a unit proportional to the spot market price as presented in Table 2.

Table 2. Attributes that Determine the Own-Rate of Interest in Monetary Terms

Attribute	Description
Expected Appreciation (a)	It consists of the expected gains or losses defined by the difference between the expected selling or purchase price of the asset as follows: $a = (EP - CP/CP)$
Expected yield, or quasi-rent (q)	It corresponds to all the expected monetary revenues that can be obtained from the use of the asset in the production process (profits) or simply from holding it (interest rates). It is worth to highlight that these revenues are essentially speculative since individuals know that unexpected events can occur. So, a crucial aspect related to quasi-rents is the level of expectations about future conditions in the consumer markets for the respective production. Another aspect is that this kind of yield is not related to capital productivity as in the Austrian theory of capital, but how the wealth owners perceive the scarcity of capital in comparison with the market demand for it. The ratio between the revenues and the asset's current price is $q = (Q/CP)$

Attribute	Description
Carrying cost (c)	It includes the costs (or negative yields) associated with maintaining an asset in the portfolio, such as financing, maintenance, storage, insurance, losses caused by the mere passage of time, etc. Generally, this kind of cost can be estimated with a lower uncertainty level because it is about anticipated expenditures. The ratio between these expected costs and the current price of the asset is indicated by c = (C/CP)
Liquidity premium (l) and Risk (r)	It is defined as the implicit yield related to the ability to quickly convert an asset into money without loss in its initial value. Thus, the assets that need more time to be converted into money (without loss of value) are less liquid, while highly convertible assets are more liquid, according to the three levels of liquidity, according to Hicks. Also, considering that the maximum liquidity is just the equivalent of minimum risk, it is possible to establish an inverse relation between these two variables, as indicated by r = -l

Source: own elaboration from (CARVALHO, 2020; KREGEL, 1998; OREIRO, 2024; ROMERO, 2014).

The Keynesian asset choice model highlights how wealth owners compete for assets with higher own-interest rates in monetary terms, influencing spot/forward price relations. When spot prices exceed forward prices, investment and production increase until equilibrium is achieved (OREIRO, 2024). However, changes in expected values like Expected Appreciation (a) and Quasi-Rent (q) affect asset prices and raise the Liquidity Premium (l), leading to a preference for more liquid, less risky assets (Romero, 2014). This shift can reduce investment in riskier assets, impacting land use allocation pathways. From this framework, forest management and restoration activities follow the same rationale, but it is crucial to understand their particularities for scaling up investments.

3 Forest Restoration in the Keynesian Asset Choice Model

A defining feature of forest investments is their flexibility. Unlike most assets, forests are multifunctional (PERMAN et al., 2011), offering timber, bark, leaves, gums, and other products, along with ecosystem services such as carbon storage, climate regulation, and biodiversity conservation. Revenue generation depends on the chosen business model, which is shaped by market demands (for ecological restoration or productive rehabilitation), environmental factors, operational capacity, and land prices. Land values may fluctuate due to real estate dynamics and competition among land uses, which can significantly affect investment outcomes (ANTONIAZZI et al., 2016; HEALEY; CORRIERO; ROZENOV, 2005; INSTITUTO ESCOLHAS, 2023; SILVA, 2013; SILVA; JACOVINE; VALVERDE, 2012; WHATELY, 2008).

Forest establishment must be accelerated regardless of the chosen model to achieve self-sustaining structural and functional parameters (INSTITUTO ESCOLHAS, 2023). This is because biological growth drives most financial returns, allowing higher-value uses of forest products and services (HEALEY; CORRIERO; ROZENOV, 2005), such as timber and carbon storage. Forest assets appreciate in proportion to growth, assuming constant product prices (WHATELY, 2008). For example, in timberland investments, biological growth contributes to 61% of returns, followed by timber prices (33%) and land appreciation (6%), as shown in Figure 1.

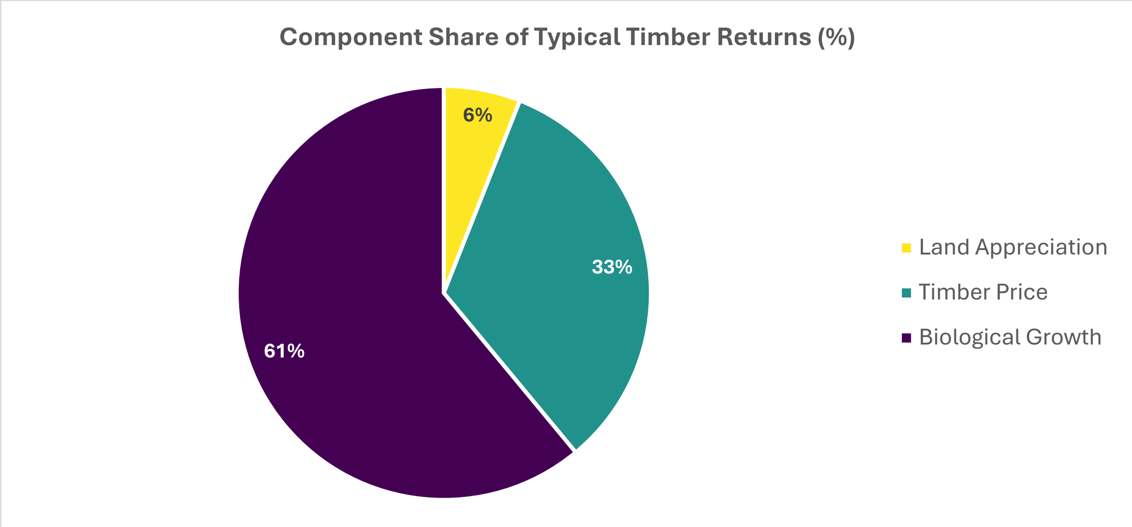

Figure 1. Components of Typical Timber Returns
Source: Healey; Corriero; Rozenov (2005), adapted.

Costs in forest projects include implementation, maintenance, harvesting, renovation, and administration (LUZ, 2023; SILVA; JACOVINE; VALVERDE, 2012). These costs vary by business model, influenced by factors like natural regeneration potential, techniques applied, and input availability. Forest models are highly sensitive to economies of scale, meaning their viability depends on reducing unit production costs as production levels increase. This occurs because fixed costs are spread over more units, lowering the cost per unit (BRANCALION et al., 2017; GALA, 2017) and optimizing the use of equipment and human resources.

So, according to the Keynesian asset choice model, forest investments reflect land prices as expected appreciation, since wealth owners may sell the land based on real estate market conditions. Expected yields (or quasi-rents) are calculated as potential revenues minus respective costs, including depreciation. Further, forests, as an asset class, differ from other renewable resources like fisheries or capital equipment because timber cannot be regularly harvested without removing trees entirely (PERMAN et al., 2011). Even for non-timber products or carbon projects, trees cannot be used indefinitely without harvesting. This dual role of forests, as both the final product and production factor, means the tree is both the product and the machine producing it (SILVA; JACOVINE; VALVERDE, 2012). For this reason, all returns from forest use should be considered as expected yields, not expected appreciation.

Forest projects require a long-term horizon due to the extended maturity period of trees (PERMAN et al., 2011), which can reach from several years to decades, according to results found by Instituto Escolhas (2023), (SEMAS, 2024) and (SFB, 2024). Additionally, the distribution of implementation costs occurs in the early years, while revenues may take several years to materialize, depending on the business model adopted. Consequently, some implications emerge that affect the performance of forest investments compared to alternative land uses (opportunity land cost), as outlined by the Keynesian asset choice model.

The first implication concerns the carrying costs for forest investments, expressed as the cost of capital. Based on the Keynesian concept of marginal efficiency of capital, his is the discount rate that equalizes the present value of quasi-rents with the supply price of capital – the price needed to produce an additional unit of capital (OREIRO, 2024). Practically, it represents the expected return for undertaking the risks of investing in a project or the rate that makes a person indifferent between receiving a value now or in the future with added yield (DANTAS, 2021). For forest projects, a higher discount rate diminishes the present value impact of revenues relative to costs, given their long-term distribution. Moreover, the lower the investor's financial capacity and the project scale, the more sensitive the project is to increased discount rates.

The second consequence relates to the liquidity premium (or risk). Forest investments are notably illiquid. Until maturity, various uncertainties, like creditor bankruptcy and personal events (marriages, divorces, illness, death) can force investors to alter their portfolios (SCHOLTENS; SPIERDIJK, 2007; SCHOLTENS, 1998), often incurring financial losses. Also, limited forest buyers and lengthy transaction times compound this illiquidity (HEALEY; CORRIERO; ROZENOV, 2005). This is especially true for markets for environmental service payments, such as carbon and biodiversity credits, which are still consolidating and involve higher transaction costs (CHRISTOFOLI, 2017; TEIXEIRA, 2022).

Due to the long-term nature of forest investments, they face extended exposure to various risks compared to annual crops like soybeans, corn, wheat, or cotton. Key risks include extreme climate events, fires, pests, diseases, forest price fluctuations, exchange rate and interest rate changes, regulatory shifts, and social conflicts that may threaten project locations (BRANCALION; GANDOLFI; RODRIGUES, 2015; TEIXEIRA, 2014). Additionally, there are technical risks, especially with lesser-known species in tropical areas, stemming from knowledge gaps about native species, remote locations, and logistical and monitoring challenges. These risks can be mitigated by obtaining globally recognized certification schemes (e.g., FSC and VCS-Verra), although maintaining these certifications until forest maturity requires periodic audits.

Therefore, although forest and agricultural investments share the same own-interest rate attributes, the significantly lower liquidity premium (or higher risk) of forest uses and potentially high carrying costs (depending on the discount rate adopted) may create perverse incentives. This situation could promote degrading activities necessitating forest conversion, rather than supporting sustainable management and forest ecosystem recovery (BRANCALION et al., 2017). In other words, short-term profits with lower risks from unsustainable exploitation of natural resources are crucial in delaying the forest restoration scaling up.

3.1 Implications for a Green New Developmentalism Strategy for Forest Restoration

As discussed, land use pathways depend on various investment decisions about which assets to hold, according to their comparative advantages (CARVALHO, 2020). In the context of forest restoration, investment scaling up is not spontaneous due to high levels of uncertainties, risks, and market failures that prevent the private sector from internalizing all associated benefits and costs. This inefficiency means that free markets alone cannot allocate resources effectively for this purpose (ALTERNBURG; RODRIK, 2017; RODRIK, 2014), leading to persistent underfunding (PISTORIUS; FREIBERG, 2014; TREVISAN et al., 2016). In other words, if markets were to operate efficiently without regulation, deforestation, and land degradation would be priced at their social marginal cost, and the benefits from forestlands would be fully captured by investors, ensuring that private investment decisions always align with socially desirable outcomes.

The specialized literature identifies three main market failures affecting investments in sustainable technologies, including forest land uses: (i) positive technological externalities (spillovers) not fully captured by investors, such as collective learning, skill development, and crowding effects, which are highly experimental and risky; (ii) difficulty in pricing carbon due to fossil fuel subsidies and inadequate taxes or controls that fail to internalize climate change risks, resulting in a private cost of carbon much lower than its social cost; and (iii) the global public good nature of carbon reduction, leading to free-riders (BRANCALION et al., 2017; GUTTMANN, 2018;

RODRIK, 2014). Addressing these issues requires an institutional arrangement fostering effective interaction between the market and public sectors, considering accumulated knowledge on structural change and natural resources management. This is made possible through a mix of fiscal, industrial, trade, and regulatory policies in an eco-developmental strategy (GUARINI, 2020; GUARINI; OREIRO, 2022).

Forest restoration projects, regardless of their objectives, are large-scale activities with high implementation costs and long-term benefits. They rely on economies of scale to be economically viable (SCHOLTENS; SPIERDIJK, 2007; SILVA; JACOVINE; VALVERDE, 2012), requiring significant quasi-rents combined with low carrying costs. This presents challenges for local communities, landowners, investors, and governments. So, effective policies should enhance program efficiency by reducing both public spending and the burden placed on involved parties (GONG et al., 2012). Strengthening forest value chains to provide resources and labor at competitive costs is essential. This requires dynamism in the market for goods and services on both demand (e.g., consumer markets, landowners) and supply sides (e.g., forest nurseries, skilled labor, technical assistant companies). Enhanced information flow and engagement reduce transactional, capital, and unit costs of key inputs due to network organization throughout the forest sector (HIDALGO, 2015; TEIXEIRA; HERCOWITZ; GUERIN, 2022).

Due to the high level of uncertainty associated with the long-term benefits, securing adequate financial resources for restoration investments is a critical issue (BLIGNAUT; ARONSON; DE WIT, 2014). The smaller the financial capacity of the landowner or investor and the scale of the forest restoration initiative, the more sensitive the project will be to an increase in the discount rate. Additionally, there is the challenge of mobilizing "patient capital," which refers to capital willing to wait for a long period until the forest restoration project starts generating revenue to cover its financing. There is a lack of historical data among financial agents regarding forestry activities to support credit analysis (BERTÃO, 2024).

The financial mechanisms known as blended finance emerge as a promising solution to bridge the financial gaps in forest restoration by strategically combining public, private, and philanthropic resources to enhance the viability of long-term projects. This approach leverages concessional funding or risk-sharing mechanisms from public and philanthropic actors to attract private investments, mitigating perceived risks and improving the financial feasibility of restoration initiatives. By aligning the interests of diverse stakeholders, blended finance can catalyze investments in natural capital, particularly in contexts where patient capital is required. In this context, Table 3 provides an overview of the financial mechanisms identified in the literature, ranging from ecological strategies (e.g., biobanking, agroecology, and forest products) to public policies, economic instruments, and public funding sources, with a particular emphasis on the widespread application of payments for ecosystem services.

Table 3. Financial mechanisms for restoration cited in the literature.

Financing Source	References
Government funding, legislation, and associated litigation	BenDor et al. (2015); Bullock et al. (2011; Rohr et al. (2018)
Corporate restoration of degraded ecosystems	Bullock et al. (2011)
Biobanking and biodiversity offsetting	Bullock et al. (2011)

Financing Source	References
Payments for ecosystem services	Aronson et al. (2010); Blignaut; Aronson; De Groot (2014); Bullock et al. (2011); De Groot et al. (2013); Long et al. (2018); Matzek (2018); Rohr et al. (2018); Schiappacasse et al. (2012); Brancalion et al. (2017)
REDD+	De Groot et al. (2013); Schiappacasse et al. (2012); Stickler et al. (2009)
Public-private collaborations	BenDor et al. (2015)
Private sector investments	BenDor et al. (2015)
Forest products	Brancalion et al. (2017); Nunes et al. (2017); Vogler et al. (2015)
Carbon farming	Evans et al. (2015)
Environmental assurance bonds	Bullock et al. (2011); Rohr et al. (2018)
Agroecology	Trevisan et al. (2016)

Source: Luz (2023).

By obtaining knowledge about structural change, technological spillovers, market failures, and barriers to investment in forest restoration, it is the State's role to coordinate and provide information during policy management, acting as an identifier of opportunities for diversification and dynamism that contributes to the sustainable growth of forest sector (GALA, 2017; RODRIK, 2014). In this sense, while markets play a crucial role, governments often spearhead and finance restoration initiatives, primarily because the benefits often materialize in the long term and align with public interests (BULLOCK et al., 2011). Given that most restoration activities occur on private land, legal mechanisms alone are insufficient. Policies must incorporate economic incentives, direct compensation, and benefits to ensure compliance (BLIGNAUT; ARONSON; DE GROOT, 2014; CROSSMAN; BRYAN; SUMMERS, 2011).

In addition, it is necessary to deepen the understanding of the alignment between climate, economic, and social development policies in rural areas, as well as potential trade-offs, for the economy to effectively meet its environmental targets throughout the process of economic development (CHIAVARI; ANTONACCIO, 2023). Numerous researchers have explored approaches to balance ecological and socioeconomic goals within restoration projects (ARONSON et al., 2010). This dichotomy creates a problem of policy coordination that has the potential to limit the job creation and income generation through sustainable practices, and the value-adding process to forest products (BUAINAIN; BATALHA, 2007; CASTANHEIRA NETO; SCÁRDUA; JACINTO, 2010; CNI, 2020). So, the challenge is how to align the policy mix to improve the supply of legal products (mainly timber) through different forest management and restoration typologies and all land tenure categories, as well as to control the demand for it, at the same time increase the value of primary forests through a combination of payments for ecosystem services (LOPES; CHIAVARI, 2024; MEYFROIDT; LAMBIN, 2011).

In this context, the effectiveness of ecological structural change depends on prevailing conventions regarding acceptable profit rates for both less environmentally efficient sectors (e.g., extensive livestock) and more efficient ones (e.g., forest management and restoration) (GUARINI; OREIRO, 2022). This highlights the importance of the liquidity premium (or risks) associated with forest investments. Combined with uncertainties, this implies that the profit rate deemed competitive for forest investments must be higher than that for alternative uses. Due to the uncertainties regarding investment in the latter sector, it is reasonable to assume that the profit rate considered competitive will be higher than the profit rate for the former. So, policy coordination plays a key role in instituting strategies that foster competitiveness in sustainable investments, such as a competitive exchange rate and/or low interest rates. However, simultaneously, it can also prevent new investments in less sustainable activities, like the establishment of a regulated carbon market or carbon tax.

Additionally, policy coordination is essential for avoiding possible green rebound effects as a consequence of the output increase caused by the income multiplier jointly with higher environmental efficiency (GUARINI; GRAZINI; OREIRO, 2023). For example, this situation might lead to a net increase in degradation, like the case of an increase in land use change resulting from a rise in meat demand surpassing productivity gains. Or when the rise in investment costs in agriculture within one region leads to the expansion of this activity in other regions, which is known as leakages. This is the case with the Brazilian cerrado being more vulnerable to agricultural activities due to land use restrictions being more stringent in the Atlantic Forest and the Amazon. The last example is still potentialized by poor governance of the environmental policy in Brazil where Municipalities, State and National governments do not necessarily follow the same alignment in terms of environmental goals, such as the case of the control of legal deforestation in Matopiba Region[3](ANTONACCIO; LOPES; MINSKY, 2024).

Finally, it is important to highlight that this need for coordination may result in an excessive proximity between policymakers and businessmen. Consequently, this elevates the risk of corruption and the initiation of rent-seeking practices by corporations and lobbyists, which distorts the coordination role (GALA, 2017; GUTTMANN, 2018; RODRIK, 2014). To avoid this situation, it is necessary to keep the bureaucrats at a safe distance from entrepreneurs who are the object of regulation by creating councils and coordination forums between public and private sectors as well as development agencies, non-profit organizations, and class representation bodies; in these instances, knowledge exchange between the actors flows better. There also needs to establish mechanisms for transparency and accountability as well the eco-developmental strategy must have a high status in the governmental agenda (GALA, 2017; RODRIK, 2014). For this purpose, the literature points out the strategy called forest landscape restoration approach. It focuses on large-scale, integrated restoration efforts that simultaneously restore forest ecosystems and enhance livelihoods (LONG et al., 2018; MENZ; DIXON; HOBBS, 2013). This approach emphasizes planning and governance at the landscape level, moving beyond isolated restoration activities (MENZ; DIXON; HOBBS, 2013).

4 Concluding Remarks

Forest restoration represents a cornerstone strategy for addressing some of the most pressing environmental and socio-economic challenges of our time, including climate change mitigation, biodiversity loss, and land degradation. Beyond its ecological significance, forest restoration offers opportunities to stimulate economic growth, generate jobs, and improve livelihoods, particularly in rural and vulnerable communities. However, realizing this potential at scale requires addressing systemic barriers, including financial constraints, policy misalignment, and market inefficiencies.

[3] Matopiba is a region comprising the state of Tocantins and parts of the states of Maranhão, Piauí, and Bahia, where significant agricultural expansion occuried starting in the second half of the 1980s, particularly in grain cultivation. The name is an acronym formed from the initials of the four states: MA + TO + PI + BA (EMBRAPA, 2015).

The Post-Keynesian perspective provides a framework for analyzing the main drivers of land use allocation, and the complexities of investment decision-making in restoration projects.

According to the Keynesian Asset Choice Model, it is possible to understand that forest and agriculture share the same attributes of own-interest rates: expected appreciation of the asset price, expected yields (or quasi-rents) from the asset operation, carrying cost (here, mainly related to the capital cost), and the liquidity premium (or risk). However, forest investment particularities related to the low liquidity premium combined with potentially high costs and the need for economies to scale may create perverse incentives. Thus, the short-term profits with lower risks from unsustainable exploitation of natural resources are crucial in preventing the investment scaling up in forest restoration.

Blended finance emerges as a critical tool to bridge these gaps by mobilizing diverse funding sources, including public, private, and philanthropic capital. By leveraging concessional financing and risk-sharing mechanisms, blended finance can attract patient capital and incentivize investments in restoration initiatives that would otherwise be deemed too risky or unprofitable. Moreover, the broader application of payments for ecosystem services (PES), combined with robust governance frameworks, can further enhance the financial feasibility of restoration projects.

So, it becomes necessary for the State to assume its organizational role, and not only normative, by formulating a mix of public policies that combines fiscal, industrial, trade, and regulatory policies in an eco-developmental strategy. In this context, the State has to assume its organization role, not only normative, in order to overcome the great challenge of how to increase the forest products supply while valuing the primary forests (LOPES; CHIAVARI, 2024; MEYFROIDT; LAMBIN, 2011). Consequently, it reveals a problem of policy coordination, specifically in terms of creating conditions to balance the profit rates between land uses, and preventing potential rebound effects). Besides that, to avoid corruption and rent-seeking processes, it is important to establish a proper institutional arrangement for effective interaction between the market and public sectors, mechanisms for transparency and accountability as well as the eco-developmental strategy must have a high status in the governmental agenda.

In conclusion, forest restoration offers a transformative pathway toward sustainable development, but its success depends on innovative financing, effective policy coordination, and multi-stakeholder collaboration. By addressing financial, institutional, and social challenges, it is possible to unlock the full potential of restoration as a tool for ecological recovery and economic resilience, contributing to a more sustainable and equitable future.

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