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La presente importante obra, denominada: Transformación de los BRICS. Hacia la preponderancia global, tensiones, nuevos desafíos; propone en su título y contenido, de manera acertada, precisa y objetiva, lo que actualmente vienen experimentando los BRICS en sede global. Vale decir, que lo referido no pudo ser mejor, debido a que se trata de una propuesta fresca, contemporánea, que analiza y desentraña lo que acontece a los BRICS de ahora. Atrás quedaron su inicial expansión, alcances y avances. Ello, en vista que asistimos al tránsito de una efectiva como innegable nueva etapa de los BRICS.

En ese sentido, la presente obra abraza en su desarrollo de manera insular como señera en dichas temáticas, a efectos de proporcionar profundas reflexiones y aportes de importantes profesionales especialistas.

Así, queda evidenciado, que lo capital y sumamente interesante y trascendente propuesta que la contiene, la convierte en una fuente de obligatoria consulta y referencia de los lectores del orbe.

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TRANSFORMAÇÃO DOS BRICS

RUMO À PREPONDERÂNCIA GLOBAL, TENSÕES E NOVOS DESAFIOS

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TRANSFORMATION OF THE BRICS. TOWARDS GLOBAL PREPONDERANCE, TENSIONS, AND NEW CHALLENGES

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Prologue
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SUMÁRIO

PRÓLOGO

Ante todo, corresponde agradecer muy de sobremanera la gentil invitación para elaborar el prólogo a la presente capital obra, denominada: Transformación de los BRICS. Hacia la preponderancia global, tensiones, nuevos desafíos. A propósito, el título y contenido no pudo ser mejor, en tanto que revela de manera acertada, precisa y objetiva, lo que actualmente vienen experimentando los BRICS. Vale decir, que asistimos al tránsito de una nueva etapa de los mismos.

Así, dentro de los logros más significativos de los BRICS, tenemos la creación de su propia arquitectura financiera, que incluye el Nuevo Banco de Desarrollo (NBD) y el Acuerdo de Reservas Contingentes (ARC). El NBD, establecido en 2015, tiene como objetivo financiar proyectos de infraestructura y desarrollo sostenible en los países BRICS y otras economías emergentes. El ARC, también establecido en 2015, proporciona un mecanismo de apoyo financiero a los países BRICS en caso de crisis de balanza de pagos.

La creación del NBD y el ARC representa un paso importante hacia la autonomía financiera de los BRICS y su capacidad para desafiar el dominio de las instituciones financieras occidentales. Estas iniciativas también reflejan la creciente confianza de los BRICS en su capacidad para gestionar sus propias economías y promover el desarrollo sostenible.

A pesar de su creciente influencia global, los BRICS enfrentan una serie de tensiones internas y desafíos que podrían limitar su capacidad para actuar como un bloque cohesivo. Una de las principales tensiones internas es la asimetría económica entre los países BRICS. China es, con diferencia, la economía más grande del grupo, seguida de India, mientras que Brasil, Rusia y Sudáfrica tienen economías mucho más pequeñas. Esta asimetría económica puede generar tensiones en la toma de decisiones y la distribución de los beneficios de la cooperación.

Otro desafío importante que enfrentan los BRICS es la falta de una visión común sobre el orden mundial. Si bien todos los países BRICS comparten el objetivo de promover un sistema multipolar, existen diferencias significativas en sus enfoques y prioridades. Por ejemplo, China y Rusia tienen una visión más revisionista del orden mundial y están dispuestas a desafiar abiertamente las

normas y instituciones existentes, mientras que Brasil, India y Sudáfrica tienen una visión más reformista y prefieren trabajar dentro del sistema existente para promover sus intereses.

Además de las tensiones internas, los BRICS también enfrentan una serie de desafíos externos, como la creciente competencia geopolítica entre Estados Unidos y China, la inestabilidad económica global y los desafíos del cambio climático y la pandemia de COVID-19. Estos desafíos requieren una mayor cooperación y coordinación entre los países BRICS, pero también ponen a prueba su capacidad para superar sus diferencias internas y actuar como un bloque unido.

No obstante, a pesar de las tensiones internas y los desafíos externos, los BRICS siguen siendo un actor importante en la economía y la política mundial. Los BRICS representan el 40% de la población mundial y el 25% del PIB mundial, y su influencia seguirá creciendo en el futuro.

Para que los BRICS puedan alcanzar su pleno potencial, es necesario que superen sus diferencias internas y desarrollen una visión común sobre el orden mundial. También es importante que los BRICS fortalezcan su cooperación en áreas clave como el comercio, la inversión, la tecnología y el desarrollo sostenible.

En el futuro, los BRICS podrían desempeñar un papel más importante en la gobernanza global, promoviendo un sistema más justo y equitativo que tenga en cuenta los intereses de los países en desarrollo. Los BRICS también podrían liderar la lucha contra el cambio climático y la promoción del desarrollo sostenible, trabajando juntos para construir un futuro más próspero y sostenible para todos.

En suma, es de verse, que la transformación de los BRICS ha sido notable desde su creación en 2009. El grupo ha logrado establecer su propia arquitectura financiera, desafiar el dominio de las instituciones financieras occidentales y promover una agenda más amplia que incluye la cooperación política, la seguridad y el desarrollo sostenible. A pesar de las tensiones internas y los desafíos externos, los BRICS siguen siendo un actor importante en la economía y la política mundial, y su influencia seguirá creciendo en el futuro. Para que los BRICS puedan alcanzar su pleno potencial, es necesario que superen sus diferencias internas y desarrollen una visión común sobre el orden mundial, fortaleciendo su cooperación en áreas clave y desempeñando un papel más importante en la gobernanza global.

En ese sentido, la presente obra abraza en su desarrollo de manera insular como señera en dichas temáticas, a efectos de proporcionar profundas reflexiones y aportes de importantes profesionales especialistas.

Así, queda evidenciado, que la sumamente interesante y trascendente propuesta que la contiene, la convierte en una fuente de obligatoria consulta y referencia de los lectores del orbe.

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INTRODUCCIÓN

Los BRICS, una agrupación de economías emergentes que incluye a Brasil, Rusia, India, China y Sudáfrica, han experimentado una notable transformación desde su creación en 2009. Inicialmente concebidos como un bloque económico con el objetivo de desafiar el orden mundial establecido y promover un sistema multipolar, los BRICS han evolucionado para abarcar una agenda más amplia que incluye la cooperación política, la seguridad y el desarrollo sostenible. Este ensayo examina la transformación de los BRICS, su creciente influencia global, las tensiones internas y los nuevos desafíos que enfrenta el grupo en el siglo XXI.

Orígenes y evolución de los BRICS

El concepto de BRIC fue acuñado por el economista Jim O'Neill de Goldman Sachs en 2001, quien identificó a Brasil, Rusia, India y China como las economías emergentes con mayor potencial de crecimiento en el siglo XXI. En 2009, los líderes de estos cuatro países celebraron su primera cumbre en Ekaterimburgo, Rusia, marcando el inicio formal del grupo BRIC. En 2010, Sudáfrica fue invitada a unirse al grupo, ampliando su alcance geográfico y diversificando su composición económica.

Desde sus inicios, los BRICS han buscado desafiar el dominio de las economías occidentales en las instituciones financieras internacionales, como el Fondo Monetario Internacional (FMI) y el Banco Mundial. Los BRICS han abogado por una mayor representación de los países en desarrollo en estas instituciones y han criticado las políticas económicas impuestas por Occidente a los países en desarrollo.

No obstante, los BRICS vienen presentando una nueva arquitectura de desarrollo y expansión, la que denominamos, su segunda etapa.

En la presente entrega y en ese orden de ideas, no podemos ser ajenos a la realidad expectante y de muy aguda atención que acontece en sede global.

Por ello, ponemos a la consideración de la comunidad jurídica (y no jurídica) global, la presente importante obra: "Transformación de los BRICS. Hacia la preponderancia global, tensiones, nuevos desafíos"; que reúne a destacados profesores referentes del orbe, que abordan de manera rigurosa, profunda, reflexiva, interdisciplinar.

Agradecemos de sobremanera y quedamos muy honrados, por la muy valiosa participación del reconocido jurista y amigo peruano, Dr. Jorge Isaac Torres Manrique, por haber elaborado el prólogo, de manera tan magnífica.

Nuestro indeleble agradecimiento a la prestigiosa firma brasiliana Conhecimento Editora, por la confianza, pues, sin la misma la presente obra no hubiera podido ver la luz.

Finalmente, esperamos que esta entrega tenga la importante acogida, que tuvieron nuestros anteriores proyectos.

LA PRESIDENCIA DE LA DIRECCIÓN CIENTÍFICA

CAPÍTULO XII

REGULATED CARBON MARKET IN BRAZIL: A CRITICAL ANALYSIS FROM THE PERSPECTIVE OF ENVIRONMENTAL AND ECONOMIC SUSTAINABILITY

Ana Lúcia Ribeiro Ramos[1]
Deilton Ribeiro Brasil[2]
Maria A. Egorova[3]

I. INTRODUCTION

The debate on climate change and the search for effective mitigation mechanisms have progressively occupied a central position in global political and legal agendas, particularly following the adoption of the 2015 Paris Agreement. The consolidation of nationally determined contributions (NDCs) has required States to redesign domestic regulatory frameworks capable of reconciling environmental protection with economic development. In this scenario, market-based instruments have gained prominence as alternatives to traditional command-and-control environmental regulation.

Among these instruments, the regulated carbon market emerges as a strategic mechanism of climate governance. By establishing emission caps and allowing

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the trading of carbon credits, the cap-and-trade model transforms environmental externalities into measurable and tradable economic variables. This approach seeks to internalize the environmental costs of greenhouse gas (GHG) emissions while preserving productive dynamism. Rather than imposing uniform technological mandates, it permits regulated entities to adopt cost-efficient mitigation strategies within a structured regulatory framework.

In Brazil, the regulated carbon market was formally institutionalized by Law No. 15,042 of December 11, 2024, which created the Brazilian Emissions Trading System (SBCE). The SBCE establishes emission limits for regulated sectors, recognizes tradable environmental assets such as carbon credits, and integrates these instruments into the broader architecture of financial and capital markets regulation. This legislative development marks a significant institutional innovation in Brazilian environmental governance, positioning the country within global decarbonization dynamics.

However, the implementation of a regulated carbon market in Brazil presents structural particularities. The country possesses a relatively renewable energy matrix, yet faces persistent challenges, particularly in relation to deforestation control, industrial emissions, regional inequalities, and institutional capacity asymmetries. Therefore, the adoption of an emissions trading system cannot be analyzed merely as a technical economic instrument; it must be examined within the broader framework of environmental sustainability, economic competitiveness, and governance effectiveness.

The central research problem guiding this study is the following: to what extent can the Brazilian Emissions Trading System significantly reduce greenhouse gas emissions without compromising economic growth while simultaneously promoting environmental sustainability? This question reflects an intrinsic tension between ecological responsibility and developmental imperatives, especially in emerging economies.

The general objective of this research is to critically analyze Law No. 15,042 of December 11, 2024 as an instrument capable of aligning environmental sustainability with economic rationality. The specific objectives are: (i) to examine the operational structure of the SBCE; (ii) to analyze its governance and oversight mechanisms; (iii) to evaluate the inclusion of business sectors, particularly small and medium-sized enterprises; and (iv) to investigate the role of fiscal incentives and technological innovation, including blockchain, in ensuring transparency and market credibility.

Methodologically, the research adopts the hypothetical-deductive approach. A guiding hypothesis is formulated, according to which the effectiveness of the regulated carbon market depends on the articulation of solid state regulation, collective engagement, and technological reliability. The hypothesis is then confronted with normative provisions and specialized literature in order to assess its consistency. This methodological structure allows for a critical and systematic evaluation of both the normative potential and the institutional vulnerabilities of the Brazilian model.

Preliminarily, it is argued that the regulated carbon market represents a promising but structurally complex instrument. Its success will depend not only on legislative sophistication but also on enforcement capacity, credibility of monitoring mechanisms, and coherence with broader environmental policies. By examining these dimensions, this study intends to contribute to the strengthening of Brazilian climate governance and to the positioning of Brazil as a relevant actor in the transition toward a sustainable low-carbon economy.

II. THE ECONOMIC NATURE OF THE REGULATED CARBON CREDIT MARKET: LAW NO. 15,042 OF DECEMBER 11, 2024.-

The regulated carbon market established by Law No. 15,042 of December 11, 2024 introduces a structural transformation in Brazil's environmental-economic regulatory framework. Rather than relying exclusively on command-and-control environmental regulation, the Brazilian Emissions Trading System (SBCE) incorporates market-based instruments aimed at internalizing environmental externalities. In economic terms, this model operationalizes the "polluter pays" principle by converting emission reductions into tradable financial assets.

As noted by Meneguin (2012), carbon credits represent digital certificates generated from verified emission reductions. This digitalization of environmental performance creates liquidity and enables the monetization of climate mitigation efforts. Such a mechanism reallocates economic incentives: emission reduction ceases to be merely a compliance burden and becomes a strategic asset capable of generating financial returns.

Milaré (2018) frames carbon credits as environmental assets, thereby situating them within a broader conception of environmental law that recognizes the economic value of ecological goods. The SBCE reinforces this perspective by formally recognizing carbon credits as negotiable assets subject to financial regulation. The article 14 of Law No. 15,042 of December 11, 2024 explicitly

integrates these instruments into the securities regime under Law No. 6,385 of December 7, 1976 when traded in financial and capital markets. This dual legal nature - environmental asset and financial security - places carbon credits at the intersection of environmental governance and capital markets regulation.

The cap-and-trade model adopted by the SBCE establishes an emission ceiling while permitting flexibility in how regulated entities achieve compliance. This model reduces overall mitigation costs by allowing the market to identify the most efficient emission reductions. Brazilian Emission Allowances (CBEs) and Verified Emission Reduction or Removal Certificates (CRVEs) function as regulatory tools that stimulate technological investment and encourage innovation in clean production processes (Tavares & Silva, 2022).

Importantly, the legal differentiation between public market trading - subject to CVM oversight - and private placements introduces regulatory flexibility. However, this dual structure also demands high standards of transparency and traceability to avoid distortions, speculation, or double counting of credits. Thus, the economic rationality of the SBCE is contingent upon institutional robustness and regulatory clarity.

From a broader macroeconomic perspective, the regulated carbon market may attract foreign investment, strengthen Brazil's ESG profile, and enhance its competitiveness in international trade, particularly in jurisdictions implementing carbon border adjustment mechanisms. Nevertheless, this economic potential is inseparable from environmental credibility. Market confidence depends on the integrity of the accounting system, the reliability of verification mechanisms, and the enforceability of emission caps.

II.1 Effectiveness of Carbon Credits: The Role of Monitoring, Reporting, and Verification (MRV) Mechanisms

The increase in greenhouse gas (GHG) concentrations in the atmosphere, associated with the acceleration and intensification of temperature variations observed over the last century, reveals an incompatibility with the pace required for ecosystem adaptation, directly contributing to the phenomenon of global warming. The consequences of this process include rising average surface temperatures, the intensification of extreme weather events, the melting of polar ice caps and glaciers, and, consequently, the rise in mean sea levels. This warming perpetuates a vicious cycle, as it intensifies the greenhouse effect by increasing

evaporation and the concentration of water vapor in the atmosphere (Lamarca Junior, 2007).

Within this context, international mitigation mechanisms have emerged, including carbon credits, whose purpose is to promote sustainable practices and offset emissions through projects aimed at reducing or removing GHGs. However, the effectiveness of these credits, both domestically and internationally, fundamentally depends on their credibility and traceability. To ensure such integrity, it is essential to adopt robust Monitoring, Reporting, and Verification (MRV) mechanisms.

The MRV systems ensure the accurate collection of emissions data, transparency in disclosure, and verification by independent entities. As a result, the carbon credits generated acquire technical and institutional backing, thereby strengthening market confidence, attracting investment, and safeguarding the environmental integrity of transactions. The continuous improvement and harmonization of these mechanisms are therefore crucial to the effectiveness of global environmental governance.

Specifically in the forestry sector, MRV systems play a central role in estimating anthropogenic GHG emissions associated with forests, considering available resources, carbon sinks, forest reserves, and land-use changes. Under the framework of Reducing Emissions from Deforestation and Forest Degradation (REDD+), each participating country is required to establish its own MRV system, in accordance with international requirements and national capacities. These systems must follow the guidelines of the Intergovernmental Panel on Climate Change (IPCC) for national inventories, while also taking into account the specific characteristics of the REDD+ strategy adopted, since different activities generate distinct impacts on monitoring systems (Herold & Skutsch, 2010).

Thus, the credibility of carbon credits and the effectiveness of climate policies depend directly on the quality and reliability of monitoring, reporting, and verification systems. Strengthening these mechanisms, combined with international cooperation and the development of local technical capacities, is fundamental to ensuring transparency, environmental integrity, and the advancement of climate governance on a global scale.

III. THE LAW NO. 15,042 OF DECEMBER 11, 2024 AS AN INSTRUMENT OF ENVIRONMENTAL SUSTAINABILITY

Although Law No. 15,042 of December 11, 2024 establishes a sophisticated regulatory architecture, its environmental effectiveness depends on practical

and institutional conditions. The transition from normative design to tangible emission reductions is not automatic.

Neiva (2023) highlights the institutional fragility that may compromise implementation, particularly the shortage of specialized technical teams capable of managing monitoring, reporting, and verification (MRV) systems. Without adequate technical capacity, the credibility of emission inventories and credit certification processes may be undermined. Thus, institutional strengthening is not peripheral; it is central to environmental integrity.

Technological innovation emerges as a complementary instrument. Cupertino et al. (2024) emphasize the potential of blockchain to improve traceability and reduce fraud risks. In the carbon market, transparency is inseparable from environmental legitimacy. If credits cannot be reliably tracked from generation to retirement, the system risks becoming a purely financial instrument detached from measurable environmental outcomes.

Silveira and Oliveira (2021) correctly stress that governance extends beyond legal norms. Effective climate governance requires coordinated participation of public authorities, private enterprises, financial institutions, and local communities. The success of the SBCE will depend on multilevel governance capable of harmonizing federal regulation with regional economic realities.

Fiscal incentives, as discussed by Masson & Queiroz (2024), play a structural role in reducing entry barriers and enhancing economic feasibility, particularly in sectors with high decarbonization costs. Without calibrated economic stimuli, compliance costs may generate resistance or lead to regulatory circumvention. Tax policies and subsidies must therefore operate not merely as benefits but as strategic instruments aligned with long-term decarbonization objectives.

The inclusion of SMEs presents a decisive structural challenge. As Fonseca (2022) observes, informational asymmetry and limited access to technical expertise impede smaller enterprises from participating effectively. Excluding SMEs would risk concentrating benefits among large corporations, thereby undermining distributive fairness and weakening the system's overall reach.

Educational and awareness initiatives (Caetano et al., 2016) are equally relevant. Environmental regulation achieves greater compliance when economic agents understand not only the costs of non-compliance but also the systemic advantages of participation. In this regard, sustainability must be framed not exclusively as an obligation but as a strategic opportunity.

Ultimately, environmental effectiveness depends on coherence among regulatory ambition, enforcement capacity, economic incentives, and technological

safeguards. If any of these pillars fail, the market risks degenerating into symbolic compliance without producing significant reductions in greenhouse gas emissions.

III.1 The Effectiveness of Constitutional Principles in Environmental Protection

The brazilian Federal Constitution of 1988 established the Rule of Law enshrining fundamental rights and guarantees such as liberty, equality, justice, well-being, and sustainable development. These constitutional values form the normative foundation of a society grounded in the dignity of the human person, pluralism, and social harmony, as provided in Article 1, item III of the Federal Constitution of 1988. The centrality of human dignity confers systematic unity upon the constitutional order and guides the interpretation of environmental protection as an essential condition for a dignified existence.

Within this constitutional framework, the right to life extends beyond mere biological survival and encompasses the guarantee of a dignified quality of life, which necessarily includes the protection of health, environmental balance, and ecological integrity. For the first time in Brazilian constitutional history, the environment was explicitly recognized as a fundamental right in Article 225 of the Federal Constitution of 1988, which provides that everyone has the right to an ecologically balanced environment, a common good of the people and essential to a healthy quality of life, imposing upon the government and the community the duty to defend and preserve it for present and future generations.

The constitutionalization of environmental protection represents a paradigmatic transformation in Brazilian legal thought. Environmental preservation ceases to be merely an administrative or sectoral policy and becomes a constitutional imperative. The State, through its public law entities and the exercise of police power, bears the responsibility to regulate, supervise, protect, and promote public policies aimed at environmental preservation, as detailed in Article 225, paragraph 1. These constitutional duties include environmental impact assessments, control of potentially polluting activities, biodiversity protection, and the promotion of environmental education.

However, constitutional environmental protection is not limited to state action. Article 225 establishes a shared responsibility, attributing to society the co-duty of environmental defense and preservation. This shared responsibility reflects the structural design of Brazilian environmental constitutionalism, which

recognizes environmental protection as both a public function and a collective obligation. The effectiveness of environmental norms therefore depends not only on regulatory authority but also on social engagement and participatory governance.

In this perspective, the environmental rule of law does not seek to hinder economic development. Its objective is to ensure sustainable development by promoting strategies capable of reconciling environmental externalities with economic gains derived from resource exploitation. It must encourage research, technological innovation, and the transition toward renewable energy alternatives, internalizing within society the awareness that unsustainable development ultimately undermines the very conditions for human survival.

Beyond the constitutional text, the Brazilian environmental legal system is reinforced by several infra-constitutional statutes that operationalize the article 225. Thus, the Law No. 6,938 of August 31, 1981 establishes the National Environmental Policy, integrating environmental protection into economic and social planning; The Law No. 9,605 of February 12, 1998 provides for criminal and administrative sanctions for environmentally harmful conduct; The Law No. 9,795 of April 27, 1999 institutes the National Environmental Education Policy; The Law No. 10,257 of July 10, 2001 Regulates the articles 182 and 183 of the Federal Constitution, establishes general guidelines for urban policy, and makes other provisions; The Law No. 11,105 of March 24, 2005 regulates items II, IV, and V of paragraph 1 of Article 225 of the Federal Constitution; establishes safety standards and oversight mechanisms for activities involving genetically modified organisms (GMOs) and their derivatives. Together, these statutes reflect a systemic approach in which environmental, urban, educational, scientific, and social policies are interconnected.

The Article 2 of Law No. 6.938/1981 reinforces that environmental policy must be integrated into national economic and social planning, aiming at improving environmental quality as a condition for socioeconomic development and the dignity of human life. Thus, environmental protection is framed not as a limitation to development, but as a structural prerequisite for sustainable progress.

Brazil's participation in the international environmental agenda, particularly through carbon market mechanisms and the Clean Development Mechanism under the Kyoto Protocol, further demonstrates the alignment between domestic constitutional principles and global climate governance commitments. Such engagement reinforces the principle of intergenerational equity, ensuring that development policies respect the environmental rights of future generations.

The principles guiding Brazilian Environmental Law are constitutionally grounded in human dignity and concretized through a comprehensive infra-constitutional framework. Their effectiveness depends on democratic governance, regulatory coherence, institutional capacity, and active societal participation. Environmental protection, as structured by the brazilian Federal Constitution of 1988, represents not merely a legal obligation but a structural commitment to sustainability and environmental justice, requiring continuous coordination between the State and civil society in pursuit of a balanced and equitable development model.

IV. FINAL REMARKS

The present study set out to critically analyze Law No. 15,042 of December 11, 2024 as an instrument capable of promoting environmental and economic sustainability through the institutionalization of the Brazilian Emissions Trading System (SBCE). The general objective was to examine whether the regulated carbon market can effectively reconcile greenhouse gas reduction targets with economic development. The specific objectives included understanding the operational structure of the SBCE, evaluating its governance and oversight mechanisms, assessing the participation of different economic sectors - particularly SMEs - and examining the role of fiscal incentives and technological innovation in consolidating a reliable carbon market.

The central research question that guided this inquiry was: to what extent can the Brazilian emissions trading system significantly reduce greenhouse gas emissions without compromising economic growth, while simultaneously promoting sustainability? This problem reflects a structural tension between environmental responsibility and economic competitiveness, particularly in a developing country with both renewable energy advantages and persistent challenges such as deforestation and institutional asymmetries.

The preliminary hypothesis sustained that the effectiveness of the SBCE would depend on three interdependent pillars: (i) solid and coherent state regulation; (ii) collective engagement of economic and social actors; and (iii) the incorporation of technological instruments capable of ensuring traceability, transparency, and environmental integrity. The analysis developed throughout the study allows this hypothesis to be partially confirmed.

It is confirmed insofar as the normative architecture of Law No. 15,042 of December 11, 2024 provides a sophisticated regulatory design based on the

cap-and-trade model, integrates carbon credits into financial market regulation, and establishes mechanisms aimed at ensuring environmental accountability. The alignment between environmental assets and capital markets demonstrates the potential for sustainability to become structurally embedded within economic dynamics.

However, the hypothesis is only partially validated because the law's effectiveness remains contingent upon implementation capacity. Structural limitations - such as insufficient technical expertise, risks of speculative distortion, uneven participation across sectors, and governance fragmentation - reveal that legal formalization alone does not guarantee measurable emission reductions. The environmental outcome depends on enforcement rigor, credible monitoring systems, coordinated public policies, and sustained institutional strengthening.

A further relevant conclusion concerns distributive sustainability. The inclusion of SMEs, regional actors, and diversified productive sectors is not merely a matter of economic equity but of systemic efficiency. A carbon market that concentrates benefits and compliance responsibilities in restricted segments may compromise both environmental effectiveness and social legitimacy. Therefore, a just and inclusive low-carbon transition emerges as a structural condition for the SBCE's success.

From a macro-structural perspective, the SBCE represents more than a domestic regulatory reform. It constitutes a strategic instrument positioning Brazil within the global transition toward decarbonization. Its international credibility will depend on the robustness of verification mechanisms, consistency in applying emission caps, and coherence with broader environmental policies, including deforestation control and renewable energy expansion.

The adoption of the hypothetical-deductive method proved fundamental to the consistency of the analysis. By formulating a guiding hypothesis and confronting it with normative provisions and specialized literature, the study avoided purely descriptive examination and instead engaged in critical testing of assumptions. This methodological structure allowed the identification of both normative advances and structural vulnerabilities, reinforcing the analytical rigor of the conclusions. The method thus ensured coherence between problematization, theoretical framework, and final assessment.

In conclusion, Law No. 15,042 of December 11, 2024 represents an important institutional advance in Brazilian climate governance. Nevertheless, its transformative potential will depend on sustained regulatory refinement, technological reliability, fiscal alignment, and collective engagement. The

Brazilian regulated carbon market contains the structural capacity to reconcile environmental sustainability with economic rationality, but its consolidation will require continuous institutional maturity and political commitment. Only under these conditions can the SBCE move from regulatory promise to durable and measurable climate effectiveness.

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