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Risk Financing Transfers and Risk Retention : A Semantic Literature Analysis for Financial Stability

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Abstract: *The increasingly dynamic global financial landscape demands effective risk management strategies to ensure financial stability and institutional sustainability. Two critical approaches,* ***risk financing transfers*** *and* ***risk retention,*** *offer complementary solutions. Risk financing transfers allow institutions to redistribute financial risks to third parties through mechanisms such as securitization and Credit Risk Transfers (CRTs), improving market efficiency. In contrast, risk retention emphasizes accountability by require institutions to retain a portion of the risks, fostering market discipline and investor confidence.This study employs a* ***Semantic Literature Review (SLR)*** *to analyze the interaction between these approaches, focusing on mechanisms like securitization, contract design, and macroprudential policies. By reviewing ten peer reviewed articles published between 2015 and 2024, key themes and challenges related to systemic risks, moral hazards, and regulatory gaps are identified. Thematic analysis, supported by tools like NVivo, reveals the potential of these mechanisms to enhance financial stability when implemented within a robust regulatory framework.The results highlights that while risk financing transfers increase flexibility and market efficiency, they May exacerbate moral hazards without sufficient risk retention. Macroprudential policies and accurate risk pricing is crucial in addressing systemic risks, particularly in sectors like shadow banking and climate vulnerable regions. The study also underscore the importance of transparent contract design and the integration of innovative tools, such as geospatial data and machine learning, to support fair and efficient risk distribution.In conclusion, balancing market efficiency and systemic risk mitigation is imperative.While risk retention strengths accountability and oversight, effective integration with risk financing transfers is necessary to create a sustainable and resilient financial system.This review provides valuable insights for policy makers and practitioners in addressing emerging financial challenges.*

Keywords: *Risk Financing, Risk Retention, Securitization, Moral Hazard, Financial Stability.*

1. INTRODUCTION

In an increasingly dynamic global financial landscape, risk management has become a strategic priority that cannot be ignored by governments, financial institutions, and regulators. Economic stability and the operational sustainability of organizations depend heavily on the ability to identify, evaluate, and manage risks effectively. Rapid changes in market dynamics, such as the expansion of globalization, rapid advances in often disruptive technologies, and the increasing impact of climate change, have created new complexities in risk management. These factors not only increase exposure to financial risks but also add a significant layer of uncertainty for market participants around the world. The inability to proactively and comprehensively manage these risks can create a detrimental domino effect, starting with the failure of individual financial institutions and then spreading through inter-institutional relationships, markets, and other economic sectors, ultimately threatening the integrity and sustainability of the global financial system as a whole. Therefore, it is important for

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stakeholders to adopt an innovative, integrated, and adaptive risk management approach to address the challenges of this increasingly complex era.

In this context, risk management becomes an important foundation in maintaining financial stability. The two main approaches used are risk financing transfers and risks retention, each of which has a different but complementary function in ensuring a balance between market efficiency and systemic risk mitigation.

Risk Financing Transfers: A Solution for Risk Diversification

Risk financing Transfers are the process by which financial risk is transferred from one entity to another, usually through a contract or financial instrument. This approach is designed to enable financial institutions to reduce their exposure to certain risks while still ensuring operational continuity. Some commonly used mechanisms include:

a. Securitization: Securitization is one of the main tools in risk transfer. In this process, financial assets such as mortgages or loans serve as the basis for the issuance of securities that are traded on the capital markets. (Hibbeln & Osterkamp, 2024b) highlight that securitization allows banks to reduce their credit risk, but without risk retention, this can trigger moral hazard, where banks have no incentive to maintain credit quality (Allen & Barbalau, 2024; Filomeni, 2024).
b. Credit Risk Transfers (CRTs): CRTs allow financial institutions to transfer credit risk to investors through structures such as synthetic bonds. (Gete et al., 2024) highlight that CRTs are very effective in transferring credit risk, but in the context of climate risk, better regulation is needed to avoid risk accumulation in high-risk areas (Gete et al., 2024) .
c. Insurance and Derivatives: Insurance is used to transfer certain risks, such as the risk of physical loss or operational risk, to an insurance company. Meanwhile, financial derivatives such as options and swaps allow the transfer of market risks (such as fluctuations in exchange rates or interest rates) to a third party.

Although effective in distributing risk, this risk transfer mechanism is not without challenges. One of them is information asymmetry, where the party receiving the risk may not have the same understanding of the nature of the risk being transferred, which has the potential to trigger instability (Temperini et al., 2024) .

Risk Retention: Improving Discipline and Accountability

On the contrary, risk retention is a strategy where financial institutions choose to retain some of the risk they have. This approach aims to improve market discipline and prevent moral hazard by ensuring that institutions retain " skin in the game." This strategy is often applied in various contexts, such as:

a. Risk Retention in Securitization: (Hibbeln & Osterkamp, 2024b) show that banks that retain some risk in securitizations tend to improve their credit monitoring, resulting in better asset performance, and reduce credit default rates (Allen & Barbalau, 2024) .
b. Optimal Contract Design: (Allen & Barbalau, 2024) emphasize the importance of security design such as pooling and tranching in creating healthy market incentives. This strategy allows banks to share risks proportionally between internal and external parties, while maintaining their accountability (Temperini et al., 2024) .
c. Regulatory Policy: In the shadow banking system, risk retention is often regulated by macroprudential policies to avoid regulatory arbitrage, as explained by (Lubello & Rouabah, 2024) .

Challenges in Risk Management

While both approaches have their advantages, they also face a number of major challenges that need to be addressed:

a. Moral Hazard: Risk transfer without oversight mechanisms can encourage speculative behavior, especially in securitization without risk retention. This can trigger a systemic crisis such as the 2008 global financial crisis (Allen & Barbalau, 2024; Filomeni, 2024).
b. Regulatory Arbitration: (Lubello & Rouabah, 2024) highlight that regulatory loopholes are often exploited by shadow banking to avoid capital requirements, creating externality risks. systemic.
c. Security Design Complexity: (Hibbeln & Osterkamp, 2024b) noted that simple labels such as *Simple, Transparent, and Standardized (STS)* often misleads investors, who neglect in-depth analysis of the security design (Hibbeln & Osterkamp, 2024a) .

Opportunities in Financial Stability

On the other hand, several significant opportunities emerge to strengthen risk management:

a. Technology Innovation: Technologies such as blockchain can increase transparency in security design and enable real- time risk monitoring. This supports more efficient and effective risk management (Baeriswyl et al., 2024; Szálteleki et al., 2024).

b. Integrated Macroprudential Policy: An integrated approach that includes regulation for securitization, shadow banking, and CBDC issuance could enhance systemic stability. (Baeriswyl et al., 2024; Lubello & Rouabah, 2024).
c. Security Design Improvements: The use of more complex but transparent contracts can create a balance between efficient risk transfer and healthy market incentives. (Temperini et al., 2024) .

Research purposes

This article aims to:

a. Analyze the latest trends and mechanisms in risk transfer and risk retention.
b. Evaluate the challenges and opportunities that arise from both approaches.
c. Provides policy and practice-based recommendations to improve the effectiveness of risk management at the institutional and systemic levels.

2. RESEARCH METHODOLOGY

This article uses a ***Semantic approach Literature Review*** **(SLR)** to analyze the current literature related to **risk mechanisms financing transfers** and **risks retention.** This approach was chosen because it provides a systematic framework for collecting, filtering, and analyzing data from a variety of relevant academic sources. The main purpose of SLR is to identify patterns, trends, and research gaps in the existing literature. By integrating the results of various studies, this article seeks to present a deeper understanding of the topic.

The research data sources are taken from leading academic journals and globally recognized databases. The journals used include *the Journal of Financial Intermediation, Journal of Banking and Finance, Economic Modeling, Review of Quantitative Finance and Accounting,* and *Real Estate Economics.* In addition, articles published in journals such as *Annals of Operations Research* and *Swiss Journal of Economics and Statistics* are also involved to enrich the analysis. Electronic databases such as Scopus, Web of Science, and Google Scholar are used to ensure access to relevant, high-quality literature.

Inclusion and exclusion criteria were applied to ensure that only relevant literature was included in the analysis. The selected studies were articles published within the last ten years, namely from 2015 to 2024, to maintain the relevance and novelty of the findings. The articles analyzed must be directly related to the topics of risk transfer, risk retention, securitization, and financial stability. Irrelevant articles, such as those that only discuss non-financial risks, or

those that do not have full access, were excluded from this study. Literature in English was prioritized to ensure global accessibility and uniformity in the analysis.

The search strategy is carried out systematically by using keywords such as " risk " retention," " risk financing transfers," " securitization," and " financial stability." A combination of Boolean operators, such as "AND" and "OR," is used to narrow the search results. For example, a combination such as (" risk retention " OR " securitization ") AND (" financial stability ") was used to find relevant articles. Search filters were applied to limit the results based on year of publication, research subject, and source journal.

Once the literature has been collected, the analysis process is carried out thematically. The first stage is data extraction, where important information such as title, author, year of publication, research method, and key findings are identified. This data is then analyzed using tools such as NVivo to help identify key themes emerging from the literature. Some of the themes identified include the effectiveness of risk retention in reducing moral hazard, the impact of risk transfer on financial system stability, and the relevance of macroprudential policies in supporting risk management. In addition, the relationships between themes are visualized in the form of concept maps to illustrate patterns and relationships between variables.

To ensure the validity and quality of the research, each selected article was assessed based on its contribution to the field of risk management, relevance to the topic, and validity of the methodology used. The results of the initial analysis were also discussed with experts in the related field to obtain additional input and ensure consistent results. These steps were taken to ensure that the article not only covers relevant literature but also provides in-depth and reliable insights.

This methodology allows the article to offer a comprehensive analysis, with references to studies such as (Hibbeln & Osterkamp, 2024b) , which highlights risk retention in securitization as a moral hazard mitigation measure, and (Gete et al., 2024) , which explores the impact of climate risk on the mortgage market through the Credit Risk mechanism. Risk Transfers (CRTs). In addition, (Lubello & Rouabah, 2024) show the importance of macroprudential policies to manage systemic risk in the shadow sector. With this approach, this article provides a solid foundation for exploring risk transfer and risk retention in the context of global financial stability.

3. RESULTS

Summary of Key Findings

Table 1 The following is a summary of the research analyzed:

No	Writer	Year	Title	Main Focus
1	(Temperini et al., 2024)	2023	Helicopter Money and Stability Risks	Risk transfer in monetary policy
2	(Allen & Barbalau, 2024)	2024	Security Design: A Review	Security design and market efficiency
3	(Hibbeln & Osterkamp, 2024b)	2024	Risk Retention in Securitization	Reducing moral hazard
4	(Lubello & Rouabah, 2024)	2024	Macroprudential Regulation and Shadow Banking	Macroprudential policy
5	(Doldi & Frittelli, 2024)	2022	Multivariate Systemic Optimal Risk Transfer	Systemic risk optimization
6	(Hibbeln & Osterkamp, 2024a)	2024	Features vs. Labels of Complex Securities	Complex security design analysis
7	(Filomeni, 2024)	2024	Securitization and Risk Appetite	Securitization in US banking
8	(Baeriswyl et al., 2024)	2024	Retail CBDC and Risk Transfers	Credit risk through CBDC
9	(Baeriswyl et al., 2024)	2024	CAP Subsidies and Financial Resilience	Financial risks in the agricultural sector
10	(Gete et al., 2024)	2024	Climate Risk in Mortgage Markets	Climate risk transfer in mortgages

Source: Reputable Journal Article, 2024

a. Efficiency in Risk Transfer

1) Securitization and Moral Hazard

(Hibbeln & Osterkamp, 2024b) highlight that securitization allows banks to reduce credit risk by shifting loan portfolios to investors. However, without a risk-taking mechanism retention, securitization often increases moral hazard. This occurs because banks have no incentive to maintain credit quality after the risk is transferred (Allen & Barbalau, 2024; Filomeni, 2024).

2) Credit Risk Transfers (CRTs)

(Gete et al., 2024) explores how CRTs are used to transfer mortgage credit risk to capital markets. The study reveals that CRTs provide efficiency in risk distribution but require more accurate risk pricing evaluation, especially in regions vulnerable to climate risk (Gete et al., 2024) .

3) Central Bank Digital Currency (CBDC)

(Baeriswyl et al., 2024) show that the issuance of CBDC allows the transfer of credit risk from commercial banks to the central bank. However, this mechanism requires strict regulation to avoid uncontrolled accumulation of systemic risk (Baeriswyl et al., 2024) .

b. Risk Effectiveness Retention

1) Supervision and Accountability in Securitization

Banks that implement risk strategies retention indicates increased credit monitoring, resulting in more stable performance. (Hibbeln & Osterkamp, 2024b) found that the " skin in the This game "strengthens market confidence and reduces moral risk (Allen & Barbalau, 2024) .

2) Transparent Securities Design

According to (Allen & Barbalau, 2024), pooling and tranching structures in securitization allow for more efficient risk distribution, but it is important to maintain transparency to avoid misuse of complex designs (Temperini et al., 2024) .

c. Impact on Systemic Stability

1) Regulation in Shadow Banking

(Lubello & Rouabah, 2024) show that the shadow banking sector often exploits regulatory loopholes to avoid capital requirements, increasing the risk of externalities. systemic. More integrated macroprudential policies are needed to reduce excess leverage and maintain market stability.

2) Systemic Approach to Risk Transfer

(Doldi & Frittelli, 2024) developed a Multivariate model Systemic Optimal Risk Transfer Equilibrium (SORTE), which enables optimal management of systemic risk through cross-financial institution cooperation.

d. Complexity of Security Design

1) (Hibbeln & Osterkamp, 2024b) highlights that investors often rely too much on labels such as *Simple, Transparent, and Standardized (STS)* in evaluating the quality of securities. However, these labels often do not reflect the actual risk, so a thorough analysis of the security design is essential (Hibbeln & Osterkamp, 2024a) .

e. The Impact of Climate Risk on Financial Markets
    1) A study by (Gete et al., 2024) evaluated how climate risks, such as hurricanes Harvey and Irma, affect the mortgage market. Their findings suggest that without location-based risk pricing adjustments, the market tends to undervalue risk in areas with high exposure to natural disasters (Gete et al., 2024) .

Thematic Analysis

From the results of the analysis, several main themes emerged:

a. Effectiveness of Risk Transfer Mechanisms Risk transfers such as securitization, CRTs, and CBDCs provide financial institutions with flexibility in managing their exposures. However, without adequate regulation, these mechanisms can increase moral hazard and systemic risk. For example, CRTs used in the mortgage market require a location-based risk assessment model to avoid concentration of risk in certain regions (Gete et al., 2024) .
b. Strategic Role of Risk Retention in Market Stability Risk Strategy retention strengthens the accountability of financial institutions and increases investor confidence. (Hibbeln & Osterkamp, 2024b) noted that banks that retain some of the risk in securitization show more stable performance compared to banks that completely transfer the risk (Allen & Barbalau, 2024) .
c. Systemic Risk (Lubello & Rouabah, 2024) highlighted that regulatory arbitrage in the shadow banking sector creates significant challenges in maintaining systemic stability. A more stringent macroprudential policy approach is needed to mitigate the impact of externalities.
d. Transparent and Accountable Securities Design The importance of more transparent securities design is emphasized by (Allen & Barbalau, 2024) , especially in mitigating the potential for excessive speculation that can exacerbate market risk (Hibbeln & Osterkamp, 2024a; Temperini et al., 2024).

Case Study: Climate Risk and the Mortgage Market

(Gete et al., 2024) provide very important insights into the impact of climate risk on the mortgage market, with a focus on the role of **Credit Risk Transfers (CRTs)** in distributing credit risk arising from natural disasters. Their study shows that regions vulnerable to climate risk, such as coastal areas that are frequently hit by major storms, tend to experience significant increases in credit risk. CRTs, as a mechanism to transfer this risk to capital markets, should

help create efficiency in risk distribution. However, without a risk evaluation model that reflects location-specific exposures, this mechanism can actually exacerbate inequities in risk distribution, potentially creating instability in financial markets.

One of the key issues identified is **risk pricing inequity,** whereby securitization prices do not fully reflect the level of exposure to climate risk in a given region. For example, mortgages on properties in coastal areas that are frequently hit by hurricanes may have a much higher level of risk than mortgages in areas that are less vulnerable to natural disasters. However, CRTs often fail to account for this difference, creating an illusion of security for investors purchasing the securities. As a result, regions with high climate risk become overexposed to risk, while the market fails to provide appropriate price signals to reduce development incentives in those areas.

This price inequity also impacts decision-making by stakeholders. For example, property developers may feel compelled to continue building in high-risk areas because their financing costs do not reflect the actual risk. Similarly, borrowers in vulnerable areas may not be charged a risk premium that reflects the level of threat from natural disasters. This creates perverse incentives, where development and economic activity in high-risk areas continue without adequate risk mitigation.

In addition, CRTs that are not supported by accurate location-based risk assessments can exacerbate systemic risk in the financial system. When a natural disaster such as Hurricane Harvey or Irma occurs, mortgage default rates in the affected areas can spike dramatically, leading to a decline in the value of the associated securitizations. Investors holding such securitizations will face significant losses, which in turn can trigger panic in the financial markets. If this is not anticipated properly, the impact can spread to other financial sectors, creating a domino effect that threatens the stability of the market as a whole.

To address these challenges, (Gete et al., 2024) recommends the development of more sophisticated location-based risk assessment models. These models should be able to account for a range of factors that influence climate risk, such as topography, distance from coastal areas, history of natural disasters, and vulnerability of local infrastructure. By using geospatial data combined with modern analytical technologies such as artificial intelligence (AI) and machine learning, these models can provide more accurate and location-based risk assessments. For example, these models can help determine appropriate risk premiums for properties in vulnerable areas, thereby creating price signals that better reflect the reality of risk.

Furthermore, regulators have an important role to play in ensuring that climate risks are integrated into CRT mechanisms. Policies that promote transparency in risk assessment and

reporting of climate risk exposures by financial institutions can help address market uncertainty. In addition, regulators can set minimum standards for risk assessment that banks and investors involved in CRTs must meet. For example, regulators can require banks to disclose climate risk exposure maps of their mortgage portfolios, so that investors can make more informed decisions.

Technological innovations can also play a key role in improving the accuracy of climate risk assessments. The use of blockchain, for example, can ensure that relevant risk data is available to all parties involved in the risk transfer, while machine learning technologies can process big data to identify climate risk patterns and trends. Thus, the integration of technology will not only increase transparency but also help reduce systemic risks arising from information imbalances in the market.

Overall, this study highlights that climate risk is a complex but manageable challenge with the right approach. With accurate location-based risk assessment models, policies that support transparency, and the use of modern technology, mechanisms such as CRTs can be used to distribute climate risk more equitably and effectively. These measures will not only improve financial market stability but also create better incentives for sustainable and climate-adaptive development.

Practical Implications

a. Regulators:

   Regulators should strengthen supervision of risk transfer mechanisms such as securitization and CRTs to prevent moral hazard. In addition, the development of integrated macroprudential policies is needed to manage systemic risks in the shadow banking sector (Baeriswyl et al., 2024; Lubello & Rouabah, 2024).

b. Market Players:

   Market participants need to increase in-depth analysis of security design to avoid relying on misleading quality labels. In addition, location-based risk evaluation is needed to ensure fair and accurate risk pricing. (Gete et al., 2024; Hibbeln & Osterkamp, 2024a).

These results indicate that successful risk management in global financial markets requires a balance between the efficiency of risk transfer mechanisms and strengthening accountability through risk management strategies. retention.

4. DISCUSSION

This study analyzes findings from ten major journal articles to explore the role of **risk financing transfers** and **risks retention** in supporting global financial market stability. The analysis process highlights how these two approaches affect risk dynamics, presenting significant opportunities for market efficiency, but also raising significant challenges related to moral hazard, design complexity, and systemic risk. The discussion integrates theoretical and empirical insights from the literature to answer how these two mechanisms can be optimized in different contexts.

Effectiveness and Risk Challenges Financing Transfers

Risk financing transfers are an approach that allows financial institutions to transfer risk to third parties through mechanisms such as securitization, **credit Risk Transfers (CRTs),** or the issuance of **Central Bank Digital Currency (CBDC).** (Hibbeln & Osterkamp, 2024b) revealed that securitization plays an important role in diversifying risk among investors, allowing banks to reduce their exposure to credit risk. However, without a risk retention element, this risk transfer often triggers moral hazard. In this case, banks no longer have an incentive to maintain the quality of the credit they provide, thereby increasing the risk of future credit failures.

(Gete et al., 2024) add a new dimension to this discussion by evaluating CRTs in the context of climate risk. CRTs allow banks to transfer mortgage credit risk to investors through capital markets. However, their study shows that without a location-based risk assessment model, the market tends to overlook risks in disaster-prone areas such as those affected by hurricanes Harvey and Irma. CRTs, while efficient in distributing risk, require risk pricing that better reflects geographic exposure to improve the accuracy of managing systemic risk.

On the other hand, the issuance of **CBDC offers innovation in** systemic risk management. (Baeriswyl et al., 2024) show that CBDC can transfer credit risk from commercial banks to the central bank, creating temporary stability in the banking system. However, this risk transfer increases systemic risk exposure at the central bank level, which requires stricter supervision and mitigation policies. Therefore, CBDC, although innovative, requires careful planning and regulation to ensure that the risk transfer does not create new instability in the financial system.

Strategic Role of Risk Retention

As a complement to risk transfer, **risk retention** emphasizes the importance of financial institutions retaining some of their risk to reduce moral hazard and increase accountability. (Hibbeln & Osterkamp, 2024b) show that banks that implement a risk retention has better credit performance due to increased internal oversight of loan quality. This approach also provides confidence to investors, who feel confident that the bank has " skin in the game," namely a commitment to ensure that the quality of the underlying assets is maintained (Sunaryo & Lestari, 2023) .

(Allen & Barbalau, 2024) highlight that optimal securitization designs, such as pooling and tranching, can support more efficient risk distribution while maintaining healthy market incentives. However, the complexity of security design often poses a challenge. (Hibbeln & Osterkamp, 2024b) note that the reliance on simplistic labels such as *Simple, Transparent, and Standardized (STS)* often misleads investors, especially if not accompanied by an in-depth analysis of the actual structure and risks. Therefore, transparency in the design of securities becomes an important element in supporting the effectiveness of risk management strategies. retention (Deni Sunaryo, Etty Puji Lestari, Siti Puryandani, 2023; Deni Sunaryo, Hamdan, Alfina Anggriani, Cecilia Winata, 2024; Sunaryo, 2019; Sunaryo et al., 2022) .

Implications for Systemic Stability

In a broader context, **risk financing transfers** and **risks retention interacts with** systemic dynamics in financial markets. (Lubello & Rouabah, 2024) show that the shadow banking sector often exploits regulatory loopholes to avoid capital requirements, which ultimately creates externality risks. This regulatory arbitrage magnifies the risk of excessive leverage, which could trigger systemic instability if not addressed with adequate macroprudential policies.

(Doldi & Frittelli, 2024) developed a **Multivariate model Systemic Optimal Risk Transfer Equilibrium (SORTE)** offers a solution to this challenge. This approach emphasizes the need for cooperation across financial institutions to ensure optimal risk distribution. By combining risk transfer and risk retention in one framework, this model provides insights into how the financial system can be collectively managed to mitigate the impact of systemic risk. (Hascika et al., 2024; Maulana et al., 2024; Sunaryo et al., 2022; Wahyuni et al., 2024).

Climate Risk and Financial Markets

Climate risk has become one of the major threats to the stability of global financial markets, especially due to the increasing frequency and intensity of natural disasters. In this context, research by (Gete et al., 2024) provides in-depth insights into how disaster events such as Hurricanes Harvey and Irma affect the mortgage market in the United States. They found that disaster-affected areas showed a significant increase in credit risk, mainly in the form of increased default rates on mortgages and a decrease in the value of collateralized assets (Lestari et al., 2024) .

Credit Mechanism Risk Transfers (CRTs) are one way to distribute climate risk to capital markets. CRTs allow banks and financial institutions to transfer their mortgage credit risk to investors through securitization. In normal circumstances, this is an efficient way to manage risk exposure. However, in the context of climate risk, (Gete et al., 2024) highlight a fundamental weakness of CRTs, namely the lack of a risk evaluation model that reflects location-specific exposure to natural disasters. When risk prices do not reflect the actual risk in a particular region, CRTs can drive disparities in risk distribution, with investors tending to underestimate the level of risk in disaster-prone areas.

For example, coastal areas that are vulnerable to hurricanes may have a much higher risk of property loss than inland areas. However, in many cases, this risk is not properly priced by the market. This not only creates an inequitable distribution of risk but also encourages irresponsible behavior, such as uncontrolled development in high-risk areas. Furthermore, these misguided incentives can create a negative feedback loop, where the more financial assets are exposed to climate risk, the higher the potential for instability in financial markets.

Furthermore, climate risk impacts not only financial institutions but also investors and asset owners. Investors who purchase mortgage-backed securities from disaster-prone areas are often unaware of their level of exposure to climate risk. This can lead to significant losses when disasters occur, such as a decline in asset value or an increase in default rates. In addition, uncertainty about climate change and mitigation policies, such as the transition to clean energy, can affect asset values in the long term. For example, properties in coastal areas that are frequently affected by hurricanes may experience depreciation in value due to increased insurance premiums or decreased market attractiveness.

In a policy context, this study highlights the need to develop more accurate location-based risk pricing models to support mechanisms such as CRTs. These models should be able to evaluate climate risk holistically, encompassing not only the potential for immediate losses from natural disasters but also the longer-term impacts on asset values and financial stability.

One concrete step that can be taken is the integration of geospatial data into the risk assessment process, so that risk pricing can better reflect location-specific exposure levels.

In addition, regulators also have an important role to play in ensuring that climate risks are properly accounted for in financial mechanisms such as CRTs. This can be done through policies that promote transparency in risk assessments and require financial institutions to disclose their exposure to climate risks. For example, regulators can set climate risk reporting standards that banks and other financial institutions must meet. These policies will not only raise awareness of climate risks but also help markets manage these risks more effectively.

The use of technology can also be a solution to improve the accuracy of risk assessment. Technologies such as artificial intelligence (AI) and machine learning (ML) can be used to analyze historical data on natural disasters and predict their impact in the future. Blockchain can also be integrated to increase transparency in the risk transfer process, ensuring that relevant risk data is available to all parties involved.

The impact of climate risk on financial markets is a complex challenge, but it also opens up opportunities for innovation in policy design and risk management. Mechanisms such as CRTs, if supported by better risk assessment models and appropriate regulation, can be a very effective tool for managing climate risk. However, without these measures, climate risk will continue to pose a major threat to the stability of global financial markets. Further research is needed to develop a holistic approach that can integrate climate risk into the financial system more thoroughly, with a focus on fairness, transparency, and sustainability (Lestari et al., 2024)

Opportunities and Challenges in Policy Design

The results of this study indicate that responsive policy design is essential to optimize the benefits of risk. financing transfers and risks retention. A more integrated policy approach, as proposed by (Lubello & Rouabah, 2024) , could help manage systemic risk in the shadow banking sector. On the other hand, transparency in the design of securities, as emphasized by (Allen & Barbalau, 2024) , is a key element in ensuring that risk transfer mechanisms do not create moral hazard that is detrimental to the market.

Overall, these findings confirm that the effectiveness of **risk financing transfers** and **risks retention** relies heavily on a strong regulatory framework, design transparency, and accurate risk assessment. The combination of these strategies, along with technological innovations such as blockchain to increase transparency, has the potential to create a more stable and sustainable financial market.

5. CONCLUSION

This study shows that the risk financing transfers and risks retention are two very important approaches to risk management in modern financial markets. They play complementary roles, with risk transfer mechanisms providing financial institutions with the flexibility to distribute risk to third parties, while risk retention emphasizes the importance of accountability and market discipline. However, both approaches also present significant challenges that require careful attention and management.

In the context of risk financing transfers, securitization and credit Risk Transfers (CRTs) have proven to be an effective tool for diversifying credit risk and improving market efficiency. Securitization allows banks to reduce their exposure to credit risk, while CRTs provide a way for mortgage risk to be distributed to the capital markets. However, as stated by (Gete et al., 2024; Hibbeln & Osterkamp, 2024b; Lestari et al., 2024), these mechanisms are often accompanied by moral hazard risks and unfairness in risk distribution, especially if risk prices do not reflect specific conditions such as geographic exposure to climate risk. Therefore, a more accurate risk evaluation model is needed to ensure that these mechanisms do not create market distortions or wrong incentives.

In addition, innovations such as the issuance of Central Bank Digital Currency (CBDC) offer new opportunities to transfer credit risk from commercial banks to central banks. While this provides temporary stability, research (Baeriswyl et al., 2024) suggests that this mechanism increases systemic risk exposure at the central bank level, requiring stricter regulatory oversight. Without effective policies, CBDCs could create new risks that could actually threaten financial market stability.

On the other hand, risk retention has proven to be an effective strategy to reduce moral hazard and increase accountability of financial institutions. By retaining some risk, banks demonstrate their commitment to credit quality, which provides investor confidence and increases market stability. However, as noted by (Allen & Barbalau, 2024) , the effectiveness of risk retention depends largely on the transparency in the design of the securities and the incentives given to institutions to maintain asset quality.

The study also highlights the impact of climate risk on financial markets, a dimension that has become increasingly important in recent years. The study (Gete et al., 2024) shows that without location-based risk assessment, mechanisms such as CRTs can exacerbate risk distribution, especially in areas prone to natural disasters. This underscores the need to integrate geospatial data and advanced analytical technologies into risk pricing models to reflect actual exposure to climate risk.

In addition, challenges in the shadow banking sector, such as regulatory arbitrage and excessive leverage, add complexity to managing systemic risk. (Baeriswyl et al., 2024; Lubello & Rouabah, 2024) recommend a more integrated macroprudential approach to mitigate these risks, while (Doldi & Frittelli, 2024; Lestari et al., 2024)proposed an optimal risk distribution model to collectively support financial system stability.

In conclusion, despite the risk financing transfers and risks retention offers a great opportunity to support the efficiency and stability of financial markets, the success of its implementation depends largely on strong regulation, transparency of security design, and accurate risk assessment. Technological innovations such as blockchain and machine learning can be important tools to support this goal, by increasing transparency, accuracy, and fairness in risk management.

Moving forward, collaborative efforts between regulators, financial institutions, and other stakeholders are needed to create a holistic and sustainable framework. Further research is also needed to develop better approaches to integrating climate risk into the financial system, ensuring that markets remain fair, efficient, and resilient to future challenges. With the right approach, risk financing transfers and risks retention can be a key pillar in supporting sustainable global financial stability.

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