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Surviving the Streets: An Empirical Study on the Livelihood Challenges of Street Vendors in Paramathi Velur Taluk

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Abstract: Street vending is an important part of the informal economy and provides livelihood opportunities to economically weaker sections of society. This study examines the socio-economic conditions and occupational challenges faced by street vendors in Paramathi Velur Taluk, Namakkal District, Tamil Nadu. The research focuses on demographic profile, income levels, working conditions, and major livelihood issues of street vendors. A mixed-methods approach was adopted, and primary data were collected from 150 respondents through structured interviews and field observations. The data were analysed using descriptive statistical and thematic methods. The findings reveal that street vendors face problems such as irregular income, lack of social security, limited access to credit facilities, inadequate infrastructure, and harassment from authorities. Despite these challenges, street vending remains a significant source of livelihood for marginalized populations. The study concludes that effective policy support, financial inclusion, and improved infrastructure are necessary to strengthen the socio-economic conditions of street vendors.

Keywords: Street vending; Informal economy; Socio-economic status; Livelihood challenges; Tamil Nadu

1. Introduction

Street vending has long been recognized as a crucial component of the urban informal economy in India, providing livelihoods to millions of workers across cities and towns (Bhowmik, 2012). As one of the most visible aspects of informal labour, street vendors contribute significantly to local economies by offering affordable goods and services, fostering grassroots entrepreneurship, and creating employment opportunities for low-skilled labourers who may not find stable work in the formal sector. Despite their critical role in urban ecosystems, street vendors are often marginalized, operating in a space fraught with legal ambiguities, economic precarities, and social stigmas. They navigate a complex web of challenges, including a lack of recognition, absence of access to social protections, and frequent harassment by authorities.

This study seeks to examine the socio-economic conditions of street vendors in Paramathi Velur Taluk, Namakkal District, Tamil Nadu. Through an empirical investigation, the study explores the key challenges these vendors encounter, the coping mechanisms they employ to sustain their livelihoods, and the systemic factors that perpetuate their vulnerability. By providing a nuanced understanding of their circumstances, this study aims to inform policy measures that could enhance their socio-economic security and support their integration into formal economic systems.

1.1 Background and Context

Paramathi Velur Taluk, situated in Namakkal District of Tamil Nadu, is a semi-urban region known for its vibrant local markets and diverse economic activities. The taluk serves as an important trading hub for the surrounding rural and urban areas. In this context, street vending plays a vital role in sustaining the local economy by ensuring that residents have access to a wide variety of goods and services at affordable prices. Vendors in this region sell a broad range of products, including fresh produce, textiles, household items, and fast-moving consumer goods, catering to the daily needs of the local population.

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Despite their contributions to the local economy, street vendors in Paramathi Velur Taluk face numerous challenges. One of the most significant issues is their legal and social marginalization. Vendors often operate without formal licenses or recognition, which exposes them to a high degree of vulnerability. They are frequently subjected to fines, evictions, and harassment from municipal authorities and law enforcement agencies. The lack of legal recognition not only disrupts their livelihoods but also prevents them from accessing basic rights and protections that could otherwise improve their economic security.

Economic precarity is another critical challenge. The income generated by street vending is often insufficient and unpredictable, with daily earnings subject to fluctuations caused by market demand, seasonal changes, and competition. The lack of access to formal financial services, such as bank loans or insurance schemes, further exacerbates their economic instability. For many vendors, their earnings barely cover essential living expenses, leaving them in a cycle of poverty and debt.

Social challenges compound these economic and legal issues. Street vendors often occupy contested public spaces, leading to conflicts with residents, local businesses, and municipal authorities. The absence of dedicated vending zones forces vendors to set up stalls in makeshift locations, which are often unsafe and lack basic amenities like clean water, sanitation, and waste disposal facilities. This not only affects the quality of their working conditions but also exposes them to health risks and lowers the quality of goods and services they provide to customers.

In addition to these systemic challenges, street vendors in Paramathi Velur Taluk face socio-cultural hurdles, particularly gender-based discrimination. Women, who constitute a significant portion of the street vending workforce, encounter unique barriers such as limited mobility, safety concerns, and societal stigma. Many female vendors also bear the dual burden of earning a livelihood and managing household responsibilities, making their daily lives even more challenging.

Despite these adversities, the street vendors of Paramathi Velur Taluk demonstrate remarkable resilience and adaptability. They employ a variety of coping mechanisms to navigate the challenges they face, from leveraging informal social networks to accessing microfinance schemes and negotiating with local authorities. However, these strategies are often reactive and short-term, highlighting the urgent need for systemic interventions to address the root causes of their vulnerability.

The unique socio-economic dynamics of Paramathi Velur Taluk make it a compelling case for studying the challenges and opportunities associated with street vending. By focusing on this specific region, this study seeks to shed light on the lived experiences of street vendors and identify actionable solutions that can improve their livelihoods. The findings are not only relevant to Paramathi Velur Taluk but also offer valuable insights for policymakers, researchers, and practitioners working to address the broader issues faced by street vendors across India.

In summary, the street vendors of Paramathi Velur Taluk embody both the promise and the plight of the informal economy. While they play a crucial role in supporting local economies and communities, they remain excluded from the formal systems that could provide them with security and stability. This study aims to bridge this gap by providing evidence-based recommendations for policy and practice that can empower street vendors and enhance their socio-economic well-being.

1.2. Objectives of the Study

The primary aim of this study is to understand the socio-economic conditions and livelihood challenges of street vendors in Paramathi Velur Taluk, Namakkal District, Tamil Nadu. Street vending is a complex livelihood activity influenced by various economic, legal, and social factors. The following objectives guide the study:

To analyse the socio-economic profiles of street vendors in Paramathi Velur Taluk:

This objective focuses on understanding the demographic characteristics, including age, gender, education, family size, and economic conditions such as income levels, savings, and expenditure patterns of street vendors. By analysing these aspects, the study aims to provide a comprehensive picture of their socio-economic status.

To identify the key challenges impacting their livelihoods:

This includes examining the legal, social, and economic barriers faced by street vendors, such as lack of formal recognition, harassment, economic insecurity, and inadequate access to essential services. Understanding these challenges is critical for designing interventions to improve their living and working conditions.

To explore coping mechanisms and adaptive strategies employed by vendors:

This objective investigates the various strategies vendors adopt to sustain their livelihoods amidst challenges. These may include leveraging informal networks, adopting flexible work schedules, accessing microfinance, and negotiating with authorities.

To recommend actionable policy measures for improving their socio-economic status:

Based on the findings, this objective aims to propose evidence-based and practical policy recommendations that address the vulnerabilities of street vendors and promote their socio-economic well-being. These may include formalization measures, improved access to financial services, and the creation of supportive legal frameworks.

1.3. Research Questions

The study is guided by the following key research questions, which aim to unravel the various dimensions of street vending in Paramathi Velur Taluk:

What are the demographic and economic characteristics of street vendors in Paramathi Velur Taluk?

This question seeks to identify the socio-economic profiles of the vendors, including their age, gender, education, income levels, and the type of goods they sell. It also aims to understand their motivations for engaging in street vending and the role it plays in their overall livelihood.

What are the primary challenges faced by these vendors?

This question focuses on identifying the legal, economic, and social challenges faced by street vendors. It seeks to explore issues such as lack of formal recognition, harassment by authorities, economic precarity, lack of access to credit, and conflicts over public spaces.

How do street vendors cope with the challenges to sustain their livelihoods?

This question examines the various strategies vendors adopt to manage and mitigate the challenges they face. These strategies could include informal agreements with local authorities, reliance on social networks, participation in vendor associations, and leveraging alternative financial mechanisms.

What policy interventions can address these challenges effectively?

This question aims to explore potential policy measures that can enhance the socio-economic security of street vendors. It seeks to identify interventions that address both short-term challenges, such as harassment and insecurity, and long-term goals, such as formalization and integration into the formal economy.

Expanded Considerations

The research questions and objectives are interconnected and aim to provide a holistic understanding of the street vending sector in Paramathi Velur Taluk.

The first objective and research question emphasize the importance of building a foundational understanding of who street vendors are, why they engage in this activity, and what their economic realities are. This information is crucial for contextualizing their challenges.

The second objective and research question aim to delve deeper into the systemic barriers that perpetuate the vulnerability of street vendors. This includes exploring how the legal ambiguity of their status affects their ability to earn a stable income and how social attitudes toward informal labour influence their daily experiences.

The third objective and research question focus on resilience. Despite operating in challenging environments, street vendors exhibit remarkable adaptability. Understanding these coping mechanisms can provide insights into their resourcefulness and the informal support systems that sustain them

Finally, the fourth objective and research question align with the study's goal of contributing to policy discourse. By identifying actionable measures, this study seeks to bridge the gap between the informal and formal economies, ensuring that street vendors receive the recognition and support they deserve

Together, these objectives and research questions provide a comprehensive framework for analysing the livelihoods of street vendors and developing practical solutions to improve their socio-economic conditions. This expanded focus ensures that the study not only documents the challenges faced by street vendors but also actively contributes to creating a more inclusive and equitable economic landscape.

2. Literature Review

2.1. The Informal Economy in India

The informal economy is a vital component of India’s workforce, employing over 80% of the labour force. This sector includes various forms of unregulated work, including street vending, domestic work, construction, and small-scale manufacturing. Street vending, in particular, holds a significant position as it provides livelihood opportunities for low-income groups, including women and marginalized communities, who often have limited access to formal employment avenues.

Studies by Bhowmik and Singh underscore the dual role of street vending in the informal economy. On one hand, it serves as a survival strategy for the urban poor, offering a critical means of subsistence amidst economic instability. On the other hand, it also embodies elements of entrepreneurial activity, as vendors demonstrate creativity, resilience, and adaptability in managing their small businesses. Singh argues that street vending contributes to urban economies by enhancing the accessibility of goods and services, particularly for lower-income consumers. However, this contribution often goes unrecognized in official economic frameworks.

Street vending is further characterized by its accessibility as a livelihood option. Minimal capital investment and a flexible entry threshold make it an attractive choice for individuals facing barriers to formal employment, such as illiteracy, lack of vocational skills, or social marginalization. Nonetheless, despite its potential to empower vulnerable groups, the lack of integration with formal economic policies perpetuates the precarious status of vendors within the urban economy[8].

2.2. Legal and Regulatory Challenges

The absence of consistent legal recognition has been a persistent issue for street vendors across India[9]. Roever and Skinner[10] highlight the legal and regulatory hurdles faced by vendors, which include frequent eviction drives, arbitrary fines, and harassment by municipal authorities. Many street vendors operate in public spaces without formal permits, making them susceptible to exploitation[11].

The Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014, was introduced as a landmark legislation to address these challenges[12]. It aims to provide legal protection to vendors by creating town vending committees (TVCs) responsible for issuing licenses, allocating vending zones, and addressing grievances. However, the implementation of this act remains inconsistent across states. Studies, including those by Bhowmik, reveal that delays in the formation of TVCs, lack of awareness among vendors, and resistance from local authorities have limited the act's impact.

Furthermore, vendors face conflicts with formal shop owners and residents who perceive street vending as a nuisance, adding another layer of vulnerability. Such tensions often result in aggressive anti-vending campaigns, exacerbating the precarious conditions under which street vendors operate. Legal ambiguities around the use of public space further complicate their struggle for livelihood security.

2.3. Socio-Economic Vulnerabilities

Socio-economic vulnerabilities are a defining feature of street vending as an informal livelihood. Research by Kusakabe highlights the unpredictable and often inadequate income levels of street vendors. Seasonal variations, competition, and price fluctuations make it difficult for vendors to achieve financial stability. Additionally, their working conditions are often marked by exposure to extreme weather, lack of access to basic amenities, and long working hours.

The gendered dimensions of street vending add another layer of complexity. Chaudhuri argues that female street vendors face compounded vulnerabilities compared to their male counterparts. Social stigma, mobility restrictions, and additional caregiving responsibilities limit women's ability to access profitable vending locations or expand their businesses. Female vendors also experience higher levels of harassment and are often excluded from informal support networks dominated by men.

Moreover, the lack of access to social protection mechanisms such as health insurance, pensions, and childcare services further exacerbates the socio-economic challenges faced by street vendors. This exclusion places them at greater risk during economic shocks or personal emergencies. For example, during the COVID-19 pandemic, street vendors faced significant disruptions to their livelihoods due to lockdown measures, with little to no government support.

Despite these challenges, many street vendors display remarkable resilience and resourcefulness. Informal networks, peer associations, and microfinance initiatives often serve as vital support mechanisms. These coping strategies enable vendors to navigate an environment characterized by uncertainty and marginalization. However, as Bhowmik emphasizes, such informal arrangements are not a substitute for systemic reforms that address the root causes of their vulnerabilities.

In summary, the literature highlights the critical role of street vending in India's informal economy while underscoring the need for inclusive policies that recognize and support this livelihood. The socio-economic and legal challenges faced by vendors are deeply intertwined, necessitating a holistic approach to address their vulnerabilities and empower them within the urban economic landscape.

3. Methodology

3.1. Research Design

This study adopts a mixed-methods approach, combining quantitative and qualitative methodologies to provide a comprehensive analysis of the socio-economic conditions and challenges faced by street vendors in Paramathi Velur Taluk. Mixed-methods research is particularly effective in capturing the multifaceted nature of issues that cannot be fully understood through a single method. The quantitative data derived from structured interviews facilitate a statistical understanding of demographic and economic conditions, while the qualitative insights obtained through focus group discussions help uncover the lived experiences, coping strategies, and perspectives of street vendors.

The rationale for choosing this design lies in its ability to triangulate findings and enhance the reliability of the research outcomes. By integrating numerical data with narratives, the study aims to explore both the measurable and subjective dimensions of street vending. Moreover, this approach ensures that the voices of the vendors—often marginalized in academic and policy discourse—are adequately represented.

3.2. Sample Selection

The study employs purposive sampling to select participants, ensuring that the sample represents a diverse cross-section of street vendors. Purposive sampling is particularly useful for studies focusing on specific populations, as it allows researchers to target individuals who possess the characteristics necessary to address the research questions. A total of 150 street vendors were chosen, stratified based on the following criteria:

Type of Goods Sold: Vendors were categorized into those selling food items, clothing, household goods, and other miscellaneous products. This stratification enables an understanding of how the nature of the trade influences vendors' socio-economic conditions.

Gender: Both male and female vendors were included to capture the gendered dimensions of street vending. Female vendors often face unique challenges, such as restricted mobility and social stigma, which merit focused exploration.

Location: Vendors operating in different areas within Paramathi Velur Taluk—such as busy market streets, residential neighbourhoods, and transportation hubs—were selected to account for location-based variations in experiences.

The inclusion of these stratified categories ensures that the sample is representative of the broader street vending population in the region.

3.3. Data Collection Tools

3.3.1. Structured Interviews

A structured questionnaire was developed to collect quantitative data on demographic, economic, and occupational aspects of the vendors' lives. The questionnaire included sections on:

Demographic Information: Age, gender, educational background, and marital status.

Economic Variables: Monthly income, expenditure, savings, and access to credit facilities.

Occupational Details: Type of goods sold, hours of operation, and challenges faced during vending activities.

Structured interviews were conducted face-to-face to ensure accuracy and to address any questions or concerns raised by the respondents. This tool provided a robust dataset for quantitative analysis and allowed researchers to establish a baseline understanding of the vendors' conditions.

3.3.2. Focus Group Discussions (FGDs)

Focus group discussions were employed to capture qualitative insights into the lived experiences of street vendors. FGDs are particularly effective for exploring collective experiences, generating discussions, and uncovering nuanced perspectives that may not emerge in structured interviews.

The FGDs were organized in small groups of six to eight participants, stratified by gender and type of trade to ensure focused and relevant discussions. Topics covered included:

Coping mechanisms during economic downturns.

Interactions with local authorities and law enforcement.

Perceptions of the Street Vendors Act, 2014, and its implementation.

Each discussion was facilitated by a trained moderator and lasted approximately 90 minutes. Notes and recordings were made with the consent of participants to ensure comprehensive data collection.

3.3.3. Secondary Data

To contextualize the primary data, secondary sources such as policy documents, government reports, and academic literature were reviewed. These sources provided insights into the broader regulatory and socio-economic frameworks governing street vending in India[15]. For instance, the Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014, was analysed to understand its objectives, provisions, and limitations in the context of Paramathi Velur Taluk.

3.4. Data Analysis

3.4.1. Quantitative Data Analysis

The quantitative data collected through structured interviews were analyzed using descriptive statistics. This approach enabled the identification of key trends and patterns in the demographic, economic, and occupational characteristics of the vendors. Statistical tools such as percentages, mean, and standard deviation were employed to summarize the data.

For example, the analysis revealed the average monthly income of street vendors, variations in income across different types of trades, and gender disparities in earnings. Cross-tabulations were used to explore relationships between variables, such as the correlation between education levels and income or between gender and access to credit. These insights provide a numerical understanding of the socio-economic conditions of the vendors, which can inform policy recommendations.

3.4.2. Qualitative Data Analysis

The qualitative data from FGDs were analysed thematically to uncover recurring patterns, ideas, and challenges. Thematic analysis is a widely used method in qualitative research that involves identifying, analysing, and reporting themes within the data. The process consisted of the following steps:

Familiarization: Transcripts from the FGDs were reviewed multiple times to gain an in-depth understanding of the content.

Coding: Key segments of the text were labeled with codes that represented specific ideas or issues, such as "harassment by authorities" or "coping strategies during economic crises."

Theme Development: Related codes were grouped into broader themes, such as "legal vulnerabilities," "gendered challenges," and "community support networks."

This analysis revealed that vendors often rely on informal social networks for support during crises, such as borrowing money from peers or pooling resources to address common challenges. Gendered challenges, such as restricted mobility for women and higher levels of harassment, were prominent themes that highlighted the need for targeted interventions.

3.4.3. Integration of Findings

The findings from quantitative and qualitative analyses were integrated to provide a comprehensive understanding of the vendors' socio-economic conditions. For instance, while the quantitative data highlighted low average incomes, the qualitative data explained the coping mechanisms vendors adopt to manage financial instability. This triangulation ensures a holistic perspective and strengthens the validity of the research outcomes.

In summary, the mixed-methods approach, with its combination of structured interviews, FGDs, and secondary data review, provides a robust framework for analyzing the challenges faced by street vendors in Paramathi Velur Taluk. The integration of quantitative and qualitative insights not only captures the measurable aspects of their livelihoods but also delves into the socio-cultural and experiential dimensions, thereby addressing the research objectives comprehensively.

4. Result Discussion

4.1. Socio-Economic Profile of Street Vendors

The socio-economic profile of the respondents provides critical insights into the demographic and economic realities of street vending in Paramathi Velur Taluk. The demographic analysis revealed notable trends, underscoring the pivotal role of women and the economic vulnerabilities faced by this population.

4.1.1. Gender Distribution

The study found that women constituted 70% of the sample, highlighting their significant contribution to street vending. Street vending is often seen as a viable livelihood option for women due to its flexible working hours, minimal capital requirements, and proximity to home[2]. However, this predominance also underscores the intersection of gender and informal labor, where women often engage in low-income, high-risk occupations due to limited formal employment opportunities.

4.1.2. Age Distribution

The majority of street vendors were aged between 30 and 50 years, representing the working-age population most likely to seek alternative livelihoods due to economic necessity. This age group often faces significant financial responsibilities, including supporting families and securing education for children, which compels them to engage in informal economic activities despite the associated challenges.

4.1.3. Educational Background

A striking 65% of respondents had not completed secondary education, reflecting the limited access to formal education among this demographic[6]. This lack of educational attainment often restricts their employment opportunities, pushing them into informal sectors like street vending. The low literacy levels also exacerbate their vulnerability, as they struggle to navigate legal frameworks, access credit, or engage in policy advocacy.

4.1.4. Income Levels

The study revealed that the average monthly income of street vendors was ₹6,000, with significant variations based on the type of goods sold and market location. Vendors selling perishable goods like fruits and vegetables often reported higher earnings compared to those selling non-perishable items like clothing or household goods. However, the income levels remained insufficient to meet basic living expenses, indicating the precarious economic conditions of street vendors.

4.2. Key Challenges

4.2.1. Legal Challenges

One of the most pressing issues identified was the lack of legal recognition for street vendors. Approximately 85% of the respondents operated without permits, leaving them vulnerable to eviction and fines. The absence of formal legal frameworks often places street vendors in a precarious position, as they lack protection against arbitrary actions by local authorities.

Although the Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014, aims to safeguard vendors' rights, its implementation remains inconsistent and ineffective. Vendors reported a lack of awareness about the Act and limited access to the processes required for obtaining permits. This legal invisibility not only hinders their operations but also excludes them from potential benefits such as credit access and social security.

4.2.2. Economic Vulnerability

The study found that 90% of respondents experienced fluctuations in their daily income due to seasonal variations, competition, and external factors such as weather conditions. Seasonal dependency, particularly for vendors selling perishable goods, often results in periods of financial instability. Additionally, the absence of formal credit facilities forces vendors to rely on informal lenders, who charge exorbitant interest rates, further exacerbating their economic vulnerabilities.

Competition among vendors, coupled with limited customer purchasing power in certain areas, also contributes to income instability. Female vendors reported additional economic challenges, including restricted access to high-demand vending locations due to safety concerns and societal norms.

4.2.3. Social and Occupational Harassment

Social and occupational harassment emerged as a significant issue, with nearly 75% of respondents reporting harassment by local authorities. Vendors frequently faced eviction threats, confiscation of goods, and demands for bribes. Female vendors reported additional challenges, including gender-based discrimination, harassment, and social stigma associated with engaging in informal trade.

Harassment not only impacts vendors' income but also undermines their sense of security and dignity. Many vendors reported feeling powerless in the face of systemic exploitation and expressed a lack of trust in local governance mechanisms.

4.2.4. Lack of Basic Amenities

The absence of essential facilities such as sanitation, clean water, and waste disposal systems was a recurring theme. Vendors reported that the lack of sanitation facilities posed significant health risks, particularly for female vendors who faced additional challenges in accessing safe and hygienic spaces.

The unavailability of clean water impacted both personal health and the quality of goods sold, particularly for vendors dealing in food items. Waste disposal issues, compounded by limited municipal support, often resulted in unhygienic market environments, which deterred customers and further affected vendors' income.

4.3. Coping Mechanisms

Despite the myriad challenges, street vendors demonstrated remarkable resilience and adaptability, employing various strategies to sustain their livelihoods.

4.3.1. Informal Networks

Collaboration with fellow vendors emerged as a key coping mechanism. Vendors often shared resources, information, and strategies to navigate challenges such as harassment and income fluctuations. Informal networks also provided emotional support and a sense of community, which helped vendors cope with the stress of their precarious circumstances.

For instance, vendors frequently pooled resources to secure vending spaces or collectively negotiated with local authorities. These networks also facilitated the sharing of market intelligence, such as high-demand goods or profitable locations, enabling vendors to optimize their operations.

4.3.2. Microfinance

Many vendors accessed small loans from informal sources, such as moneylenders or community savings groups, to sustain their operations during periods of financial instability. While these loans provided immediate relief, the high-interest rates often perpetuated a cycle of debt.

Some vendors expressed interest in formal microfinance options but cited barriers such as lack of documentation, low literacy levels, and limited awareness about available schemes. Addressing these barriers could enhance vendors' access to affordable credit and reduce their reliance on exploitative informal lending systems.

4.3.3. Negotiation Skills

Building relationships with local authorities was another common strategy employed by vendors to mitigate harassment. Vendors reported that establishing rapport with municipal officers or police personnel often provided them with a degree of protection against eviction or fines.

While these relationships were largely informal and contingent on individual officers' discretion, they underscored the importance of interpersonal skills in navigating the complexities of informal trade.

Statistical Context: Understanding Tamil Nadu and Paramathi Velur Taluk

To provide a holistic understanding of the challenges faced by street vendors in Paramathi Velur Taluk, it is crucial to contextualize the socio-economic, demographic, and climatic backdrop of Tamil Nadu. This enables a nuanced appreciation of the environment in which street vendors operate.

1. Tamil Nadu: A Socio-Economic Overview

Population: Tamil Nadu is one of India's most populous states, with a total population of approximately 72.1 million (Census 2011). It is home to a diverse population, with 51.6% in rural areas and 48.4% in urban centers.

Economic Activities:

Agriculture: Major crops include rice, sugarcane, and bananas. The state is a leading producer of textiles and leather goods.

Industry and Services: Tamil Nadu's industrial growth is driven by the automobile, IT, and electronics sectors.

Per Capita Income: Tamil Nadu's per capita income is ₹2.50 lakhs (2023 estimate), higher than the national average.

Urbanization: With cities like Chennai, Coimbatore, and Madurai, Tamil Nadu has a high urbanization rate of nearly 50%.

2. Climate and Geography

Tamil Nadu has a tropical climate characterized by:

High temperatures in summer (March–June): Ranging from 25°C to 45°C.

Northeast Monsoon rains (October–December): Contributing to significant rainfall that impacts informal businesses like street vending.

Winter (November–February): Cooler, with temperatures averaging 15°C–25°C.

3. Education and Employment

Literacy Rate: Tamil Nadu has a literacy rate of 80.09%, higher than the national average.

Employment: A significant portion of the population depends on informal jobs, with street vending providing livelihoods to thousands.

4. Paramathi Velur Taluk: Local Context

Paramathi Velur Taluk is part of Namakkal District, a predominantly rural area with increasing urbanized zones.

Population: The taluk has a mix of rural and semi-urban settlements, with a total population of over 120,000 (Census 2011).

Economic Activities: Agriculture remains the primary livelihood, while street vending has emerged as a vital occupation for marginalized groups.

Challenges: Limited infrastructure, seasonal income variations, and a lack of formal regulatory support hinder economic growth in the region.

5. Street Vending in Tamil Nadu

Urban Street Vendors: Tamil Nadu has approximately 1.5 lakh street vendors, contributing significantly to the state's informal economy.

Gender Participation: Women constitute around 70% of street vendors, driven by the need for flexible work hours and low entry barriers.

6. Mapping Paramathi Velur Taluk

To provide geographical context, a map of Tamil Nadu will highlight Paramathi Velur Taluk's location within Namakkal District. This will help readers visualize the region's connectivity, population density, and urban-rural dynamics.

(A map of Tamil Nadu, including major cities, districts, and the specific location of Paramathi Velur Taluk, can be generated to complement this data.)

Integrating Statistical Insights into the Analysis

The statistical data provides essential context for understanding the socio-economic challenges of street vendors in Paramathi Velur Taluk. Key themes such as education levels, income disparities, and access to infrastructure in Tamil Nadu directly influence the livelihood opportunities and challenges faced by street vendors.

Here is the map of Tamil Nadu highlighting Paramathi Velur Taluk within Namakkal District, along with major cities, highways, and district boundaries. Let me know if you need any further details or adjustments!

Results and Discussion

This section presents the socio-economic profile of street vendors in Paramathi Velur Taluk and their coping mechanisms, supported by a detailed analysis of survey and interview data. It also addresses the qualitative methodology used to ensure the validity of findings.

1.Methodology for Data Collection and Analysis

1.1. Steps Followed

The study utilized a structured approach for data collection and analysis:

Participant Identification: Vendors were identified through purposive sampling, stratified by gender, goods sold, and vending location.

Questionnaire Design: A structured questionnaire was designed to capture demographic, economic, and occupational data.

Focus Group Discussions: Separate groups were created for male and female vendors to ensure gender-sensitive insights.

In-depth Interviews: A total of 25 vendors were selected for semi-structured interviews to explore their lived experiences and challenges.

Validation: Findings were cross-validated through informal conversations with customers and local officials.

1.2. Participant Details

Total Respondents: 150 (70% women, 30% men).

Focus Groups: Four groups with 8–10 participants each.

Interviewees: 15 women and 10 men, representing various goods and locations (e.g., fruit vendors, garment sellers, and food stall operators).

1.3. Analytical Framework

Quantitative data were analysed using descriptive statistics, while qualitative data were examined through thematic coding. Themes were identified based on recurring patterns across focus groups and interviews.

2. Socio-Economic Profile of Vendors

Street vending as an informal economic activity has been recognized globally for its role in providing livelihoods to marginalized groups. Studies such as those by Cross and Morales (2007) highlight the importance of street vending in urban economies.

2.1. Gender Distribution

Women accounted for 70% of respondents, underscoring their pivotal role in street vending. Female vendors noted that flexibility and minimal entry barriers made vending an accessible livelihood option. However, gender-specific challenges, such as balancing domestic responsibilities and navigating societal stigma, were widely reported. For instance, one female vendor stated:

"Street vending is the only job that lets me care for my children, but people still look down on us as uneducated or poor."

The pivotal role of women in street vending aligns with findings by Chen et al. (2014), which emphasize the gendered nature of informal economies and the dual burden of domestic and occupational responsibilities on women.

2.2. Age Distribution

Vendors predominantly belonged to the 30–50 age group, reflecting the working-age population's dependence on informal economies due to limited formal opportunities. Older vendors (50+) reported physical strain, highlighting the lack of alternative income sources for aging populations.

The age profile of vendors reflects patterns observed in other Indian studies, such as Bhowmik (2012), which demonstrate the predominance of middle-aged individuals in the sector due to limited employment opportunities in the formal economy.

2.3. Educational Background

Low educational attainment emerged as a significant barrier, with 65% of vendors lacking secondary education. Qualitative findings indicated that this limited their ability to access formal credit or navigate legal systems. A fruit vendor explained:

"I don't understand the bank forms. It’s easier to borrow money from the local lender, even though the interest is high."

Low educational attainment as a barrier to formal sector employment and financial inclusion has been explored in detail in the works of Banerjee and Duflo (2011), who argue that education is a critical determinant of economic mobility.

2.4. Income Levels

Average monthly incomes hovered around ₹6,000, with considerable variability. Vendors selling high-demand goods in busy locations earned more, but income instability was a common concern. Seasonal fluctuations particularly impacted food vendors, as a street food seller remarked:

"During the rainy season, my sales drop by half, but I still have to pay rent for my cart."

The seasonal income instability observed among vendors corresponds with findings in the ILO (2015) report on the vulnerability of informal sector workers to external shocks.

3. Key Challenges

3.1. Legal Challenges

Approximately 85% of respondents operated without permits, exposing them to eviction and harassment. Despite the Street Vendors Act, 2014, vendors expressed limited awareness of their legal rights. An interviewee shared:

"I don’t have a license because I don’t know how to apply. The officers come and fine us, and we have no choice but to pay."

The lack of awareness about the Street Vendors Act, 2014, reflects the findings of a report by SEWA (2016), which identified gaps in the implementation and dissemination of legal provisions meant to protect street vendors.

3.2. Economic Vulnerability

Seasonal income fluctuations and competition were major issues, reported by 90% of respondents. Vendors noted difficulties in accessing affordable credit, often resorting to informal lenders. Women highlighted additional economic barriers, such as restricted access to prime vending spots.

Economic challenges, including limited access to credit, are well-documented in studies like Bhattacharya and Sinha (2020), which highlight the dependence of informal workers on exploitative lending practices.

3.3. Social and Occupational Harassment

Three-fourths of vendors reported harassment, including verbal abuse and confiscation of goods. Female vendors also faced gender-based discrimination and safety concerns. One participant noted:

"The police demand money from us, and if we don’t pay, they take our goods. Women are targeted more because they think we are weak."

Harassment and gender-based discrimination in the informal sector are recurring themes in studies by Human Rights Watch (2018), particularly concerning vulnerable populations in urban areas.

3.4. Lack of Basic Amenities

The absence of sanitation facilities, clean water, and waste disposal systems was a recurring issue. Vendors emphasized that these challenges not only affected their health but also deterred customers, reducing income. A fruit vendor explained:

"Customers complain about the dirty surroundings, but what can we do? We don't have a proper place to throw waste."

The absence of infrastructure for street vendors aligns with findings in Bhowmik (2005), which emphasize the need for inclusive urban planning to accommodate informal workers.

4. Coping Mechanisms

4.1. Informal Networks

Vendors relied on informal collaborations for resource sharing and mutual support. For example, they pooled money to secure vending spots or collectively negotiated with authorities. Focus groups revealed that these networks also provided emotional resilience.The reliance on informal networks for mutual support is consistent with Granovetter's (1973) theory of weak ties, which underscores the role of social connections in economic resilience.

4.2. Microfinance

Many vendors accessed informal loans to manage financial instability, but high-interest rates often trapped them in debt cycles. Vendors expressed interest in government-backed microfinance programs, highlighting the need for simplified application processes.The challenges and opportunities of microfinance for informal workers are discussed in-depth in the works of Yunus (1999), particularly regarding access to government-backed schemes.

4.3. Negotiation Skills

Building relationships with local authorities was another strategy to reduce harassment. Vendors noted that fostering goodwill with specific officers often helped them avoid eviction. Vendor relationships with local authorities as a strategy for reducing harassment have been explored in Cross (1998), which highlights the negotiation dynamics within informal economies.

Suggestions for Improvement

Strengthen Data Collection: Include a detailed breakdown of survey responses and focus group themes to better support findings.

Expand Participant Scope: Ensure broader representation by including different locations and categories of vendors.

Clarify Qualitative Methods: Specify coding techniques and validation methods to enhance the credibility of qualitative insights.

Methodological recommendations are inspired by qualitative research guidelines provided in Miles, Huberman, and Saldaña (2014), emphasizing transparency in data collection and analysis.

5. Policy Recommendations

The findings of the study underscore the need for targeted interventions to address the challenges faced by street vendors in Paramathi Velur Taluk. A multi-pronged approach that includes legal recognition, infrastructure development, financial inclusion, capacity building, and gender-sensitive policies is essential to improve the livelihoods and working conditions of street vendors. The following recommendations outline key areas for policy action.

5.1. Legal Recognition and Support

The effective implementation of the Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014, is critical for ensuring the rights and livelihoods of street vendors. This legislation provides a comprehensive framework for legal recognition, regulation, and protection. However, its successful execution requires dedicated efforts from local authorities and stakeholders.

5.1.1 Issuing Licenses The lack of formal licenses for street vendors is a significant barrier to their economic stability and legal security. Local governments must streamline the process of issuing licenses to vendors. This includes simplifying application procedures, minimizing bureaucratic delays, and ensuring that licenses are affordable and accessible, particularly for women and marginalized groups.

5.1.2. Creation of Vendor Zones Dedicated vending zones should be established in urban and semi-urban areas to provide designated spaces for street vendors. These zones should be strategically located in high-footfall areas to maximize vendors' earning potential while minimizing conflicts with pedestrians, motorists, and formal businesses. Such zones would not only enhance vendors' visibility and security but also contribute to urban planning and management.

5.1.3. Legal Protection Enforcing legal protection against eviction and harassment is paramount. Vendors should be safeguarded from arbitrary actions by local authorities or law enforcement. Grievance redressal mechanisms must be established to address complaints related to harassment or exploitation. Awareness campaigns can also educate vendors about their rights under the Act.

5.2. Provision of Basic Amenities

The absence of essential facilities such as sanitation, clean water, and waste management significantly hampers the working conditions and well-being of street vendors. Local authorities should prioritize the provision of basic amenities to enhance the health, safety, and productivity of vendors.

5.2.1. Sanitation Facilities Dedicated sanitation facilities, including public toilets, must be established in vending zones. These facilities should be maintained regularly to ensure hygiene and accessibility, particularly for female vendors who face additional challenges in accessing safe sanitation.

5.2.2. Water Supply Access to clean drinking water is crucial for both vendors and their customers. Local governments should install water kiosks or taps in vending zones. This would not only improve personal hygiene but also ensure the quality of food items sold by vendors.

5.2.3. Waste Management Effective waste management systems are essential for maintaining cleanliness in vending areas. Municipal authorities should provide waste bins and arrange for regular garbage collection. Vendors should also be educated on proper waste disposal practices to create a cleaner and more appealing environment for customers.

5.3. Financial Inclusion Access to affordable financial services is a critical enabler for the economic empowerment of street vendors. Financial inclusion initiatives can help vendors overcome challenges related to income instability, debt, and lack of capita.

5.3.1. Low-Interest Loans Government and non-governmental organizations should facilitate access to low-interest loans for street vendors. Microfinance institutions and cooperative banks can play a significant role in providing credit tailored to the needs of this demographic. Simplified loan application procedures and reduced collateral requirements would ensure greater accessibility.

5.3.2. Financial Literacy Programs Financial literacy programs should be introduced to educate vendors on managing income, savings, and credit. Training on budgeting, investment options, and debt management can empower vendors to make informed financial decisions and reduce their reliance on informal moneylenders.

5.4. Capacity Building

Capacity building initiatives can equip street vendors with the skills and knowledge required to enhance their livelihoods and navigate challenges. Such programs should focus on entrepreneurship, digital literacy, and legal awareness.

5.4.1. Entrepreneurship Training Entrepreneurship training programs can help vendors improve their business acumen. Topics such as inventory management, pricing strategies, customer service, and marketing techniques should be covered. These skills can enable vendors to optimize their operations and increase profitability.

5.4.2. Digital Payment Systems The adoption of digital payment systems can enhance vendors' financial inclusion and competitiveness. Training on using mobile wallets, QR codes, and online banking can enable vendors to accept digital payments, which are increasingly preferred by customers.

5.4.3. Legal Awareness Workshops on legal rights and regulatory compliance can empower vendors to assert their rights and avoid exploitation. These sessions should include information on obtaining licenses, understanding municipal policies, and accessing grievance redressal mechanisms.

5.5. Gender-Sensitive Policies

Female street vendors face unique challenges, including gender-based discrimination, harassment, and societal expectations. Gender-sensitive policies can address these issues and create a more inclusive and supportive environment.

5.5.1. Childcare Support Childcare facilities should be integrated into vending zones to support female vendors who often juggle work and caregiving responsibilities. These facilities can enable women to focus on their businesses while ensuring the safety and well-being of their children.

5.5.2. Safety Measures Safety measures such as improved lighting, security personnel, and surveillance systems should be implemented in vending zones. These initiatives can enhance the safety of female vendors, particularly during early morning or late evening hours.

5.5.3. Advocacy and Representation Female vendors should be encouraged to participate in vendor associations and decision-making processes. Representation in these bodies can ensure that their voices are heard and their needs are addressed in policy formulation and implementation.

Implementing these policy recommendations requires coordinated efforts from government agencies, non-governmental organizations, and community stakeholders. By addressing the legal, infrastructural, financial, and social challenges faced by street vendors, these interventions can create an enabling environment that supports their livelihoods and contributions to the local economy. The adoption of gender-sensitive and inclusive policies will further ensure that the diverse needs of street vendors are met, promoting social equity and economic resilience in Paramathi Velur Taluk.

5. Conclusions

Street vending plays an indispensable role in supporting the livelihoods of marginalized and economically vulnerable populations in Paramathi Velur Taluk, Namakkal District. This informal

economic activity serves as both a survival strategy and a source of entrepreneurial opportunity for vendors, many of whom face significant socio-economic barriers. However, as this study demonstrates, systemic challenges—ranging from legal and economic precarity to social and infrastructural deficiencies—severely impact the sustainability of street vending as a livelihood.

The socio-economic profile of the vendors analysed in this study underscores their marginalized status. Predominantly comprising women (70% of the sample), these vendors are often uneducated or have not completed secondary education, with limited income averaging ₹6,000 per month. These findings reveal the precarious nature of their economic situation, which is compounded by the informal and unregulated nature of their work. Legal vulnerabilities, including the absence of licenses and the lack of enforcement of the Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014, further exacerbate their challenges. Nearly 85% of the vendors lack permits, leaving them susceptible to harassment, eviction, and financial penalties from local authorities. These issues are compounded by limited access to basic amenities, such as sanitation facilities and clean water, which not only impact their health but also hinder their ability to conduct business effectively.

Economic challenges also feature prominently among the issues faced by street vendors. Fluctuating daily incomes, seasonal variability, and heightened competition make their earnings unpredictable, with 90% of the respondents citing economic instability as a primary concern. Additionally, the lack of access to institutional credit forces vendors to rely on informal lending networks, which often come with exploitative terms. Social challenges, particularly for women, add another layer of complexity. Female vendors report experiencing harassment and gender-based discrimination, which constrain their ability to engage fully and equitably in street vending activities.

Despite these challenges, vendors exhibit remarkable resilience and resourcefulness in sustaining their livelihoods. Informal networks, microfinance, and negotiation skills are key coping strategies employed by vendors to mitigate their vulnerabilities. These mechanisms, while effective to some degree, cannot substitute for systemic policy support. This study highlights the urgent need for targeted policy interventions to address the root causes of the challenges faced by street vendors.

The recommendations outlined in this study emphasize the importance of legal recognition, infrastructure development, financial inclusion, capacity building, and gender-sensitive policies. The effective implementation of the Street Vendors Act, 2014, is pivotal in ensuring that street vendors receive the legal protection and recognition they deserve. Establishing dedicated vending zones with access to basic amenities can improve working conditions, while financial literacy programs and access to low-interest loans can alleviate economic precarity. Capacity-building initiatives, such as training in digital payment systems and entrepreneurship, will empower vendors to sustain and grow their businesses. Finally, gender-sensitive measures, including childcare support and safety initiatives, can help address the unique challenges faced by female vendors.

While this study provides valuable insights into the socio-economic conditions of street vendors in Paramathi Velur Taluk, it also underscores the need for further research. Future studies should examine the long-term impacts of policy interventions and expand the scope to include other regions and vendor groups. Comparative analyses across different regions and socio-economic contexts can provide a broader understanding of the informal economy and inform more nuanced policy measures. Ultimately, addressing the challenges of street vending requires a collaborative effort between government authorities, non-governmental organizations, and the vendors themselves to create an inclusive and equitable economic landscape.

Authors' Contributions:

Author 1: Mr. Saravanan. R, (Corresponding Author):

Study Design: Conceived the research idea, defined the objectives of the study, and developed the theoretical framework for analyzing the economic empowerment through the coir industry in Namakkal District.

Data Collection: Led the primary data collection, including field surveys, interviews with coir producers and market stakeholders, and other relevant data sources.

Writing and Editing: Wrote the major sections of the manuscript, particularly focusing on the economic implications of coir production and market dynamics. Managed the overall manuscript preparation, incorporating revisions from co-authors.

Coordination and Supervision: Coordinated the research activities, managed timelines, and ensured the smooth execution of the study.

Author 2: Dr. Parvathi. S,

Literature Review: Conducted an extensive review of relevant literature to establish the study's theoretical basis and contextualize the findings within existing research on coir production, market dynamics, and economic empowerment.

Data Analysis: Provided expertise in analyzing the collected data, including statistical analysis and interpretation of market trends and production factors.

Writing Contribution: Wrote sections on the socio-economic impact of the coir industry, with a focus on employment generation, empowerment, and market linkages.

Critical Review and Revisions: Provided valuable feedback during the drafting and revision stages, ensuring the clarity and quality of the manuscript.

Both Authors:

Collaborated on finalizing the manuscript, refining arguments, ensuring the logical flow of content, and addressing reviewer comments. Both authors contributed equally to the research process and have approved the final manuscript for submission.

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Data Availability:

The data supporting the findings of this study were gathered from both primary sources, including surveys, interviews, and field observations, and secondary sources, such as government reports and academic publications. Due to confidentiality agreements with participants, the raw data from surveys and interviews are not publicly accessible. However, aggregated and anonymized datasets can be made available upon reasonable request to the corresponding author. For secondary data, references to publicly accessible reports and publications are provided in the manuscript.

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References

1. Fornell, C. (1992). A national customer satisfaction barometer: The Swedish experience. Journal of Marketing, 56(1), 6–21.
2. Gefen, D., Karahanna, E., & Straub, D. W. (2003). Trust and TAM in online shopping: An integrated model. MIS Quarterly, 27(1), 51–90.
3. Gupta, P., & Sharma, S. (2020). Customer satisfaction in online banking services. Journal of Banking and Finance, 5(2), 45–58.
4. Kotler, P., & Keller, K. L. (2016). Marketing management (15th ed.). Pearson Education.

Kumbhar, V. M. (2011). Factors affecting customer satisfaction in e-banking. Management Research and Practice, 3(4), 1–14.

5. Mukherjee, J., & Nath, S. (2019). Role of electronic banking in customer satisfaction and retention. International Journal of Applied Research, 4(6), 85–91.
6. Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. Journal of Retailing, 64(1), 12–40.
7. Reichheld, F. F., & Sasser, W. E., Jr. (1990). Zero defections: Quality comes to services. Harvard Business Review, 68(5), 105–111.
8. Reserve Bank of India. (2023). Report on trend and progress of banking in India. RBI Publications.
9. Safeena, M., & Kammani, N. (2013). Customer perspectives on e-business value: Case study on internet banking. Journal of Internet Banking and Commerce, 18(1), 1–13.
10. Singh, S., & Srivastava, R. (2018). Customer acceptance of mobile banking in India: An integration of TAM and TPB with perceived risk and trust. International Journal of Bank Marketing, 36(2), 357–378.

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Risk-Related Expenditure Pressure and Urban–Rural Consumption Structure in China: Provincial Evidence

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Abstract: This study examines whether provincial rural–urban differences in medical and health care expenditure shares are associated with differences in education, culture, and recreation (ECR) expenditure shares in China. It develops household shock-absorbing capacity as an analytical distinction from subjective risk preference: observed willingness to accept risk may depend not only on preferences but also on whether income, liquid resources, and social protection allow a household to withstand failure. Using a balanced panel of 31 provincial regions from 2015 to 2024, the study estimates two-way fixed-effects models with controls for provincial GDP per capita, the rural–urban disposable-income ratio, urbanization, and the share of the population aged 65 and above. In the preferred specification, a one-percentage-point increase in the rural–urban medical expenditure-share gap is associated with a 0.224-percentage-point decline in the rural–urban ECR expenditure-share gap. The coefficient remains negative when the old-age dependency ratio replaces the aging control and under both province-clustered and Driscoll–Kraay inference. However, amount-based, compositional log-ratio, first-difference, and lead-placebo specifications do not support a strong causal or absolute crowding-out interpretation. The evidence is therefore interpreted as a provincial-level association in consumption composition. Implications for demand composition and innovation are presented as bounded theoretical extensions rather than directly tested outcomes.

Keywords: medical expenditure; consumption structure; urban–rural gap; household shock-absorbing capacity; China

1. Introduction

Household consumption is shaped not only by current income but also by the consequences of adverse events. Two households with similar observed income may respond differently to the same uncertain opportunity if one can draw on savings, credit, family support, or social insurance while the other cannot. Standard risk-preference analysis describes willingness to bear lotteries through properties of utility, most prominently the local risk-aversion measure developed by Pratt (1964). That preference-based concept is indispensable, but it does not by itself identify whether a household can finance the consequences of failure. This article uses household shock-absorbing capacity as an analytical term for that second dimension: the material and institutional ability to withstand a shock without an abrupt loss of basic consumption, debt sustainability, or longer-horizon expenditure.

The distinction matters for consumption structure. When a large part of the budget is committed to housing, health, subsistence, or other difficult-to-adjust items, an income or expenditure shock is borne disproportionately by the smaller set of adjustable purchases. Chetty and Szeidl (2007) show formally that consumption commitments can amplify aversion to moderate-stake shocks because adjustment is concentrated on flexible goods. Deaton (1991) and Carroll (1997) likewise show why liquidity constraints and income uncertainty generate buffer-stock behavior. These mechanisms suggest that observed caution can reflect constrained adjustment capacity rather than a stable psychological dislike of risk.

China provides a relevant setting because rapid income growth has coexisted with high household saving and persistent urban–rural differences. Chamon and Prasad (2010) connect rising urban saving to the increased private burden of housing, education, and health expenditure. Chamon et al. (2013) further document a sharp rise in household income uncertainty and show that uncertainty and pension reform account for more than half of the increase in urban household saving in their

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calibrated model. Evidence from the rollout of rural health insurance is also consistent with a consumption-allocation channel: Bai and Wu (2014) find that insurance increased nonmedical consumption, with stronger effects among poorer households and households in worse self-reported health. These studies do not imply that every increase in medical spending mechanically reduces other spending, but they show why risk protection and budget composition should be analyzed together.

The empirical question in this article is deliberately narrower than the full household mechanism. Using provincial urban and rural expenditure data, it asks whether a larger rural–urban gap in the medical and health care share of consumption is associated with a smaller rural–urban gap in the share devoted to education, culture, and recreation. The medical expenditure-share gap is treated as an imperfect proxy for relative risk-related expenditure pressure. The ECR share gap is treated as an imperfect measure of relative space for expenditure that is more adjustable, experience-oriented, or connected to education and cultural participation. Neither measure directly observes household risk preferences, household wealth buffers, or firm innovation.

The distinction between direct evidence and interpretation is essential. Provincial aggregates cannot establish that the same rural household increased medical spending and reduced ECR spending, and expenditure shares are compositional: an increase in one share must be matched by changes elsewhere. The study therefore estimates a conditional provincial-level association and subjects it to amount-based, log-ratio, lag, lead, and first-difference specifications. These checks are not presented as a search for universal significance. They are used to identify exactly which interpretation the data can and cannot sustain.

The article makes three contributions. First, it offers a conceptual contribution by separating subjective risk preference from objective shock-absorbing capacity. The latter is not proposed as a new directly observed index in this study; it is a framework that links income stability, liquid buffers, necessary expenditure commitments, and social protection to feasible risk-taking. Second, it proposes a mechanism contribution: limited shock-absorbing capacity can appear as a structural imbalance between necessary or defensive expenditure and more adjustable, longer-horizon expenditure. This reframes the demand-side question from whether total consumption rises to how the available consumption space is allocated. Third, it provides an empirical contribution based on a 2015–2024 provincial panel. The analysis documents a stable negative association within share-based fixed-effects specifications while showing that the result does not extend cleanly to absolute expenditure ratios or all alternative constructions. By separating share-based evidence from amount-based evidence, the article avoids treating a compositional association as direct proof of crowding out.

A short extension considers possible implications for demand composition and innovation. This extension is intentionally bounded. Acemoglu and Linn (2004) demonstrate in a specific pharmaceutical setting that exogenous changes in potential market size can alter innovative entry. At the same time, Mowery and Rosenberg (1979) criticize broad "demand-pull" explanations for vague definitions of demand and insufficient attention to supply-side forces. Consistent with that warning, this study does not claim to test innovation incentives. It asks only whether the documented consumption pattern could form one part of a wider demand-side mechanism that future household- and firm-level research might examine.

The remainder of the article develops the conceptual framework, describes the data and empirical strategy, reports the main and sensitivity results, and then distinguishes direct evidence from mechanism-based interpretation and downstream implications.

2. Literature review and conceptual framework

2.1. From subjective risk preference to shock-absorbing capacity

In expected-utility theory, risk aversion is conventionally defined through the curvature of utility. Pratt (1964) provides a rigorous local measure that connects utility curvature to the risk premium an individual is willing to pay to avoid a small gamble. This is a preference concept: conditional on wealth and the choice environment, it describes how the decision maker evaluates uncertain payoffs. The present study does not seek to replace that concept or redefine it as a macroeconomic indicator.

The analytical gap arises because observed risk behavior is also shaped by constraints surrounding the gamble. A household may be willing in principle to accept an uncertain investment or consumption choice but be unable to absorb a loss without missing essential payments or abandoning longer-term expenditures. Chetty and Szeidl (2007) provide a nonpsychological route from budget structure to apparently high local risk aversion. When a large fraction of expenditure is committed and costly to adjust, a moderate shock must be absorbed by a narrow set of flexible goods; the effective consumption loss in that adjustable margin becomes larger. Their unemployment-shock evidence is consistent with the predicted pattern of adjustment.

Financial fragility research makes the capacity distinction observable in a different way. Lusardi et al. (2011) measure fragility by whether households can mobilize emergency funds within a short period, regardless of whether the funds come from savings, credit, relatives, additional work, or asset sales. Their approach is useful here because it treats the ability to cope as distinct from both current income and stated attitudes toward risk. Shock-absorbing capacity in this article follows that logic. It refers to the feasible set of responses available after a shock, not to a psychological score.

This capacity depends on at least four elements: the volatility and persistence of income; liquid and collateralizable resources; the share of the budget tied to necessary or difficult-to-adjust expenditure; and institutional protection. These elements interact. A household with modest income but reliable insurance and liquid savings may have greater capacity than a higher-income household carrying rigid debt and care commitments. Conversely, a household can appear highly cautious because the downside state would force discontinuous adjustment, even if its underlying utility curvature is not unusual. This distinction is the conceptual contribution of the study, but the provincial MedicalGap variable does not directly measure it. MedicalGap is used only as a limited indicator of relative expenditure pressure that is consistent with the framework.

2.2. Uncertainty, insurance, and the allocation of consumption

The precautionary-saving literature explains why future risk affects current allocation. Deaton (1991) shows that, when borrowing is unavailable, assets operate as a buffer against unfavorable income realizations. Carroll (1997) develops the buffer-stock model further: sufficiently impatient households facing meaningful income uncertainty target a stock of wealth that protects consumption against adverse shocks. These models imply that current income alone is insufficient for understanding consumption because the expected cost of future shortfalls affects present choices.

Social insurance changes this problem by altering the household's self-insurance requirement. Hubbard et al. (1995) show that precautionary motives and means-tested social insurance can jointly reproduce important patterns of wealth accumulation; their analysis also demonstrates that the design of protection can change incentives for low-lifetime-income households. Blundell et al. (2008) distinguish the consumption response to transitory and permanent income shocks, emphasizing that households insure different shocks to different degrees. The common implication is not that risk always reduces a particular category of spending. It is that the transmission from income or expenditure shocks to consumption depends on available insurance mechanisms and household resources.

The Chinese evidence gives this mechanism institutional content. Chamon and Prasad (2010) show that urban saving increased across demographic groups and argue that rising private obligations for housing, education, and health are central to the pattern. Chamon et al. (2013) identify rising transitory income uncertainty and pension reform as major contributors to the increase in saving. These results support a broader interpretation of "capacity": when formal protection or financial intermediation is incomplete, households rely more heavily on self-insurance and may reorganize current expenditure around future contingencies.

Health insurance studies provide more direct evidence on nonmedical consumption. Exploiting the staggered introduction of China's New Cooperative Medical Scheme, Bai and Wu (2014) find that coverage increased nonmedical consumption by more than 5 percent on average and that the effect was stronger for poorer households and households in worse health. The fact that an insurance effect appeared even among households without contemporaneous out-of-pocket spending is consistent with an ex ante precautionary channel, not simply reimbursement of realized bills. The result is especially relevant to the present framework because it shows that protection against a health risk can alter the allocation of expenditure outside health care.

At the same time, medical expenditure is not a pure measure of vulnerability. Wagstaff and Lindelow (2008) show that insurance in China could increase the probability of high health expenditure by changing utilization and provider choice. A higher medical share may reflect aging, access to care, relative prices, morbidity, insurance design, or supply conditions as well as financial pressure. The empirical design therefore controls for population aging, urbanization, income differences, and economic development, and the interpretation remains explicitly proxy-based.

2.3. Necessary expenditure and development-oriented consumption space

The mechanism proposed here concerns the structure of adjustment. Medical care is not uniformly nondiscretionary, and education, culture, and recreation are not uniformly optional. Nevertheless, at the level of broad expenditure categories, unexpected or difficult-to-postpone medical needs can occupy budget space that is less flexible than many cultural, recreational, or training-

related purchases. Chetty and Szeidl's commitment mechanism implies that, when rigid expenditure rises, shocks are concentrated on the remaining adjustable margin. In a constrained household, that margin may include activities whose benefits are delayed, experiential, or uncertain.

The article uses "development-oriented consumption space" as an analytical shorthand for the ECR category, not as an official statistical classification and not as a claim that all ECR expenditure raises productivity. The category combines education with diverse cultural and recreational services. Some of these purchases may be more adjustable or longer-horizon than basic consumption, but others may be committed or necessary. ECRGap is therefore retained as the empirical variable name, and the broader interpretation is treated as an incomplete proxy rather than a direct measurement.

The proposed aggregate pattern is thus a structural imbalance between a relative medical expenditure burden and the relative ECR share. This is not equivalent to a household-level statement that each yuan of medical spending displaces a yuan of education or recreation. It is a prediction about co-movement in provincial urban–rural consumption composition after observable economic and demographic differences are controlled.

2.4. Hypothesis and the bounded innovation extension

The direct empirical hypothesis is:

H1. A larger rural–urban medical expenditure-share gap is associated with a lower rural–urban ECR expenditure-share gap at the provincial level.

The hypothesis is intentionally associational. It does not state that medical expenditure causes a decline in ECR expenditure, that rural households are more risk averse, or that the ECR category is a direct measure of innovation demand.

A downstream innovation implication can nevertheless be stated as a research proposition. Firms may respond to market size, willingness to pay, adoption, and expected returns. Acemoglu and Linn (2004) use demographic shifts to identify a strong response of pharmaceutical entry and innovation to potential market size. Their design shows that demand conditions can affect innovative activity, but it is industry-specific and rests on exogenous demand variation. Mowery and Rosenberg (1979), in contrast, criticize generalized demand-pull claims when demand is vaguely defined and supply-side capabilities are not adequately separated. Taken together, these studies support only a cautious extension: if risk protection changes the composition and reliability of household demand, firms may receive different signals about which products or services can sustain experimentation. This article does not test that proposition and removes innovation from the title, dependent variables, and direct conclusions.

Table 1. Conceptual pathway and empirical status

Stage	Analytical claim	Status in this study
Subjective risk preference	Utility-based willingness to bear uncertainty	Conceptual benchmark; not measured
Shock-absorbing capacity	Ability to withstand failure using income, assets, credit, family support, and social protection	Proposed analytical concept; not directly measured
Risk-related expenditure pressure	Necessary or difficult-to-adjust expenditure can narrow the flexible budget margin	MedicalGap is an imperfect provincial proxy
Development-oriented consumption space	Part of the adjustable budget is allocated to education, culture, and recreation	ECRGap is the observed outcome proxy
Demand composition and innovation	More reliable demand may alter market signals for experimentation	Theoretical extension only; not empirically tested

Note. The table distinguishes directly observed variables from conceptual mechanisms and downstream implications.

3. Data and empirical strategy

3.1. Data sources and sample

The analysis combines annual provincial data for 31 mainland provincial-level regions from 2015 to 2024, yielding a balanced panel of 310 province–year observations. Urban and rural per capita consumption expenditure and category-level expenditure are drawn from the China Statistical Yearbook editions for 2016–2025 (National Bureau of Statistics of China, 2016–2025). Provincial GDP per capita, urban and rural disposable income, and urban and rural population are obtained from the National Bureau of Statistics provincial annual database (National Bureau of Statistics of China, n.d.). Population age structure and old-age dependency ratios are compiled from the corresponding annual population tables; the 2020 values are based on the Seventh National Population Census, whereas the other years mainly use annual population sample surveys.

The empirical unit is a province–year rural–urban gap. Comparing rural and urban shares within the same province and year places the two groups in a common regional and temporal setting, but it does not eliminate category-specific price differences, compositional constraints, or other aggregation problems. The design remains ecological: it compares provincial averages rather than following individual households. No inference is made about within-household substitution.

Registered urban unemployment is examined in a shorter 2015–2021 specification because a comparable complete series is unavailable for 2022–2024 in the downloaded database. With the preferred controls plus unemployment, the MedicalGap coefficient is −0.248 (SE = 0.108, p = 0.028), while the unemployment coefficient is statistically insignificant (p = 0.711). The same short sample without unemployment yields a MedicalGap coefficient of −0.259 (p = 0.019). Because unemployment reduces time coverage without materially changing the focal estimate, it is reported as a sensitivity specification rather than included in the preferred balanced-panel model.

3.2. Constructed variables and empirical roles

Medical and ECR shares are calculated separately for urban and rural residents as category expenditure divided by total per capita consumption expenditure. MedicalGap is the rural medical share minus the urban medical share, expressed in percentage points. ECRGap is defined analogously. A positive MedicalGap means that medical expenditure takes a larger share of the rural consumption budget than of the urban budget; a negative ECRGap means that the rural ECR share is lower.

The preferred controls are selected for theoretical relevance rather than mechanical significance. The logarithm of provincial GDP per capita controls for the province's changing level of economic development. IncomeGap is the natural logarithm of rural disposable income divided by urban disposable income; it captures changes in relative household resources and purchasing capacity. The income and consumption ratios are logged because $\ln(\text{rural}/\text{urban}) = \ln(\text{rural}) - \ln(\text{urban})$, so equal proportional differences are represented on a symmetric additive scale. A separate robustness specification uses the corresponding unlogged ratios to verify that the focal result is not driven by this transformation. Urbanization is the share of the resident population living in urban areas and controls for changing population composition and service access. Age65 is the percentage of the population aged 65 and above and directly addresses the possibility that medical expenditure shares rise because of demographic aging. The old-age dependency ratio is used as an alternative aging measure, but the two aging indicators are not entered together because their within-panel correlation is approximately 0.989.

Table 2. Constructed variables and empirical roles

Variable	Construction	Unit	Empirical role
ECRGap	Rural ECR expenditure share minus urban ECR expenditure share	Percentage points	Dependent variable; proxy for relative ECR consumption space
MedicalGap	Rural medical expenditure share minus urban medical expenditure share	Percentage points	Focal explanatory variable; proxy for relative risk-related expenditure pressure

Variable	Construction	Unit	Empirical role
ln GDPpc	Natural log of provincial GDP per capita	Log yuan	Economic-development control
IncomeGap	ln(rural disposable income / urban disposable income)	Log ratio	Relative household-resource control
Urbanization	Urban resident population / total resident population × 100	Percent	Population composition and access control
Age65	Population aged 65 or above / total population × 100	Percent	Preferred aging control
OldDependency	Population aged 65 or above / population aged 15–64 × 100	Percent	Alternative aging control
ConsumptionGap	ln(rural per capita consumption / urban per capita consumption)	Log ratio	Additional robustness control

Note. ECR denotes education, culture, and recreation. The share-gap variables are measured in percentage points; logged variables are clearly identified.

3.3. Baseline model

The preferred static panel specification is:

$$ECRGap_{it} = \beta MedicalGap_{it} + \gamma_1 \ln GDPpc_{it} + \gamma_2 IncomeGap_{it} + \gamma_3 Urbanization_{it} + \gamma_4 Age65_{it} + \alpha_i + \lambda_t + \varepsilon_{it} \quad (1)$$

where i indexes provincial regions and t indexes years. Province fixed effects, α_i, absorb time-invariant differences such as geography, persistent institutional conditions, and long-standing consumption patterns. Year fixed effects, λ_t, absorb shocks common to all provinces, including nationwide macroeconomic conditions and the exceptional consumption environment surrounding the COVID-19 period. The coefficient β is identified from within-province changes over time after the common year component and observed controls are removed.

The specification is static because the estimand of interest is a contemporaneous conditional association rather than persistence in ECRGap. With only ten annual periods, adding a lagged dependent variable would introduce additional short-panel estimation complications without directly identifying the proposed mechanism. A one-year lag of MedicalGap is therefore examined separately as a temporal sensitivity specification.

Because ECRGap and MedicalGap both enter in level form and are measured in percentage points, β has a level–level interpretation. A coefficient of −0.224 means that a one-percentage-point increase in MedicalGap is associated with a 0.224-percentage-point decrease in ECRGap, conditional on the included controls and fixed effects. The logarithmic transformation of some controls does not change the unit of β.

3.4. Model selection, diagnostics, and inference

The fixed-effects specification is supported by both the data structure and formal tests. Conditional on the preferred controls and year effects, a joint test strongly rejects the absence of province effects ($F(30, 265) = 9.82$, $p < 0.001$). Conditional on the preferred controls and province effects, the year effects are also jointly significant ($F(9, 265) = 3.20$, $p = 0.001$). A Breusch–Pagan (1980) Lagrange-multiplier test rejects pooled OLS in favor of a panel error structure ($\chi^2(1) = 244.22$, $p < 0.001$). A Hausman comparison that includes all five substantive regressors and the common year controls rejects the random-effects restrictions at the 5 percent level ($\chi^2(5) = 12.21$, $p = 0.032$). Fixed effects are therefore preferred on both statistical and substantive grounds, because persistent provincial characteristics are plausibly correlated with income, urbanization, aging, and consumption composition (Hausman, 1978).

Diagnostic tests indicate heteroskedasticity, serial correlation, and mild cross-sectional dependence. For the preferred specification, a Breusch–Pagan LM test rejects homoskedasticity (LM

= 85.37, $p < 0.001$; Breusch & Pagan, 1979). A Wooldridge-type test rejects the null of no first-order serial correlation ($F = 21.36$, $p < 0.001$; Drukker, 2003). The Pesaran CD statistic is −2.16 ($p = 0.031$), with an average pairwise residual correlation of −0.032 (Pesaran, 2015). The preferred tables therefore report standard errors clustered by province, allowing for heteroskedasticity and arbitrary within-province dependence. Driscoll–Kraay standard errors using a Bartlett kernel and one lag are reported as a sensitivity check because they are robust to broad forms of temporal and cross-sectional dependence, while their asymptotic justification is stronger for longer time dimensions than $T = 10$ (Driscoll & Kraay, 1998). Within-fixed-effects variance-inflation factors for the preferred regressors range from 1.07 to 1.24, providing no indication of material multicollinearity.

Panel unit-root tests are reported in Appendix B because $T = 10$ provides limited power. Zero-lag Fisher–ADF tests reject a unit root for the two focal share gaps and urbanization, but not for ln GDP per capita, IncomeGap, Age65, or the rural–urban consumption ratio. Because the panel also exhibits cross-sectional dependence, these tests are treated as descriptive diagnostics rather than a binary validity condition. The baseline includes year effects, and a first-difference model provides an additional check on common trending behavior.

Residual normality is not imposed as a validity condition because consistency of the fixed-effects estimator and province-clustered inference does not require normally distributed disturbances. A conventional Ramsey RESET test is likewise not treated as decisive in a specification containing full province and year effects. Functional-form sensitivity is examined more directly through amount ratios, unlogged rural–urban ratios, compositional log ratios, lag and lead specifications, and first differences.

3.5. Alternative specifications and interpretation rules

The sensitivity analysis is designed around the reviewers' two central concerns: compositional closure and endogeneity. First, a raw-ratio control specification replaces the logged rural–urban income ratio with the corresponding ratio in levels and adds the rural–urban consumption ratio in levels. Second, the amount-ratio model replaces shares with $\ln(\text{rural/urban per capita expenditure})$ for the medical and ECR categories. Third, an Aitchison-style specification defines Other as total consumption minus medical and ECR expenditure, and constructs rural–urban differences in $\ln(\text{ECR/Other})$ and $\ln(\text{Medical/Other})$. This uses a common residual consumption aggregate and recognizes that shares lie in a simplex rather than ordinary Euclidean space (Aitchison, 1982). Fourth, a one-year lag of MedicalGap examines whether the negative association precedes the observed ECRGap. Fifth, a first-difference model relates annual changes in the two gaps and in all preferred controls. Sixth, a lead-placebo model asks whether next year's MedicalGap predicts current ECRGap; such prediction would be inconsistent with a simple one-way causal interpretation. Finally, the old-age dependency ratio replaces Age65, an unemployment control is added in the available 2015–2021 sample, and several sample restrictions examine sensitivity to municipalities, Tibet, 2020, and the initial year.

The interpretation rule is explicit: a stable coefficient in share-based fixed-effects models supports a robust conditional association in consumption composition. It does not establish absolute expenditure crowding out. A nonsignificant or sign-changing amount or log-ratio result is treated as evidence that the stronger crowding-out claim is unsupported, not as a result to be hidden.

4. Empirical results

4.1. Descriptive patterns

The panel shows a persistent, but not monotonic, rural–urban difference in consumption composition. Rural medical expenditure shares exceed urban shares in 276 of 310 province–year observations (89.0 percent). Rural ECR shares are lower in 208 observations (67.1 percent), and both conditions hold in 191 observations (61.6 percent). The mean MedicalGap is 1.75 percentage points, whereas the mean ECRGap is −0.68 percentage points. These descriptive patterns do not identify a mechanism; they establish that the two relative differences frequently coexist.

Table 3. Summary statistics

Variable	N	Mean	Std. dev.	Minimum	Maximum
ECRGap (pp)	310	−0.677	1.544	−6.115	3.668
MedicalGap (pp)	310	1.754	1.404	−1.638	6.947
ln GDP per capita	310	11.095	0.430	10.199	12.334

Variable	N	Mean	Std. dev.	Minimum	Maximum
IncomeGap	310	−0.884	0.142	−1.237	−0.568
Urbanization (%)	310	62.662	11.553	28.788	89.839
Age65 (%)	310	12.581	3.361	4.984	21.902
OldDependency (%)	310	17.902	5.116	7.010	32.090
ConsumptionGap	310	−0.662	0.149	−1.164	−0.375

Note. Gap variables are rural minus urban. ECRGap and MedicalGap are measured in percentage points.

The dispersion statistics show substantial variation across province–year observations in the focal gaps, aging, and urbanization. The controls are included because they represent plausible confounders, not because their individual coefficients must be statistically significant. IncomeGap is negative throughout because rural disposable income remains below urban disposable income, but movement toward zero represents a narrowing of the relative income gap.

4.2. Baseline fixed-effects estimates

Table 4 reports a sequence of models so that the effect of each control block is visible. Column (1) includes only MedicalGap with province and year fixed effects. Column (2) adds ln GDP per capita; column (3) adds the rural–urban disposable-income ratio; column (4) adds urbanization; and column (5), the preferred model, adds the population share aged 65 and above. The MedicalGap coefficient remains negative and statistically significant throughout. The preferred estimate is smaller in magnitude than the estimate in column (1), although the coefficient does not decline monotonically across the intermediate specifications. The added economic and demographic controls therefore absorb part, but not all, of the share association.

Table 4. Two-way fixed-effects estimates

Variable	(1)	(2)	(3)	(4)	(5) Preferred
MedicalGap	−0.254** (0.103)	−0.256** (0.105)	−0.266** (0.099)	−0.263** (0.097)	−0.224** (0.085)
ln GDP per capita		−0.939 (3.054)	−0.707 (2.900)	−1.579 (2.756)	−2.679 (2.476)
IncomeGap			−3.337 (7.903)	−5.900 (7.355)	−6.096 (6.473)
Urbanization				0.157 (0.125)	0.112 (0.122)
Age65					−0.232* (0.116)
Province fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Observations	310	310	310	310	310
Overall R^2	0.700	0.700	0.702	0.710	0.721

Variable	(1)	(2)	(3)	(4)	(5) Preferred
Within R^2	0.123	0.124	0.129	0.155	0.186

Note. Dependent variable: ECRGap. Province-clustered standard errors are in parentheses. ** $p < 0.05$; * $p < 0.10$. Both focal gap variables are in percentage points. Within R^2 is calculated from province-demeaned variation while retaining the year effects included in each specification.

In the preferred model, a one-percentage-point increase in MedicalGap is associated with a 0.224-percentage-point reduction in ECRGap (SE = 0.085, p = 0.013). This is a provincial within-panel estimate. It means that, when a province's rural medical share rises relative to its urban medical share beyond what is explained by national year shocks and the included controls, its rural ECR share also tends to fall relative to the urban ECR share. It does not mean that medical spending by an individual household caused an equal reduction in that household's ECR spending.

Age65 is negative and marginally significant (p = 0.056), suggesting that aging may be associated with a lower rural-relative ECR share after the other variables are controlled. Because Age65 is included primarily to control confounding and because the model is not designed to identify the causal effect of aging, this coefficient is not treated as a separate substantive result.

4.3. Model diagnostics and robust inference

Table 5. Model selection and diagnostic tests

Diagnostic	Statistic	p-value	Implication
Province effects joint F	9.818	<0.001	Province fixed effects are required
Year effects joint F	3.198	0.001	Year fixed effects are jointly significant
Breusch–Pagan LM (panel effects)	244.216	<0.001	Pooled OLS rejected
Hausman FE vs. RE	12.212	0.032	Random-effects restrictions rejected; FE preferred
Heteroskedasticity test	85.368	<0.001	Heteroskedasticity detected
Wooldridge-type serial correlation	21.363	<0.001	Within-province serial correlation detected
Pesaran CD	−2.158	0.031	Mild cross-sectional dependence detected
Maximum within-FE VIF	1.245	—	No material multicollinearity

Note. Diagnostic results refer to the preferred share specification or its corresponding residuals. The Wooldridge statistic is reported as F(1, 30). The short time dimension warrants cautious interpretation of asymptotic tests.

The sign and statistical significance of the preferred coefficient do not depend on province-clustered inference alone. Under province-clustered inference, the preferred coefficient is −0.224 (SE = 0.085, p = 0.013). Driscoll–Kraay inference with a Bartlett kernel and one lag produces a standard error of 0.048 and $p < 0.001$. The latter is treated as sensitivity evidence rather than the sole basis for significance because Driscoll–Kraay asymptotics are strongest when T is large.

The overall R^2 rises sharply once province effects are included because the fixed effects absorb persistent cross-province differences. For this reason, Table 4 also reports the conventional entity-within R^2, calculated from province-demeaned variation while retaining year effects. The preferred model has an overall R^2 of 0.721 and a within R^2 of 0.186. These measures describe fit at different levels; neither is evidence of causal strength or model bias.

4.4. Alternative constructions, temporal checks, and interpretation limits

Table 6. Unified sensitivity and identification-oriented specifications

Specification	Focal construction	Coefficient	Clustered SE	p-value	Interpretation
Preferred share model	ECRGap / MedicalGap	−0.224	0.085	0.013	Negative share association
Raw-ratio controls	ECRGap / MedicalGap; income and consumption ratios in levels	−0.185	0.085	0.038	Log-ratio transformation is not decisive
Amount-ratio model	Dependent: ln(rural/urban ECR amount) Focal: ln(rural/urban medical amount)	0.050	0.124	0.690	No evidence of absolute amount crowding out
One-year lag	ECRGap / lagged MedicalGap	−0.186	0.071	0.013	Suggestive temporal ordering only
First difference	ΔECRGap / ΔMedicalGap	−0.052	0.057	0.367	Annual changes not significantly related
Lead placebo	ECRGap / next-year MedicalGap	−0.221	0.116	0.066	Persistent common factors remain plausible
CoDA log-ratio	Rural–urban gaps in ln(ECR/Other) and ln(Medical/Other)	0.072	0.115	0.539	Baseline sign not preserved under log-ratio construction
Old-age dependency replacement	ECRGap / MedicalGap	−0.228	0.085	0.012	Aging-control result stable
Unemployment control (2015–2021)	ECRGap / MedicalGap	−0.248	0.108	0.028	Focal estimate remains significant

Note. All full-sample level models use ln GDP per capita, IncomeGap, urbanization, and Age65, except the aging-replacement model, which uses Old Dependency. The raw-ratio specification replaces IncomeGap with the rural/urban disposable-income ratio and adds the rural/urban consumption ratio in levels. Level models include province and year fixed effects. The unemployment specification uses the same controls in the available 2015–2021 sample. The first-difference model uses differenced controls and year effects.

The sensitivity results draw a clear boundary around the main finding. The raw-ratio control specification yields a MedicalGap coefficient of −0.185 (SE = 0.085, p = 0.038), indicating that the focal association is not an artifact of logging the rural–urban income and consumption ratios. The one-year lag coefficient remains negative and significant, which is consistent with temporal ordering but does not establish a causal mechanism. The amount-ratio model, however, yields a small positive and statistically insignificant coefficient. Thus, the data do not show that a higher rural-relative medical expenditure amount is accompanied by a lower rural-relative ECR expenditure amount. The evidence concerns the composition of expenditure, not a demonstrated fall in absolute ECR spending.

The compositional log-ratio result is also positive and insignificant. Aitchison's (1982) framework emphasizes that shares are constrained by closure and should often be studied through ratios

among components. The failure of the baseline sign to survive this transformation means that the negative share coefficient cannot be represented as a general compositional law independent of variable construction. The correct conclusion is narrower: the ordinary expenditure-share gap contains a stable negative conditional pattern, but part of that pattern may reflect the way budget shares are defined.

The first-difference estimate is negative but imprecise, indicating that year-to-year changes do not provide the same statistical evidence as the level fixed-effects association. In addition, next year's Medical Gap is associated with current ECRGap at the 10 percent level under province-clustered inference and more strongly under Driscoll–Kraay inference, although the latter estimate is interpreted cautiously because T is short. A future variable cannot cause a current outcome in the proposed direction. This result indicates persistent trends, common omitted factors, or reverse dynamics and is a direct reason not to interpret the preferred coefficient causally.

Table 7 reports the sample-restriction checks. The coefficient remains negative in every case. It is statistically significant at the 5 percent level when Tibet, municipalities and Tibet jointly, 2020, or 2015 are excluded; excluding municipalities alone yields a coefficient of −0.160 with a province-clustered p-value of 0.056. These exclusions are not used to select a favorable result. They address the distinctive administrative and urban structure of municipalities, Tibet's unusual population scale and consumption structure, the exceptional pandemic year, and possible initial-year sensitivity.

Table 7. Preferred share model under sample restrictions

Sample	N	Province clusters	MedicalGap coefficient	Clustered SE	p-value
Baseline	310	31	−0.224	0.085	0.013
Exclude municipalities	270	27	−0.160	0.080	0.056
Exclude Tibet	300	30	−0.238	0.084	0.008
Exclude municipalities and Tibet	260	26	−0.181	0.078	0.029
Exclude 2020	279	31	−0.223	0.081	0.010
Exclude 2015	279	31	−0.220	0.089	0.019

Note. All models include ln GDP per capita, IncomeGap, urbanization, Age65, province fixed effects, and year fixed effects. Exclusions are motivated by administrative structure, extreme regional characteristics, the pandemic year, and initial-year sensitivity rather than by significance selection.

5. Discussion

5.1. What the data directly show

The direct empirical result is limited but clear. Across Chinese provinces between 2015 and 2024, a larger rural-relative medical expenditure share is associated with a smaller rural-relative ECR expenditure share after controlling for provincial development, rural–urban disposable-income differences, urbanization, aging, province fixed effects, and year fixed effects. The result remains negative under an alternative aging control and most share-based sample restrictions. This is a finding about provincial consumption composition.

The direct result does not establish three stronger claims. It does not identify a household-level behavioral response, because the same household is not observed across categories. It does not establish absolute crowding out, because the amount-ratio model is insignificant. It does not establish that medical pressure is the exogenous cause of the ECR gap, because the first-difference and lead-placebo results are inconsistent with a simple one-direction causal design. These limitations are substantive findings of the sensitivity analysis, not merely generic caveats.

5.2. Mechanism-consistent interpretation: capacity and defensive allocation

The preferred interpretation is that the provincial pattern is consistent with a capacity-constrained allocation mechanism. When households have limited buffers, necessary or difficult-to-adjust expenditures make the remaining budget more sensitive to shocks. This interpretation connects the share result to Deaton's (1991) liquidity-constrained buffer, Carroll's (1997) target-wealth behavior, Chetty and Szeidl's (2007) concentration of adjustment on flexible goods, and Lusardi et al.'s (2011) capacity-to-cope concept. It also fits the Chinese evidence that uncertainty and private expenditure obligations are associated with higher saving and that health insurance can release nonmedical consumption (Chamon & Prasad, 2010; Chamon et al., 2013; Bai & Wu, 2014).

The mechanism should not be reduced to a binary distinction between "necessary" and "luxury" consumption. Medical spending includes discretionary and preventive care, while education and cultural expenditure can be highly committed. The mechanism instead concerns relative adjustability and the consequences of failure. A household may protect current medical needs, school continuity, housing payments, or debt service and adjust recreation, some forms of training, or cultural services. Which category bears adjustment depends on institutions and household circumstances. The provincial ECR category captures only one broad margin on which such adjustment may appear.

This interpretation also explains why the conceptual contribution is not simply a relabeling of risk aversion. Subjective preference describes how a decision maker values uncertain outcomes. Shock-absorbing capacity describes whether the adverse outcome can be financed without crossing a discontinuity such as debt distress, interrupted education, or loss of essential consumption. Preferences and capacity can interact, but they are analytically different. The empirical study provides aggregate evidence compatible with the capacity channel; it does not estimate a structural parameter of either preference or capacity.

5.3. Demand composition, effective demand, and innovation as an extension

The term effective demand requires particular caution. In Keynes's (1936) framework, effective demand concerns the level of aggregate expenditure consistent with output and employment decisions. The present models do not estimate that object. They estimate a relationship between two components of household consumption. The defensible extension is therefore about the composition of realized demand: total consumption can grow while a relatively large share remains tied to health and other risk-related needs, leaving less relative space for education, cultural services, and other adjustable purchases.

This composition may matter to producers, but the connection is not automatic. Acemoglu and Linn (2004) show that exogenous increases in potential pharmaceutical market size encouraged entry of new drugs and new molecular entities. Their result establishes that demand conditions can shape innovation under a design that directly observes innovative outcomes. This article has no comparable firm, patent, R&D, or product-entry variable. It therefore cannot infer that the provincial ECR pattern changed innovation incentives.

Mowery and Rosenberg's (1979) critique is especially relevant: studies that define "demand factors" too broadly risk attributing innovation to demand while folding technological opportunity, supply capabilities, regulation, and other influences into the same label. The innovation extension here is accordingly formulated as a hypothesis for future research. If household-level evidence shows that improved protection expands reliable demand for new services, training, cultural products, or technology adoption, firm-level work could then test whether such demand affects entry, product development, or R&D. The current article supplies neither that causal link nor an innovation outcome.

5.4. Policy implications

The policy implications follow from the bounded interpretation. First, health protection can affect welfare beyond reimbursed medical bills. Bai and Wu's (2014) evidence indicates that insurance coverage can increase nonmedical consumption, especially among poorer and less healthy households, and that actual experience with reimbursement affects the response. Policies that reduce unpredictable out-of-pocket exposure, improve reimbursement reliability, and limit catastrophic payment risk may therefore expand households' feasible allocation set. The present provincial results are consistent with this possibility but do not estimate the effect of a particular reform.

Second, rural–urban disposable-income differences, urbanization, and public-service availability remain relevant even though the focal coefficient survives the inclusion of the corresponding controls. Improving household capacity involves not only temporary consumption stimulus but also more stable income, access to liquid resources, and predictable public services. Such measures can

reduce the cost of adverse states and may allow households to preserve longer-horizon expenditure when shocks occur.

Third, policies should not target ECR shares mechanically. A lower medical share is not necessarily desirable if it reflects unmet care, and a higher ECR share is not automatically productive. The appropriate objective is to reduce involuntary financial exposure and improve the household's capacity to choose among consumption categories. The structure of consumption is an indicator of constraints, not a policy target in isolation.

5.5. Limitations and future research

The study has five principal limitations. First, provincial aggregates create an ecological-inference problem. Household microdata are required to test whether medical shocks, insurance, assets, and ECR spending move together within the same household. Second, MedicalGap is an imperfect proxy that may reflect morbidity, utilization, prices, supply, insurance, and aging. Third, ECRGap combines heterogeneous categories and does not directly measure human-capital investment, adoption of innovative goods, or demand quality. Fourth, compositional closure materially affects the interpretation: the log-ratio and amount models do not reproduce the baseline negative result. Fifth, no exogenous policy shock or credible instrument identifies causality, and the lead-placebo result signals unresolved dynamics.

Future work should use household panels that jointly observe health shocks, insurance reimbursement, liquid assets, debt, income uncertainty, and detailed consumption. A credible staggered policy reform or threshold design could distinguish ex ante protection from realized medical expenditure. Linking such household data to local product entry, firm sales, patents, or R&D would be necessary before the innovation extension could be evaluated. The present article should be read as a disciplined provincial evidence base and conceptual mechanism, not as the completion of that research agenda.

6. Conclusion

This article examines the provincial-level relationship between rural–urban differences in medical expenditure shares and differences in education, culture, and recreation expenditure shares in China. It introduces household shock-absorbing capacity as an analytical distinction from subjective risk preference: observed caution may arise not only from utility-based preferences but also from limited resources, rigid necessary expenditure, and incomplete protection against failure.

Using a balanced panel of 31 provincial regions from 2015 to 2024, the preferred two-way fixed-effects model controls for GDP per capita, the rural–urban disposable-income ratio, urbanization, and population aging. A one-percentage-point increase in MedicalGap is associated with a 0.224-percentage-point reduction in ECRGap. The relationship remains negative when the old-age dependency ratio replaces the preferred aging control and under province-clustered and Driscoll–Kraay inference.

The stronger interpretation is not supported. The amount-ratio and compositional log-ratio coefficients are insignificant, the first-difference estimate is imprecise, and the lead-placebo result indicates unresolved common dynamics. The evidence therefore concerns a stable association in ordinary expenditure shares, not a demonstrated fall in absolute ECR expenditure and not a causal household-level crowding-out mechanism.

The principal contribution is consequently threefold: it distinguishes preference from capacity, identifies a mechanism through which constrained capacity may appear in consumption composition, and provides aggregate evidence while explicitly separating share relationships from amount relationships. Possible implications for effective demand and innovation remain theoretical extensions. Testing them requires household-level identification and direct firm or innovation outcomes.

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Appendix A. Annual urban–rural consumption-share patterns

Table A1. Annual simple averages across 31 provincial regions

Year	Urban medical (%)	Rural medical (%)	Urban ECR (%)	Rural ECR (%)	MedicalGap (pp)	ECRGap (pp)
2015	7.17	9.26	11.01	10.37	2.08	−0.63
2016	7.51	9.32	11.30	10.56	1.81	−0.74
2017	7.74	9.73	11.55	10.55	1.98	−0.99
2018	8.30	10.27	11.36	10.65	1.97	−0.71
2019	8.62	10.69	11.71	10.95	2.08	−0.76
2020	8.65	10.29	9.41	9.19	1.65	−0.22
2021	8.90	10.07	10.84	9.87	1.17	−0.97
2022	8.76	10.05	9.86	9.48	1.29	−0.39
2023	9.24	10.91	10.71	10.05	1.67	−0.66
2024	9.05	10.91	11.11	10.41	1.86	−0.69

Note. Urban and rural category values are simple averages of provincial expenditure shares. Gaps are rural minus urban.

Appendix B. Additional econometric information

Zero-lag Fisher–ADF panel tests reject the unit-root null for ECRGap ($p = 0.002$), MedicalGap ($p < 0.001$), and urbanization ($p < 0.001$), but not for ln GDP per capita, IncomeGap, Age65, or the rural–urban consumption ratio. Because each provincial series contains only ten annual observations and the panel exhibits cross-sectional dependence, these tests have limited diagnostic value and should not be interpreted mechanically. Year fixed effects and the first-difference sensitivity model provide complementary checks on common trending behavior.

In the available 2015–2021 sample, adding the registered urban unemployment rate to the preferred controls yields a MedicalGap coefficient of −0.248 (SE = 0.108, $p = 0.028$); the unemployment coefficient is −0.118 ($p = 0.711$). The same short sample without unemployment yields a MedicalGap coefficient of −0.259 (SE = 0.104, $p = 0.019$). The focal estimate is therefore not materially altered by the unemployment control, while the balanced-panel specification preserves three additional years of data.

References

1. Acemoglu, D., & Linn, J. (2004). Market size in innovation: Theory and evidence from the pharmaceutical industry. Quarterly Journal of Economics, 119(3), 1049–1090. https://doi.org/10.1162/0033553041502144
2. Aitchison, J. (1982). The statistical analysis of compositional data. Journal of the Royal Statistical Society: Series B (Methodological), 44(2), 139–160. https://doi.org/10.1111/j.2517-6161.1982.tb01195.x
3. Bai, C.-E., & Wu, B. (2014). Health insurance and consumption: Evidence from China's New Cooperative Medical Scheme. Journal of Comparative Economics, 42(2), 450–469. https://doi.org/10.1016/j.jce.2013.07.005
4. Blundell, R., Pistaferri, L., & Preston, I. (2008). Consumption inequality and partial insurance. American Economic Review, 98(5), 1887–1921. https://doi.org/10.1257/aer.98.5.1887
5. Breusch, T. S., & Pagan, A. R. (1979). A simple test for heteroscedasticity and random coefficient variation. Econometrica, 47(5), 1287–1294. https://doi.org/10.2307/1911963
6. Breusch, T. S., & Pagan, A. R. (1980). The Lagrange multiplier test and its applications to model specification in econometrics. Review of Economic Studies, 47(1), 239–253. https://doi.org/10.2307/2297111
7. Carroll, C. D. (1997). Buffer-stock saving and the life cycle/permanent income hypothesis. Quarterly Journal of Economics, 112(1), 1–55. https://doi.org/10.1162/003355397555109
8. Chamon, M. D., Liu, K., & Prasad, E. S. (2013). Income uncertainty and household savings in China. Journal of Development Economics, 105, 164–177. https://doi.org/10.1016/j.jdeveco.2013.07.014
9. Chamon, M. D., & Prasad, E. S. (2010). Why are saving rates of urban households in China rising? American Economic Journal: Macroeconomics, 2(1), 93–130. https://doi.org/10.1257/mac.2.1.93

10. Chetty, R., & Szeidl, A. (2007). Consumption commitments and risk preferences. Quarterly Journal of Economics, 122(2), 831–877. https://doi.org/10.1162/qjec.122.2.831
11. Deaton, A. (1991). Saving and liquidity constraints. Econometrica, 59(5), 1221–1248. https://doi.org/10.2307/2938366
12. Driscoll, J. C., & Kraay, A. C. (1998). Consistent covariance matrix estimation with spatially dependent panel data. Review of Economics and Statistics, 80(4), 549–560. https://doi.org/10.1162/003465398557825
13. Drukker, D. M. (2003). Testing for serial correlation in linear panel-data models. Stata Journal, 3(2), 168–177. https://doi.org/10.1177/1536867X0300300206
14. Hausman, J. A. (1978). Specification tests in econometrics. Econometrica, 46(6), 1251–1271. https://doi.org/10.2307/1913827
15. Hubbard, R. G., Skinner, J., & Zeldes, S. P. (1995). Precautionary saving and social insurance. Journal of Political Economy, 103(2), 360–399. https://doi.org/10.1086/261987
16. Keynes, J. M. (1936). The general theory of employment, interest and money. Macmillan.
17. Lusardi, A., Schneider, D., & Tufano, P. (2011). Financially fragile households: Evidence and implications. Brookings Papers on Economic Activity, 2011(1), 83–134. https://doi.org/10.1353/eca.2011.0002
18. Mowery, D. C., & Rosenberg, N. (1979). The influence of market demand upon innovation: A critical review of some recent empirical studies. Research Policy, 8(2), 102–153. https://doi.org/10.1016/0048-7333(79)90019-2
19. National Bureau of Statistics of China. (2016–2025). China Statistical Yearbook. China Statistics Press.
20. National Bureau of Statistics of China. (n.d.). Provincial annual data database. National Data. https://data.stats.gov.cn/
21. Pesaran, M. H. (2015). Testing weak cross-sectional dependence in large panels. Econometric Reviews, 34(6–10), 1089–1117. https://doi.org/10.1080/07474938.2014.956623
22. Pratt, J. W. (1964). Risk aversion in the small and in the large. Econometrica, 32(1/2), 122–136. https://doi.org/10.2307/1913738
23. Wagstaff, A., & Lindelow, M. (2008). Can insurance increase financial risk? The curious case of health insurance in China. Journal of Health Economics, 27(4), 990–1005. https://doi.org/10.1016/j.jhealeco.2008.02.002

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Analysis of the Determinants of Financial Inclusion in WAEMU Countries: An Approach Based on a Fixed Effects Model

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Abstract: This research aims to analyze the determinants of financial inclusion in the West African Economic and Monetary Union (WAEMU) over the period 2012–2022. Using a panel-data, fixed-effects econometric approach, it identifies the key factors that promote or hinder access to financial services in this region. The results show that the geographical accessibility of services and the adaptation of products to the needs of the population are essential drivers of financial inclusion. Furthermore, the high cost of credit limits access to financing for vulnerable populations. These observations call for an integrated policy that combines infrastructure deployment, the development of digital solutions, and regulations governing financial costs to promote sustainable and equitable financial inclusion within WAEMU.

Keywords: Financial inclusion; Panel data; Cost of credit; WAEMU

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1. Introduction

Between the 1970s and 1980s, the concept of financial inclusion gradually took shape and evolved, initially drawing on the development of modern microcredit, championed in particular by the economist Muhammad Yunus (Yunus, 1999). This innovation aimed to provide access to credit for populations excluded from the traditional banking system, thereby highlighting huge disparities in banking penetration in developing regions (34% compared with 69% in East Asia and 94% in-high-income economies)[1]. Subsequently, prudential regulation evolved to regulate microfinance institutions within more formal frameworks, notably through the creation of appropriate legal frameworks and the official recognition of decentralized financial institutions. At the same time, the sector has gradually seen the emergence of new forms of financial services, including crowd-funding, 'remote banking', mobile banking, and electronic payment methods, accompanied by specific legislation concerning electronic money and non-salaried payment agents (BCEAO, 2025).

Financial inclusion, generally defined as the provision of accessible, affordable, and suitable financial services for all individuals and businesses, is central to economic policies in West Africa, particularly within the West African Economic and Monetary Union (WAEMU). This entity comprises eight countries (Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo)[2] that share a common currency, the CFA franc, and coordinated monetary policies (BCEAO, 2025). In these countries, where a large portion of the population lives in poverty, equitable access to basic financial services is a fundamental challenge for reducing inequalities and promoting inclusive development.

At the regional level, several ambitious initiatives have been deployed. The BCEAO's 2021 annual report indicates that member states have implemented coordinated national financial inclusion strategies, accompanied by financial education programs and awareness campaigns to increase demand for and use of financial services. Furthermore, the digitalization of payments and support for financial innovation have been essential levers for reaching populations far removed from traditional banking networks. Consequently, the development of national funds dedicated to microfinance has strengthened the financing capacity of the poorest (BCEAO, 2025). These efforts have

[1] According to the Findex Global database report produced in 2015

[2] The WAEMU is a sub-regional institution which brings together eight coastal and Sahelian states (Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal and Togo).

contributed to a significant improvement in banking penetration indicators in the region, demonstrating positive momentum.

Since 2005, the issue of improving people's access to basic financial services has become increasingly significant globally, particularly in African countries. The promotion of an inclusive financial system thus led to the publication of a blue book entitled « Building Financial Sectors for All » by the United Nations (UN) in 2006. Within the WAEMU, financial inclusion has been made a priority with the adoption by the Council of Ministers of the Regional Strategy for Financial Inclusion in the Union (BCEAO, 2016). It is seen as a key instrument for promoting the integration of the most disadvantaged social groups into the economic and social fabric of the Union (BCEAO, 2018).

In analyzing this issue in the context of sub-Saharan Africa, Guérineau and Jacolin (2014) show that, from a supply-side perspective, the following factors contribute to the underdevelopment of the banking sector in particular: excessive bank concentration, the density of banking infrastructure, and the degree of information asymmetry between banks and their potential customers. On the demand side, the low level of GDP per capita in sub-Saharan Africa and in the countries of the Franc Zone, as well as lower levels of education (both financial and general), contribute to the low rate of banking penetration.

Consequently, the BCEAO (Central Bank of West African States) has developed strategies and reforms to promote an inclusive financial system and address challenges in regulation, access to financial services, supervision, and financial stability (BCEAO, 2021). To this end, the central bank has decided to focus attention on:

- The ongoing adaptation of the regulatory framework to ensure secure transactions, consumer protection, effective financial risk management, and compliance with anti-money laundering rules (BCEAO, 2018; FATF, 2020);

- The restructuring and consolidation of the microfinance sector, notably through improved governance and professionalism within the sector (BCEAO, 2018);

- The expansion of the distribution and acceptance network, particularly via mobile telephony, which is expected to enhance access to and use of digital financial services (BCEAO, 2022);

- The involvement of the public sector in financial education for the population, a key to greater financial inclusion, and the adoption of measures aimed at the digitalization of public payments (BCEAO, 2021; AFI, 2021).

In this work, we will focus on the characteristics of the countries to analyze the level of access to financial services, using the determining factors identified by WAEMU. These include, on the one hand, macroeconomic, institutional, and technological factors, and on the other hand, socio-demographic factors. Although financial inclusion is regarded as a means of reducing poverty and stimulating economic development, understanding its determinants poses a major challenge in Africa compared to other countries, according to Zins and Weill (2016).

The international empirical literature highlights the vital importance of financial inclusion in combating poverty and vulnerability. Vivekanandan (2013), in a study on India, demonstrated that the financial marginalization of low-income groups is a major cause of persistent inequality and that limited access to basic financial services hinders social and economic advancement. For Odeleye and Olusoji (2016), this link between financial inclusion and the reduction of poverty and vulnerability, by promoting improved well-being and sustainable economic growth, is confirmed across various contexts, reinforcing the importance of a proactive financial inclusion policy.

To better monitor developments in financial inclusion and facilitate comparisons, it is essential to have an accurate measure of financial inclusion. This research, therefore, focuses on the following question: What are the determinants of financial inclusion in the WAEMU region?

To provide appropriate responses to this concern, our article analyzes the factors influencing financial inclusion in the WAEMU. Whilst the economic and financial literature has long examined the impact of various indicators on financial performance, a fresh analysis is now required to understand the specific effects of these indicators on financial inclusion within a specific regional context (Beck et al., 2007; Honohan, 2008).

The following hypotheses guide this work:

- H1: The overall demographic penetration rate and the geographical penetration rate of financial services have a positive impact on financial inclusion in the WAEMU;

- H2: The nominal interest rate on loans has a positive impact on financial inclusion in the WAEMU.

This article is divided into three sections. We will first present a review of the literature, then the methodological framework, and finally examine the analysis and discussion of the main findings, as well as the resulting economic policy proposals.

2. Literature Review

This section first presents the theoretical foundations of financial inclusion and then provides an overview of empirical research on persistent inequalities.

Financial inclusion is traditionally defined as the ability of all individuals to access and use a full range of appropriate financial services, including credit, insurance, and payment systems, on affordable and transparent terms (AFI, 2010). Although this definition is a key reference point, it is subject to numerous nuances and debates across disciplines and the objectives pursued by institutions. Some authors, such as Leyshon and Thrift (1995), emphasize that financial inclusion is a dynamic process. They view it as the gradual, continuous integration of individuals into the formal financial system, with the shift from exclusion to effective participation as paramount.

The understanding of financial exclusion has also evolved. Leyshon and Thrift (1995) define it not simply as the lack of a bank account, but as the result of institutional, social, and structural mechanisms that block access to the formal financial system. This exclusion disproportionately affects specific social groups, notably rural populations, women, young people, and the poorest sections of society. Gloukoviezoff (2004) and Servet (2006) expand on this analysis by emphasizing the qualitative dimension of exclusion. According to them, it also encompasses the inability to make adequate use of essential financial instruments, such as payment methods, credit, insurance, and the ability to transfer funds. In this respect, the quality of the services on offer, their relevance to users' actual needs, and proficiency in using the tools prove to be just as fundamental as mere physical access.

Furthermore, the rise of financialization is profoundly transforming the conditions under which financial services are accessed and used. Servet (2006) and Gloukoviezoff (2013) describe financialization as the intensification of social relations mediated by financial products and mechanisms, affecting all aspects of daily life, including housing, health, agriculture, and employment. This development means that financial exclusion can no longer be separated from social exclusion in the broader sense; in other words, the inability to access or use these tools constitutes a new form of marginalization, thereby amplifying economic and social inequalities. This complexity is recognized and taken into account by the conceptual frameworks of major institutions such as the World Bank, which adopted a holistic approach in 2017.

Financialization influences not only demand but also the supply of financial services. Indeed, the emergence of digital technologies and, subsequently, fintech is fundamentally redefining how these services are accessed and used. Doligez (2017) and the BCEAO (2022) highlight that digitalization offers new opportunities, particularly for alleviating constraints linked to geographical distance or access costs, especially in underserved rural areas. However, this development also presents new challenges in terms of regulation, consumer protection, and financial education, to ensure that technological advances do not create new forms of exclusion.

In this debate, microfinance occupies a special place as a key theoretical and operational tool for promoting financial inclusion in resource-constrained countries. By offering tailored products such as microcredit, microinsurance, and flexible savings options, microfinance institutions (MFIs) seek to address the shortcomings of traditional banks (Morduch, 1999). This sector is the subject of debate, particularly regarding the tension between social inclusion and financial viability. Guéri et al. (2009) and Morduch (1999) warn that the economic profitability of microfinance institutions may be incompatible with maximum inclusivity, with some MFIs refocusing on more creditworthy urban populations at the expense of the poorest.

Empirical research on financial inclusion emphasizes the macroeconomic environment's role in determining people's ability to access and use financial services. Allen et al. (2016) demonstrated, using a panel of developing countries, that growth in per capita national income stimulates not only the demand for financial services but also households' actual ability to access them. This idea, consistent with classical analyses of economic capital, is taken up in several subsequent studies that discuss the knock-on effects of growth on financial inclusion (Beck et al., 2007; Demirguc-Kunt and Klapper, 2012). Honohan (2004) provides essential institutional insight by emphasizing that the creation of a stable environment is a prerequisite for effective use of microfinance institutions.

Furthermore, the role of technology, particularly mobile telecommunications, is unanimously recognized in the empirical literature as a catalyst for financial inclusion, especially in countries

with poor physical infrastructure. Zins and Weill (2016) provided robust empirical evidence showing that the spread of mobile telephony is positively correlated with increased access to financial services in sub-Saharan African countries. Empirical studies also show that socio-demographic factors are key determinants in explaining persistent inequalities in financial inclusion. The link between educational attainment and financial inclusion was highlighted in early quantitative research (Chikalipah, 2016), demonstrating that greater human capital improves financial risk management and facilitates active, diversified use of financial products.

About gender disparities, the work of Zins et al. (2016) shows that, despite the growth of digital services, socio-cultural and institutional barriers limit women's access to a significantly lower extent than that of men; this is supported by the longitudinal analyses of Bruhn and Love (2014) on the impact of policies promoting women's inclusion. This issue remains pronounced in rural areas, where social norms still largely restrict women's economic autonomy (Kabeer, 2015)

The geographical divide between urban and rural areas is also well documented. For example, Suri and Jack (2016) show that urban areas account for the majority of formal financial infrastructure, reinforcing the spatial advantage, whilst rural areas suffer from a persistent deficit despite the growing use of mobile finance. Finally, numerous multidimensional studies have examined the barriers to financial inclusion. Beck (2016), as well as Chamberlain and Walker (2005), emphasize that these barriers are not limited to economic and physical aspects, but also include informational, cultural, and psychological constraints, particularly those linked to self-exclusion, a phenomenon whereby certain individuals voluntarily choose not to use formal financial services due to mistrust or a lack of confidence.

Despite the wealth of empirical research on financial inclusion, several divergent or contradictory findings have sparked significant debates in the academic and institutional literature. These controversies concern both the impact of certain factors and the actual effectiveness of inclusion tools.

A key debate concerns the effect of economic growth on financial inclusion. Whilst authors such as Allen et al. (2016) and Dermirguc-Kunt and Klapper (2012) observe a positive correlation between growth in per capita income and access to financial services, other research suggests that this relationship is far from linear or sufficient. Beck and De la Torre (2007) thus suggest that strong economic growth can coexist with limited financial inclusion, due in particular to internal disparities and institutional inequalities, or to vertical growth that concentrates the benefits within restricted segments of the population. This ambivalence indicates that growth does not automatically guarantee the democratization of financial services and highlights the importance of institutional and social conditions (Honohan, 2008).

Another point of contention concerns the impact of technology, particularly mobile finance and fintech. Whilst the majority of recent research (Zins and Weill, 2016; GSMA, 2023) tends to demonstrate a positive effect of digitalization, certain authors and other reports, such as those by Amer et al. (2016) and Owino et al. (2025), warn of the risk of exacerbating digital inequalities. Unequal access to digital infrastructure, difficulties with digital literacy, and challenges relating to the protection of personal data can indeed generate new forms of exclusion, sometimes referred to as « digital divides » (Donner, 2015). Thus, digitalization does not resolve all obstacles and requires vigilant, inclusive public policy.

The issue of socio-demographic disparities, particularly those related to gender, is also the subject of debate. Whilst Zins et al. (2016) report a persistent gap in women's access, analyses highlight contexts where this gap narrows significantly or disappears, notably in certain urban areas or through targeted interventions (Dupas et al., 2018). This variation across geographical, cultural, and political contexts fuels discussions on the reproducibility of empirical findings and the need to adapt policies to local specificities (Kabeer, 2015).

Finally, microfinance serves as a good illustration of the complexity of the debates surrounding the actual impact of inclusion schemes. Morduch (1999) and Guérin et al. (2009) highlight the recurring tension between social inclusion and financial viability, noting that most microfinance institutions struggle to reconcile profitability with the maximum extension of services to the poorest populations, which undermines long-term effectiveness. Nevertheless, other research, such as that by Banerjee and Duflo (2011) or Karlan and Zinman (2011) within the framework of Randomized Control Trials (RCTs), shows that certain microfinance programs significantly improve economic well-being and financial inclusion, even if these effects may vary depending on the nature and quality of the intervention. These contradictions highlight the importance of a nuanced, context-specific approach and the need to combine microfinance, digitalization, and financial education to maximize benefits.

In summary, these debates highlight the complexity of financial inclusion and the difficulty of drawing general conclusions from research that is sometimes contextually limited or methodologically distinct. The literature therefore calls for an integrative approach that takes into account

the interactions among economic, institutional, technological, and socio-cultural factors, as well as greater methodological rigor in the interpretation of results.

3. Methodology

Before proceeding with the regression tests and discussing the results, it is first necessary to outline the methodological framework by specifying the model and providing an overall analysis of the data used.

We adopt a hypothetical-deductive approach based on quantitative panel data. The analysis focuses on the determinants of financial inclusion in the WAEMU for the period 2012 to 2022. The data sources are drawn from the BCEAO database. In accordance with current standards and procedures, microfinance institutions must regularly report their financial information to the Central Bank of West African States (BCEAO) and to the Ministries of Economy and Finance.

3.1. Model Specification

The factors that can influence financial inclusion have, of course, evolved significantly and attracted the attention of financial authorities over time, particularly since the onset of the 2008 financial crisis. Consequently, the ordinary least squares method has been the most commonly used estimation technique for both time-series and panel-data analysis. However, this technique has several limitations, some stemming from the data structure, so it does not always yield the best results. For a given panel model, information is available in the individual (N) and time (T) dimensions.

The panel model is written as : Yit=bXit+εit. The term (i) refers to the individual under consideration; in our case, this is the country; the term (t) refers to the point in time at which the, and E (εit) = 0. There are several patterns of parameter variation depending on whether a fixed-effects model or a random-effects model is used. The fixed-effects model in this specific case assumes that the coefficients are uniform across countries, except r the constant term Yit=αi+bXit+εit. In our analysis, the term αi is the individual effect that is constant over time but specific to each country ; it is called the « country specific effect » and captures individual heterogeneity.

The estimator for this fixed-effects model is called the Within estimator. However, as we are working with panel data and fixed effects, it is preferable to use an estimation technique that accounts for the presence of fixed effects across individuals.

A fixed effects panel model using the « Within » estimator. Thus, this method allows us to consistently analyze the determinants of financial inclusion.

We draw on the findings of the aforementioned research literature on the determinants of financial inclusion, as summarised in the empirical review, to guide our analysis of these determinants in the WAEMU.

Based on the above, the model is presented as follow :

$$\boldsymbol{y_{it}} = \boldsymbol{c} + \boldsymbol{\alpha Internal_{it}} + \boldsymbol{\beta Macro_{it}} + \boldsymbol{\delta Industry_{it}} + \boldsymbol{\varepsilon_{it}} \quad (1)$$

Where i denotes the country and t indicates the time period.

The dependent variable, y_it represents the financial inclusion index.

The independent variables are divided into three groups: internal, macroeconomic, and industry specific; c is the constant, and ε_it represents the error term. Since we have included a range of variables in each group, the terms α, β, and δ in equation (1) represent parameter vectors rather than individual parameters.

In this study, we use panel data. Our financial data is aggregated by country and is sourced from the BCEAO database, which provides annual financial information on banks (BCEAO, 2022).

They cover the 154 active credit institutions operating in the eight countries of the WAEMU zone. All financial statement data are annual and denominated in CFA francs. The period covered by the aggregated financial data by country is from 2012 to 2022. We will therefore need to introduce variables that can represent this inclusion. We have drawn on the literature on the determinants of financial inclusion to guide this work.

All variables are taken from the « 2018 Report on the State of Financial Inclusion in the WAEMU » published by the Central Bank of West African States (BCEAO). The definitions are given below :

- **Overall demographic penetration rate for financial services (ODPR)**: this measures the number of service outlets available per 10,000 adults:

- **Overall geographical penetration rate for financial services (OGPR)**: this assesses the degree of accessibility, i.e., the number of service outlets available within an area of 1,000 km²;

- **Strict banking penetration rate (SBPR)**: this measures the percentage of the adult population holding an account with banks, postal services, national savings banks, and the Treasury;

- **Broad banking penetration rate (BBPR)**: this measures the percentage of the adult population holding accounts with banks, postal services, national savings banks, and the Treasury, plus the percentage of account holders with microfinance institutions;

- **Overall Financial Services Usage Rate (OFSUR)** or financial inclusion rate: this estimates the percentage of the adult population holding an account with banks, postal services, national savings banks, the Treasury, and microfinance institutions, plus the percentage of e-money account holders ;

- **Nominal interest rate on deposits (NIRd)**: this measures the return on savers' deposits at banks and the decentralized financial system (DFS);

- **Nominal interest rate on loans (NIRL)**: this provides information on the costs borne by customers to access loans granted by banks and DFS;

- **Financial Inclusion Index (FII)**: financial inclusion is assessed, in all its dimensions, within the WAEMU, using a composite index calculated by taking into account all seven indicators combined. This is a single value, ranging from 0 to 1, representing total exclusion and full financial inclusion, respectively. It is derived from a weighted average of the various indicators analyzed above.

The main problem with panel data is intra-individual correlation, in which observations for the same unit over time are often correlated. This can lead to bias and inefficiencies in the estimates. To address this issue, fixed- or random-effects models are used, along with methods to correct for autocorrelation and heteroscedasticity.

In a region-specific study, such as the WAEMU, panel data is among the most appropriate methods (Loya, 1999). Indeed, this technique not only captures the dynamic effects in economic agents' behavior but also facilitates control over individual and/or temporal heterogeneity.

The use of panel data provides greater variability and precision, and allows for the influence of unobservable characteristics to be taken into account. It also reduces the risk of multicollinearity among variables, offering greater degrees of freedom and improved performance. These features facilitate the study of change dynamics by enabling the capture of both short- and long-term effects.

Therefore, to address the question of the determinants of financial inclusion, this work draws on the model developed by Davis, Karim, and Noel in 2020. A country-level fixed effects panel model will be used to achieve our research objectives. Following the presentation of our variables and building on the baseline model, we explicitly specify the models to be estimated in this study so that the econometric estimates yield satisfactory results.

Equation (1) is the model to be estimated in this work. It includes all internal, macroeconomic, and industry-specific variables.

To clearly identify the factors most influencing financial inclusion, as measured by the FII, we break down the internal, macroeconomic, and industry-specific variables. The model specification, therefore, becomes:

$$\boldsymbol{Y}_{it} = \boldsymbol{\alpha}_{it} + \boldsymbol{\beta}_{it}\boldsymbol{lnodpr}_{it} + \boldsymbol{\beta}_{it}\boldsymbol{lnogpr}_{it} + \boldsymbol{\beta}_{it}\boldsymbol{lnsbr}_{it} + \boldsymbol{\beta}_{it}\boldsymbol{lnbbr}_{it} + \boldsymbol{\beta}_{it}\boldsymbol{lnofsur}_{it} + \boldsymbol{\beta}_{it}\boldsymbol{lnnird}_{it} + \boldsymbol{\beta}_{it}\boldsymbol{lnnirl}_{it} + \boldsymbol{\varepsilon}_{it} \quad (2)$$

The following table presents the descriptive statistics of the selected variables. The results obtained are summarized by mean, standard deviation, minimum, and maximum values for the country, based on the sample size.

Table 1. Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
Fii	88	.3596023	0.1557216	.137	.667
Gdp	88	4.867254	2.695182	-5.370447	10.76021
Lnodpr	88	2.962637	1.576607	0	5.669881
Lnogpr	88	4.006966	1.889905	0	7.512618
Lnsbr	88	2.656944	0.5750648	0.7884574	3.54674
Lnbbr	88	3.399924	0.6760716	1.568616	4.433195
lnofsur	88	3.618946	0.7374239	1.410987	4.450853
Lnnird	88	1.642165	0.1134449	1.036737	1.819699
lnnirl	88	2.072012	0.1728657	1.667707	2.417698

*Source***:** Authors' calculations, data from BCEAO report, 2022

3.2. *Results and discussion*

This section first presents stationarity tests, then cointegration tests for the variables, and finally model estimation.

Table 2. Estimation of regression model variables

Variables	FII
Gdp	-0.005** (-2.57)
Lnodpr	-0.062 (-1.23)
Lnogpr	0.137** (2.63)
Lnsbr	-0.159 *** (-3.67)
Lnbbr	0.073 (0.266)
lnofsur	0.018 (0.48)
Lnnird	0.079 (1.29)
Lnnirl	-0.230 ** (-2.04)
Constant	0.475 (1.48)

Source: Authors' calculations, data from the BCEAO 2022 report.
(***), (**) and (*) denote the 1%, 5% and 10% thresholds respectively.

The fixed effects model yields a mean of 0.9005 ($R^2 = 0.9005$). Thus, 90.05% of the variation in the variables included in the analysis of financial inclusion intensity is explained by the model across all countries, accounting for the time dimension (Appendix 2).

The mixed-effects model shows a mean in the individual dimension ($R^2 = 0.8394$). This means that the model explains 83.94% of the variation in financial inclusion across countries. The model's goodness of fit, measured by the coefficient of determination (**Overall with an $R^2 = 0.8174$**), is fairly close to one.

As a result, the variables included in the model account for 81.74% of the observed variability in financial inclusion. Regarding the choice of model, the Hausman test indicates that the fixed effects model is best, as the p-value from the chi-squared test exceeds the threshold.

Table 2 above presents the robust estimates from a fixed-effects panel model. The dependent variable is financial inclusion. It is also noted that certain variables are significant at different significance levels (1%, 5%), notably :

- **Gross Domestic Product (GDP)**

The results show that gross domestic product has a significant negative effect on financial inclusion at the 5% significance level. This finding suggests that a 1% increase in GDP will lead to a 0.005% decrease in the financial inclusion index. It highlights that economic growth alone is not sufficient to improve financial inclusion. It is therefore necessary to accompany economic development with proactive, inclusive policies that broaden access to financial services, particularly for marginalized populations.

- **Overall geographical penetration rate of financial services (lngpr)**

The overall geographical penetration rate of financial services is positively associated with the financial inclusion index at a 5% significance level. A 1% increase in the overall geographical penetration rate of financial services (lngpr) is associated with a 0.137-point increase in the financial inclusion index, all else equal.

This result suggests that the physical accessibility of financial services plays a crucial role in improving financial inclusion. In other words, the more financial service outlets (bank branches, cash machines, microfinance institutions, etc.) there are across the territory, the easier it is for people to access services such as savings, credit, insurance, or payment methods.

The positive, significant effect of geographical penetration on financial inclusion underscores the importance of physical infrastructure in financial inclusion strategies. This implies that policymakers and financial institutions must continue to invest in the geographical coverage of financial services, particularly in remote or marginalized areas.

- **Strict banking penetration rate (lnsbpr)**

At the 1% significance level, the strict banking penetration rate is negatively associated with financial inclusion. A 1% increase in the strict banking penetration rate is associated with a 0.159% decrease in the financial inclusion index. This result highlights a significant limitation of the approach that relies solely on formal banking penetration as an indicator of financial inclusion. It suggests that simply having a bank account is not enough to guarantee effective inclusion. To improve financial inclusion, it is necessary not only to promote access but also to encourage the regular, useful, and appropriate use of financial services, taking into account the specific needs of excluded populations.

- **Nominal interest rate on loans (lnnirl)**

The nominal interest rate on loans has a significant negative effect on financial inclusion at the 5 per cent significance level; therefore, our hypothesis H2 is rejected. The results indicate that a 1 percentage point increase in the nominal interest rate on loans will lead to a 0.23 per cent decrease in the financial inclusion index. This finding suggests that the level of interest rates acts as a barrier to financial inclusion. Therefore, to promote better integration of the population into the financial system, it is crucial that monetary authorities and financial institutions ensure that interest rates remain sustainable, in particular by:

- Macroeconomic stability (reduction in inflation),
- Competition within the banking sector,
- And the development of financial products tailored to low-income groups.

5. Conclusions

The findings show that financial inclusion within the WAEMU region is shaped by a complex interplay of economic, institutional, technological, and social factors. The rigorous analysis covered the period 2012–2022. It used a panel econometric model, demonstrating that improvements in financial inclusion cannot rely solely on economic growth or the expansion of banking networks. It is above all the geographical expansion of service points, the rise of electronic money, the diversification of financial product offerings, and the development of the microfinance sector that prove decisive in including the most vulnerable populations and reducing disparities, particularly in rural areas.

Nevertheless, the persistence of challenges such as the high cost of accessing credit, the vulnerability of certain social groups within the financial system, and inequalities linked to education and

location shows that effective financial inclusion requires much more than simply increasing the number of accounts or boosting GDP. The quality of usage, the relevance of the solutions offered, and the expansion of financial education remain essential to transforming access into a genuine driver of improved living standards.

The findings of this research call on policymakers to prioritize an integrated strategy that combines infrastructure development, digitalization, appropriate regulation, and innovation to improve local access. The development of a healthy competitive environment, the promotion of microfinance, and targeted support for users also appear to be key drivers for more equitable inclusion.

Ultimately, addressing the challenge of financial inclusion within the WAEMU requires a multisectoral approach tailored to national contexts. Only by maintaining this momentum, combining local engagement, innovation, education, and effective regulation, will it be possible to ensure sustainable access to financial services and support economic and social transformation towards greater equity.

With a view to future research, it would be particularly relevant to conduct an in-depth analysis of the impact of financial inclusion on the reduction of multidimensional poverty and on the economic empowerment of women and young people within the WAEMU region.

Appendix

Table 1. Geographic Penetration Table

Country	Geographic Penetration (points / 1,000 km²)
Benin	1 831
Ivory Coast	856
Senegal	740
Togo	589
Burkina Faso	413
Mali	185
Guinea-Bissau	155
Niger	18

Source: BCEAO Report, 2023

Table 2. Fixed-effects model

Fixed-effects (within) regression — Number of obs = 88
Group variable: id — Number of groups = 8

R-sq:
within = 0.9005
between = 0.8394
overall = 0.8174

Obs per group:
min = 11
avg = 11.0
max = 11

F (8,72) = 81.42
corr(u_i, Xb) = -0.6487 — Prob > F = 0.0000

iif	Coef	Std. Err.	t	P > I t I	[95% Conf	Interval]
Gdp	-.0049526	.0019234	-2.57	0.012	-.0087868	-.0011184
Lnodpr	-.0615154	.0502091	-1.23	0.224	-.1616054	.0385746
Lnogpr	.137044	.0520456	2.63	0.010	.033293	.2407951
Lnsbr	-.1594822	.0434085	-3.67	0.000	-.2460155	-.0729489
Lnbbr	.0732321	.0653644	1.12	0.266	-.0570696	.2035337
lnofsur	.0176558	.0370976	0.48	0.636	-.0562969	.0916086
Lnnird	.0793047	.0616655	1.29	0.203	-.0436232	.2022326
Lnnirl	-.2303578	.1128495	-2.04	0.045	-.4553191	-.0053964
_cons	.4747537	.3203186	1.48	0.143	-.1637897	1.113297
sigma_u	.07351131					
sigma_e	.04474659					
rho	.72965014	(fraction of variance due to u_i)				

F test that all u_i = 0: F (7, 72) = 3.58

Source: Authors' calculations, data from BCEAO report, 2022

Table 3. Hausman fixed

hausman fixed

	— Coefficients — (b) Fixed	(B) .	(b—B) Difference	sqrt (diag(V_b-V_B) S.E.
Gdp	-.0049526	-.005287	.0003344	.
Lnodpr	-.0615154	-.0013289	-.0601865	.0489827
Lnogpr	.137044	.0822637	.0547804	.0505
Lnsbr	-.1594822	-.017607	-.1418752	.0335117
Lnbbr	.0732321	-.031822	.1050541	.0617612
lnofsur	.0176558	.0205708	-.0029149	.0250486
Lnnird	.0793047	-.0152049	.0945096	.0241103
Lnnirl	-.2303578	-.0483218	-.182036	.1032851

b= consistent under Ho and Ha; obtained from xtreg
B= inconsistent under H;a, efficient under Ho; obtained from xtreg

Test: Ho: difference in coefficients not systematic

Chi2 (B) = (b-B) ' [(V_b-V_B)^(-1)] (b-B)
= -13.00 chi2<0 ==> model fitted on these data fails to meet the asymptotic assumptions of the Hausman test; see suest for a generalized test

Source: Authors' calculations, data from BCEAO report, 2022

Table 4. Hausman fixed

```
================================================================================
*** Panel Data Breusch-Pagan Diagonal Covariance Matrix LM Test
================================================================================
    Ho: Run OLS Regression  -  Ha: Run Panel Regression

    Lagrange Multiplier Test  =  1.341e+04
    Degrees of Freedom        =       28.0
    P-Value > Chi2(28)        =    0.00000
================================================================================
```

Source: Authors' calculations, data from BCEAO report, 2022

References

1. AFI. (2021). Initiatives politiques et réglementaires pour soutenir l'inclusion financière en Afrique. Publications de l'Alliance pour l'Inclusion Financière (AFI)
2. Allen, F., Demirgüç-Kunt, A., Klapper, L., & Martinez Peria, M. S. (2016). The Foundations of Financial Inclusion: Understanding Ownership and Use of Formal Accounts. Journal of Financial Intermediation, 27, 1-30.
3. Amer, A. M. A., Gamal, A. A. M., Abdul Jalil, N., Pei-Tha, G., Zakariya, Z., & Umar, M. (2025). Re-evaluating the Malaysian shadow economy: evidence from public expenditure patterns. Journal of Financial Crime, 32(4), 950-969.
4. Banerjee, A., & Duflo, E. (2011). Poor Economics: A Radical Rethinking of the Way to Fight Global Poverty. New York: PublicAffairs.
5. BCEAO. (2016). Stratégie Régionale d'Inclusion Financière dans l'UEMOA.
6. BCEAO. (2018). Rapport annuel sur l'inclusion financière dans l'UEMOA.
7. BCEAO. (2021). Rapport annuel sur la stratégie régionale d'inclusion financière.
8. BCEAO. (2022). Rapport Annuel sur l'Inclusion Financière dans l'UEMOA.
9. BCEAO. (2023). Tableau de bord de l'inclusion financière dans l'UEMOA.
10. BCEAO. (2025). Rapport sur la politique monétaire de l'UEMOA.
11. Beck, T., Demirguc-Kunt, A., & Peria, M. S. M. (2007). Reaching out: Access to and use of banking services across countries. Journal of Financial Economics, 85(1), 234-266.
12. Beck, T., & De La Torre, A. (2007). The basic analytics of access to financial services. Financial markets, institutions & instruments, 16(2), 79-117.
13. Beck, T. (2016). Financial Inclusion–Measuring progress and progress in measuring. This paper was written for the Fourth IMF Statistical Forum "Lifting the Small Boats: Statistics for Inclusive Growth: Cass Business School, City, University of London, CEPR, and CESifo.
14. Bruhn, M., & Love, I. (2014). The real impact of improved access to finance: Evidence from Mexico. The Journal of Finance, 69(3), 1347-1376.
15. Chamberlain, D., & Walker, J. (2005). Auto-exclusion des services financiers : une étude exploratoire. Financial Services Authority.
16. Chikalipah, S. (2017). Institutional environment and microfinance performance in Sub-Saharan Africa. African Development Review, 29(1), 16-27.
17. Demirgüç-Kunt, A., & Klapper, L. F. (2012). Measuring financial inclusion: The Global Findex Database. World Bank Policy Research Working Paper, (6025).
18. Donner, J. (2015). After access: Inclusion, development, and a more mobile Internet. MIT Press.
19. Doligez, F. (2017). La microfinance, précurseur de la financiarisation de l'aide au développement ? Mondes en développement, 178(2), 41-58.
20. Dupas, P., Karlan, D., Robinson, J., & Ubfal, D. (2018). Banking the unbanked? Evidence from three countries. American Economic Journal: Applied Economics, 10(2), 257-297.
21. FATF. (2020). Annual Report 2019-2020 of the Financial Action Task Force (FATF)
22. Gloukoviezoff, G. (2004). De la bancarisation de masse à l'exclusion bancaire puis sociale. Revue française des affaires sociales, (3), 9-38.
23. Gloukoviezoff, G. (2013). Les banques face à leurs clients.
24. GSMA. (2023). Rapport sur l'argent mobile et l'inclusion financière en Afrique subsaharienne.
25. Guérin, I., Morvant-Roux, S., & Villarreal, M. (2009). Exclusion financière et économie informelle : un regard contemporain sur le Sud. Développement et Changement, 40(6), 1183-1201.
26. Guérineau, S., & Jacolin, L. (2014). L'inclusion financière en Afrique subsaharienne : faits stylisés et déterminants. Revue d'économie financière, 116(4), 57-80.
27. Honohan, P. (2004). Financial development, growth, and poverty: how close are the links?. In Financial development and economic growth: Explaining the links (pp. 1-37). London: Palgrave Macmillan UK.
28. Honohan, P. (2008). Household financial assets are in the process of development.
29. Kabeer, N. (2015). Gender, poverty, and inequality: a brief history of feminist contributions in the field of international development. Gender & Development, 23(2), 189-205.
30. Karlan, D., & Zinman, J. (2011). Microcredit in theory and practice: Using randomized credit scoring for impact evaluation. Science, 332(6035), 1278-1284.

31. Leyshon, A., & Thrift, N. (1995). Geographies of financial exclusion: financial abandonment in Britain and the United States. Transactions of the Institute of British Geographers, 312-341.
32. Loya, J. (1999). Méthodes d'analyse de données de panel en économie. Éditions Universitaires.
33. Morduch, J. (1999). La promesse de la microfinance. Revue de littérature économique, 37(4), 1569-1614.
34. Odeleye, A. T., & Olusoji, M. O. (2016). Financial inclusion and economic growth in Nigeria.
35. Servet, J.-M. (2006). La finance inclusive : une chance pour le développement ? Économica.
36. Suri, T., & Jack, W. (2016). The long-run poverty and gender impacts of mobile money. Science, 354(6317), 1288-1292.
37. Owino, O., Walter, O., & Achochi, O. G. (2025). Liquidity Risk and Financial Performance of Deposit-Taking Microfinance Banks in Kenya. Journal of Economics, Management Sciences & Procurement, 4, 232-245.
38. UEMOA. (2022). Rapport Annuel sur les Activités de l'UEMOA. Publications de l'UEMOA.
39. Microfinance, inclusion et finance digitale
40. Vivekanandan, N. R. (2013). Financial inclusion in India: A path towards inclusive economic growth. Available at SSRN 2294779.
41. World Bank (2017). Universal Access to Financial Services by 2020: Global Monitoring Report.
42. World Bank (2018). Universal Access to Financial Services by 2020: Global Strategy.
43. World Bank (2023). Financial Inclusion in the WAEMU: Monitoring Report.
44. Yunus, M. (1999). The Grameen Bank. Scientific American, 281(5), 114-119.
45. Zins, A., & Weill, L. (2016). Les déterminants de l'inclusion financière en Afrique. Revue du financement du développement, 6(1), 46-57.

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From Organizational Culture to Competitive Performance: Integrating Market Orientation, Dynamic Capabilities, and Organizational Learning

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Abstract: Organizations increasingly operate in environments characterized by rapid technological change, intense competition, and evolving customer expectations. In response, scholars have emphasized the importance of intangible organizational resources and capabilities that enable firms to achieve and sustain superior performance. While prior studies have independently examined the roles of organizational culture, market orientation, organizational learning, and dynamic capabilities, limited attention has been devoted to understanding how these factors interact within an integrated framework to drive multidimensional competitive performance, including operational effectiveness, innovation capability, market responsiveness, and strategic success. This conceptual paper addresses this gap by proposing a sequential framework that links organizational culture to competitive performance through the development of market orientation, organizational learning, and dynamic capabilities. The proposed framework advances existing literature by integrating four major streams of research into a coherent model and offering eight propositions for future empirical testing. The paper contributes to theory by clarifying the mechanisms through which intangible organizational resources translate into competitive outcomes and provides practical guidance for managers seeking to enhance organizational adaptability, innovation, and long-term performance in dynamic business environments.

Keywords: Organizational Culture; Market Orientation; Organizational Learning; Dynamic Capabilities; Competitive Performance; Organizational Competitiveness.

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1. Introduction

Achieving and sustaining competitive performance has become increasingly challenging in contemporary business environments characterized by rapid technological change, evolving customer expectations, and intensified global competition. While organizations have traditionally relied on tangible resources such as capital, technology, and infrastructure to improve performance, growing attention has been directed toward intangible organizational assets that are more difficult for competitors to imitate. Among these assets, organizational culture, market orientation, organizational learning, and dynamic capabilities have emerged as critical drivers of long-term organizational success (El Baz & Ruel, 2024; Majhi et al., 2023). Understanding how these factors interact has therefore become an

important concern for both scholars and practitioners seeking to explain differences in organizational performance.

Recent examples from practice illustrate the importance of organizational capabilities in sustaining competitiveness (Grego et al., 2025; Stadtfeld & Gruchmann, 2024). Organizations operating in highly dynamic environments increasingly rely on adaptive organizational cultures, continuous learning, customer-focused strategies, and dynamic capabilities to sustain long-term competitiveness (Verbeke et al., 1998). These examples highlight the growing importance of understanding how organizational resources and capabilities interact to influence performance outcomes.

Organizational culture has long been recognized as a fundamental element shaping employee behavior, organizational values, and strategic decision-making. A strong and supportive culture encourages collaboration, knowledge sharing, innovation, and adaptability, all of which contribute to organizational effectiveness. Ekmekcioglu and Öner (2024) argued that culture influences how organizations perceive challenges, interpret opportunities, and respond to environmental changes. Similarly, research has demonstrated that organizational culture can foster creativity and innovation by creating an environment that supports experimentation and continuous improvement. For example, Mobarakabadi and Karami (2014) found that organizational culture plays a significant role in enhancing creativity, highlighting its importance as a foundation for organizational development and performance improvement.

Although organizational culture provides an internal foundation, organizations must also develop an external orientation to remain competitive (Johnson et al., 2025). Market orientation reflects an organization's ability to understand customer needs, monitor competitor actions, and coordinate resources to create superior value (Masa'deh et al., 2018). Considerable evidence suggests that market-oriented organizations achieve stronger performance outcomes because they are better equipped to identify emerging opportunities and respond effectively to market changes. (Kohli & Jaworski, 1990) established market orientation as a central strategic capability, while (Karami et al., 2016) demonstrated a positive relationship between market orientation and organizational performance within the manufacturing sector. These findings suggest that organizations capable of aligning their culture with market-focused behaviors may be better positioned to achieve sustainable competitive advantages (Borazon et al., 2022).

Beyond market awareness, organizations must continuously acquire, share, and apply knowledge to adapt to changing environments. Organizational learning provides a mechanism through which firms transform information into actionable knowledge and improve their ability to respond to environmental uncertainty (Sita Nirmala Kumaraswamy & Chitale, 2012). Learning-oriented organizations are generally more innovative, adaptable, and capable of sustaining performance over time. According to Huber and McDaniel (1986), organizational learning enables firms to modify behaviors based on experience and feedback. Previous research suggests that organizational learning strengthens the relationship between market orientation and organizational performance by enabling firms to transform market intelligence into actionable organizational knowledge (Rakthin et al., 2016).

The growing complexity of modern business environments has also increased interest in dynamic capabilities, which refer to an organization's ability to integrate, build, and reconfigure internal and external resources in response to environmental change (Pitelis et al., 2024). Dynamic Capabilities Theory proposes that sustainable performance is not determined solely by the possession of valuable resources but by the organization's ability to continually renew and redeploy those resources (Teece et al., 1997). Teece et al. (1997) and Teece (2007) emphasized that sensing opportunities, seizing opportunities, and transforming organizational resources are essential for maintaining competitiveness in dynamic markets. Supporting this perspective, Karami (2026) demonstrated how market-oriented capabilities can contribute to operational excellence through the development of dynamic capabilities (Cordero Paez et al., 2022).

Despite substantial research on organizational culture, market orientation, organizational learning, and dynamic capabilities, existing studies have primarily examined these constructs through direct or isolated relationships (Carpenter, 2017; Corrales-Estrada et al., 2025). For example, prior research has investigated the influence of organizational culture on performance, the impact of market orientation on organizational outcomes, and the role of dynamic capabilities in sustaining competitive advantage (Ekmekcioglu & Öner, 2024). While these studies have generated valuable insights, they provide only a partial understanding of how organizational resources are transformed into performance-enhancing capabilities over time. Specifically, limited attention has been devoted to explaining the sequential capability development process through which organizational culture shapes market-oriented behaviors, facilitates organizational learning, and ultimately contributes to the formation of dynamic capabilities (Linde et al., 2021).

This limitation is important because organizations rarely develop strategic capabilities independently. Instead, capabilities often emerge through interconnected organizational processes that build upon one another. Understanding this developmental sequence may provide a more comprehensive explanation of why some organizations are more successful than others in converting intangible organizational resources into sustainable competitive performance. Therefore, this paper extends existing literature by proposing an integrated framework that conceptualizes organizational culture as the origin of a capability-building pathway leading to competitive performance through market orientation, organizational learning, and dynamic capabilities (Varadarajan, 2017).

Despite substantial research on organizational culture, market orientation, organizational learning, and dynamic capabilities, existing studies have largely examined these constructs independently or through isolated relationships (Zada et al., 2025). Consequently, limited attention has been devoted to understanding how these factors collectively contribute to competitive performance within a unified framework. The absence of an integrated perspective restricts our understanding of how organizations transform cultural values into strategic capabilities and ultimately into superior performance outcomes. Addressing this gap is particularly important because organizations rarely develop these capabilities in isolation; rather, they emerge through interconnected organizational processes and behaviors.

Dynamic Capabilities Theory provides the primary theoretical foundation for the proposed framework because it explains how organizations continuously integrate, build, and reconfigure organizational resources to achieve sustained competitive performance in changing environments. However, the proposed framework also draws complementary insights from the RBV and the organizational learning perspective. From the RBV, organizational culture is conceptualized as a valuable, difficult-to-imitate strategic resource that creates the organizational conditions necessary for capability development. Market orientation and organizational learning are viewed as operational organizational capabilities that enable firms to acquire, interpret, and apply market knowledge. Building upon these capabilities, Dynamic Capabilities Theory explains how organizations sense opportunities, seize emerging possibilities, and transform organizational resources to sustain competitive performance. Together, these complementary theoretical perspectives provide an integrated explanation of capability development rather than relying on a single theoretical lens (Nugroho, 2018).

To address this limitation, this paper develops a conceptual framework that links organizational culture, market orientation, organizational learning, and dynamic capabilities as sequential drivers of competitive performance. Specifically, the paper proposes that organizational culture serves as the foundational organizational resource that facilitates market-oriented behaviors and learning processes, which subsequently support the development of dynamic capabilities and enhance competitive performance. By integrating these four influential streams of research, the paper contributes to the literature by providing a more comprehensive explanation of how intangible organizational resources generate sustainable performance advantages.

The remainder of the paper develops the proposed conceptual framework, presents a series of theoretical propositions, discusses theoretical and managerial implications, and identifies directions for future research. Table 1 presents the key constructs and definitions used in the proposed framework.

Table 1. Key constructs and definitions used in the proposed framework.

Construct	Definition	Key Reference
Organizational Culture	Shared values, beliefs, and norms guiding organizational behavior	Ekmekcioglu and Öner (2024)
Market Orientation	Customer orientation, competitor orientation, and interfunctional coordination	Narver & Slater (1990)
Organizational Learning	Process of acquiring, sharing, and applying knowledge	Huber and McDaniel (1986)
Dynamic Capabilities	Ability to sense, seize, and transform resources	Teece (2007)
Competitive Performance	Firm-level competitive performance reflected in superior market, operational, innovation, and strategic outcomes relative to competitors.	Ning and Yao (2023)

1.1 Theoretical Positioning and Contribution

Although organizational culture, market orientation, organizational learning, dynamic capabilities, and competitive performance have each received substantial scholarly attention, existing research has primarily examined these constructs through isolated relationships or limited combinations. Previous studies have typically focused on the influence of organizational culture on organizational outcomes, the relationship between market orientation and performance, the role of organizational learning in knowledge development, or the contribution of dynamic capabilities to competitive advantage. While these studies have generated important theoretical insights, they provide only a partial explanation of how organizations progressively transform intangible organizational resources into sustainable competitive performance through interconnected capability-development processes.

The present study addresses this limitation by proposing an integrated capability-development framework that explains the sequential and complementary relationships among these organizational capabilities. Rather than viewing organizational culture, market orientation, organizational learning, and dynamic capabilities as independent determinants of performance, the proposed framework conceptualizes them as mutually reinforcing organizational capabilities that collectively support competitive performance. Specifically, organizational culture provides the foundational organizational context that encourages market-oriented behaviors and organizational learning, while market orientation and organizational learning contribute to the development of dynamic capabilities that enable organizations to sense opportunities, seize emerging possibilities, and reconfigure organizational resources in response to environmental change.

Accordingly, the principal theoretical contribution of this study lies not in introducing new constructs but in providing a more comprehensive explanation of the mechanisms through which established organizational capabilities interact to generate competitive performance. By integrating Dynamic Capabilities Theory with complementary insights from the Resource-Based View and organizational learning

literature, the proposed framework advances existing theory by identifying a coherent capability-development pathway that clarifies the antecedents of dynamic capabilities and explains how intangible organizational resources are progressively transformed into sustainable organizational outcomes. The framework further offers a set of theoretically grounded propositions that provide a foundation for future empirical research examining both the direct and indirect relationships among these organizational capabilities.

2. Conceptual Methodology

This conceptual paper develops an integrated theoretical framework by synthesizing established research on organizational culture, market orientation, organizational learning, dynamic capabilities, and competitive performance. Rather than testing hypotheses empirically, the study follows a theory-building approach that systematically identifies, evaluates, and integrates relevant literature to explain how these organizational capabilities collectively contribute to competitive performance. This approach is appropriate because the existing literature has largely examined these constructs separately, creating the need for an integrated conceptual explanation of their interrelationships.

2.1 Literature Identification and Selection

The literature was identified through structured searches of the Scopus and Web of Science Core Collection databases, which were selected because they index high-quality peer-reviewed journals in strategic management, organizational behavior, marketing, and management. Search focused primarily on publications related to organizational culture, market orientation, organizational learning, dynamic capabilities, competitive performance, organizational capabilities, strategic management, and capability development. Additional backward and forward citation searches were conducted to identify influential theoretical and foundational studies that have shaped the development of these research streams.

The review prioritized peer-reviewed journal articles and seminal theoretical contributions published in internationally recognized journals. Preference was given to studies that provided conceptual, theoretical, or empirical insights into one or more of the focal constructs or examined relationships among them. Publications with limited relevance to organizational capability development or competitive performance were excluded from further consideration.

2.2 Conceptual Synthesis and Theory Development

Following the literature selection process, the identified studies were analyzed through iterative comparison and thematic synthesis. The objective was not to summarize individual studies but to identify recurring theoretical mechanisms that explain how organizational capabilities develop and interact over time. Particular attention was given to recurring relationships involving organizational culture, market orientation, organizational learning, dynamic capabilities, and competitive performance.

The framework was developed through an abductive theory-building process in which evidence from multiple research streams was integrated using Dynamic Capabilities Theory as the primary theoretical lens while drawing complementary insights from the Resource-Based View and organizational learning literature. Through continuous comparison of existing theoretical arguments, common patterns, conceptual overlaps, and unresolved gaps were identified and synthesized into a coherent capability-development framework. Based on this synthesis, eight theoretically grounded propositions were formulated to explain the sequential and complementary relationships among the constructs and to provide a foundation for future empirical investigation.

3. Conceptual Framework Development

3.1 Organizational Culture and Market Orientation

Organizational culture reflects the shared values, beliefs, and behavioral norms that shape how employees think, communicate, and make decisions within an organization. It influences how people respond to challenges, interact with colleagues, and pursue organizational goals. As a result, culture plays an important role in shaping organizational capabilities and long-term strategic direction. Organizations characterized by adaptive, collaborative, learning-oriented, and customer-focused cultural values are generally more responsive to environmental changes than organizations dominated by rigid, hierarchical, or highly bureaucratic cultures. Accordingly, the present study does not assume that all forms of organizational culture contribute equally to performance; rather, it focuses specifically on cultural characteristics that encourage knowledge sharing, collaboration, adaptability, and continuous improvement. Such cultural characteristics create an environment where employees are encouraged to share ideas, work collectively, and contribute to continuous improvement initiatives.

Market orientation refers to an organization's commitment to understanding customer needs, monitoring competitors, and coordinating internal activities to deliver superior value. According to Narver and Slater (1990), market orientation consists of customer orientation, competitor orientation, and interfunctional coordination. Research suggests that market-oriented behaviors are strongly influenced by organizational culture rather than emerging independently. Organizations that encourage communication, teamwork, knowledge sharing, and customer responsiveness are more likely to develop effective market-oriented practices. In contrast, highly bureaucratic cultures may hinder responsiveness to market changes. Supporting this view, (Kohli & Jaworski, 1990) found that supportive organizational environments play a significant role in fostering market-oriented behaviors and strategic responsiveness.

Proposition 1: Organizational culture positively influences market orientation.

3.2 Organizational Culture and Organizational Learning

Organizational learning has become increasingly important as firms navigate technological change, market volatility, and growing competitive pressures (Park & Kim, 2018). The ability to acquire, share, interpret, and apply knowledge helps organizations respond more effectively to environmental challenges and identify new opportunities for growth. However, learning does not occur automatically. Its development depends heavily on the organizational environment and the values that guide employee behavior. Organizational culture plays a particularly important role because it influences how individuals communicate, collaborate, and exchange knowledge. Cultures that encourage openness, trust, and continuous improvement create conditions where employees feel comfortable sharing ideas, learning from experience, and contributing to organizational development.

The connection between organizational culture and organizational learning has been widely acknowledged in management research. Lis et al. (2014) argued that learning organizations cultivate cultures that support knowledge exchange, systems thinking, and continuous improvement, while Camps et al. (2016) emphasized that learning is fundamentally shaped by shared values and collective experiences. From a resource-based perspective, culture represents a valuable intangible asset that facilitates knowledge creation and organizational adaptation. Organizations that encourage participation, innovation, and collaboration tend to develop stronger learning capabilities and greater adaptability. Supporting this perspective, Jerez-Gomez et al. (2005) argued that organizational learning capability develops within organizational environments that encourage participation, knowledge sharing, experimentation, and continuous improvement, reinforcing the importance of supportive organizational cultures for long-term organizational adaptability. In this study, organizational learning refers specifically to the organizational processes through which knowledge is acquired, shared, interpreted, and applied. This concept

differs from learning orientation, which reflects an organization's strategic commitment to learning, knowledge management, which concerns the systems and practices used to organize and distribute knowledge, and absorptive capacity, which emphasizes the ability to recognize, assimilate, and exploit external knowledge. While these concepts are complementary, they represent distinct organizational phenomena and are therefore treated separately within the proposed framework.

Proposition 2: Organizational culture positively influences organizational learning.

3.3 Market Orientation and Organizational Learning

Market orientation and organizational learning are closely related capabilities that help organizations remain competitive in dynamic business environments. Market orientation enables firms to understand customer needs, monitor competitor activities, and identify changes in the external environment, while organizational learning allows them to interpret and apply that information effectively. Organizations that combine these capabilities are generally better equipped to adapt to changing market conditions and improve long-term performance. Simply collecting market information is not enough; firms must also develop the ability to transform that information into useful knowledge that supports decision-making, innovation, and strategic action. In this sense, market orientation provides the input, while organizational learning helps convert that input into organizational value.

Researchers have consistently suggested that market-oriented organizations naturally promote learning behaviors because they maintain continuous interaction with customers, competitors, and other stakeholders. Borazon et al. (2022) argued that market orientation creates conditions that encourage knowledge acquisition and learning, while Jaworski and Kohli (2017) highlighted the complementary nature of market orientation and learning orientation. Through regular exposure to market information, employees gain new insights and develop a deeper understanding of environmental changes. This process encourages knowledge sharing, experimentation, and organizational adaptation. Supporting this perspective, Anjum et al. (2012) found that organizational learning strengthens the positive influence of market orientation on performance outcomes (Mohamad et al., 2015). Consequently, organizations that effectively integrate market orientation with learning processes are more likely to enhance adaptability, innovation, and long-term competitiveness.

Importantly, the relationship between market orientation and organizational learning should not be viewed as automatic (Alegre & Chiva, 2013). Organizations may gather extensive market information yet fail to convert that information into meaningful organizational knowledge. Information can remain isolated within departments, be ignored by decision-makers, or fail to challenge existing assumptions and routines. Consequently, the value of market orientation depends not only on information acquisition but also on the organization's willingness and ability to learn from that information. Firms that successfully transform market intelligence into shared understanding are more likely to develop stronger learning capabilities and adapt effectively to changing market conditions.

Proposition 3: Market orientation positively influences organizational learning.

3.4 Organizational Learning and Dynamic Capabilities

Organizational learning and dynamic capabilities are closely related but conceptually distinct organizational capabilities. Organizational learning focuses on developing, sharing, interpreting, and applying organizational knowledge, whereas dynamic capabilities refer to the higher-order ability to integrate, renew, and reconfigure organizational resources and operational capabilities in response to environmental change (Migdadi, 2021; Stadtfeld & Gruchmann, 2024). According to Teece (2007), organizations must continuously sense opportunities, seize emerging possibilities, and transform resources to remain competitive. These activities depend heavily on learning processes that help organizations update their knowledge base, challenge existing assumptions, and develop a deeper understanding of changing market conditions.

The relationship between learning and dynamic capabilities has received considerable attention in strategic management research (Durman et al., 2025). Jerez-Gomez et al. (2005) argued that dynamic capabilities emerge through organizational learning mechanisms that improve routines and organizational processes over time, while Nugroho (2018) emphasized the role of learning and knowledge integration in supporting strategic adaptation. Organizations that actively learn from customers, competitors, and internal experiences are generally better positioned to recognize opportunities and respond effectively to environmental changes. By encouraging experimentation, reflection, and knowledge sharing, learning-oriented organizations strengthen their sensing, seizing, and reconfiguration capabilities. Consequently, organizational learning serves as an important foundation for the development of dynamic capabilities that support adaptability, innovation, and sustained competitive advantage (Shuen et al., 2014).

Proposition 4: Organizational learning positively influences dynamic capabilities.

3.5 Market Orientation and Dynamic Capabilities

Market orientation and dynamic capabilities are increasingly recognized as complementary drivers of organizational success in rapidly changing business environments (Ludwikowska & Tworek, 2022). Market-oriented organizations continuously gather information from customers, competitors, suppliers, and other stakeholders to better understand market developments and emerging opportunities. However, collecting information alone is not sufficient to achieve superior performance. Organizations must also possess the ability to interpret market signals, make informed strategic decisions, and adjust resources when circumstances change. Dynamic capabilities support this process by enabling firms to transform market intelligence into effective organizational actions (Wilden & Gudergan, 2015). Consequently, market orientation provides the external awareness necessary for adaptation, while dynamic capabilities help organizations convert that awareness into meaningful strategic responses (Matysiak et al., 2018).

The connection between market orientation and dynamic capabilities is well supported in the strategic management literature (Li et al., 2025; Manzoor et al., 2022). According to Teece (2007), dynamic capabilities involve sensing opportunities, seizing opportunities, and transforming organizational resources to maintain competitiveness. Market-oriented organizations are naturally better positioned to perform these activities because they continuously monitor customer needs and competitive conditions. This external focus helps firms identify opportunities earlier and respond more effectively to environmental changes. Therefore, market orientation should be viewed not only as a customer-focused strategic orientation but also as an information-generating capability that supports opportunity sensing, strategic responsiveness, and the subsequent development of dynamic capabilities (Teece, 2007; Wilden & Gudergan, 2015).

Although market orientation provides access to valuable external information, information alone does not create dynamic capabilities (Abu-Rumman et al., 2021). Organizations must possess mechanisms that allow market knowledge to influence strategic decisions and resource allocation. Firms that merely collect customer and competitor information without acting upon it may gain awareness of environmental changes but remain unable to respond effectively. Dynamic capabilities emerge when market intelligence is integrated into organizational processes and used to support adaptation, innovation, and resource reconfiguration. This distinction highlights why some organizations are more successful than others in converting market awareness into competitive advantage.

Proposition 5: Market orientation positively influences dynamic capabilities.

3.6 Dynamic Capabilities and Competitive Performance

Competitive performance remains a central objective for organizations seeking sustainable growth and long-term success. In today's dynamic business environment, however, superior performance depends on more than possessing valuable resources

or strong market positions (Ghasemi et al., 2016). Organizations must also be capable of adapting to changing circumstances and responding effectively to new opportunities and threats. This idea lies at the heart of Dynamic Capabilities Theory, which emphasizes an organization's ability to renew, reconfigure, and deploy resources as conditions evolve (Dobrovnik et al., 2025). Through activities such as sensing opportunities, seizing emerging possibilities, and transforming organizational processes, firms can maintain alignment with changing market demands and sustain their competitiveness over time (Teece, 2007).

In this study, competitive performance is conceptualized as a firm-level multidimensional organizational outcome that reflects an organization's ability to achieve superior results relative to competitors. Rather than representing a single financial indicator, competitive performance encompasses operational effectiveness, market responsiveness, innovation capability, and strategic success. Within the present conceptual framework, these dimensions collectively reflect overall competitive performance rather than functioning as independent outcome variables. Accordingly, competitive performance is treated as an overarching organizational construct representing the ultimate outcome of the proposed capability-development process.

A growing body of research suggests that dynamic capabilities contribute to multiple dimensions of organizational performance, including innovation, operational efficiency, customer responsiveness, and strategic resilience (Tripathi et al., 2025). Organizations that continually adapt their resources and capabilities are often better equipped to cope with uncertainty and capitalize on emerging opportunities. Ning and Yao (2023) argued that dynamic capabilities improve organizational effectiveness by enhancing flexibility and supporting strategic renewal. Similarly, Wilden and Gudergan (2015) demonstrated that dynamic capabilities enhance organizational performance by strengthening firms' ability to respond effectively to changing environmental conditions and market uncertainty. Together, these findings suggest that dynamic capabilities play a vital role in transforming organizational knowledge and resources into sustained competitive performance, particularly in environments characterized by rapid change and increasing complexity.

The performance benefits associated with dynamic capabilities may also vary across organizations (Bianchi et al., 2022). Possessing dynamic capabilities does not guarantee superior outcomes if organizations fail to deploy them effectively or align them with strategic objectives. In some cases, excessive adaptation may create instability, increase costs, or divert resources from core activities. Therefore, the value of dynamic capabilities depends not only on their existence but also on how effectively organizations apply them to support strategic goals and respond to environmental demands.

Proposition 6: Dynamic capabilities positively influence competitive performance.

3.7 Organizational Learning and Competitive Performance

Organizational learning has long been recognized as an important driver of organizational adaptability and performance (Jerez-Gomez et al., 2005; Mohammadi et al., 2016). In today's knowledge-based economy, organizations that effectively acquire, share, and apply knowledge are generally better positioned to respond to changing market conditions and maintain competitiveness. Learning enables firms to transform experiences into valuable organizational assets, helping them improve existing practices, develop innovative solutions, and respond more effectively to emerging challenges. Unlike many tangible resources that decline in value over time, knowledge often becomes more valuable when it is shared and integrated throughout the organization. As a result, learning capabilities have become increasingly important for sustaining organizational success in dynamic business environments.

The positive influence of organizational learning on performance is well established in the management literature. Huber and McDaniel (1986) argued that learning helps organizations improve decision-making by modifying behaviors based

on experience, while Huber and McDaniel (1986) emphasized the importance of knowledge acquisition and information processing in enhancing organizational effectiveness. Learning contributes to performance by improving managerial decisions, encouraging innovation, and strengthening organizational adaptability. Organizations that continuously learn from successes and failures are often more resilient and better prepared to respond to uncertainty. By promoting knowledge sharing, employee development, and continuous improvement, organizations can strengthen innovation capabilities, improve operational effectiveness, and achieve higher levels of competitive performance over the long term.

Proposition 7: Organizational learning positively influences competitive performance.

Proposition 8: Proposition 8: Organizational culture contributes to competitive performance through complementary capability-development pathways involving market orientation, organizational learning, and dynamic capabilities, with both sequential and direct relationships jointly supporting competitive performance.

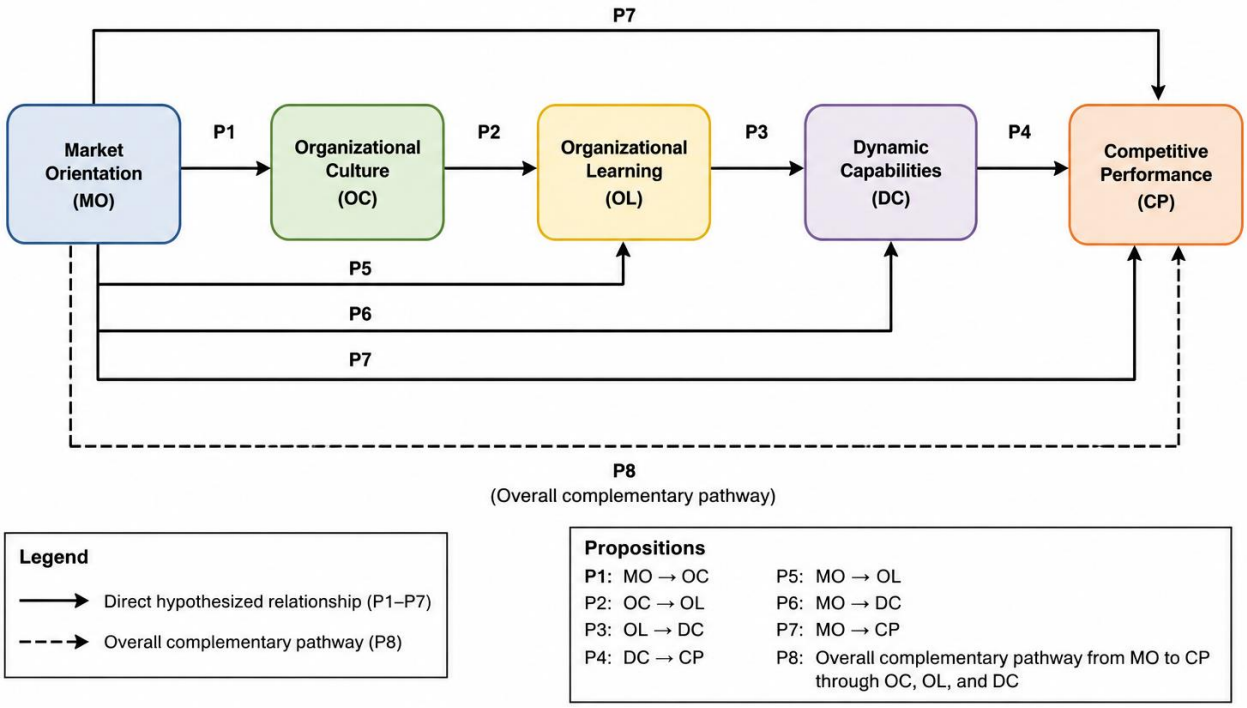
3.8 Integrated Framework

Rather than viewing organizational success as the result of one capability alone, the framework suggests that competitive performance emerges through a series of interconnected organizational processes that collectively enhance adaptability, responsiveness, and long-term effectiveness (Wilden & Gudergan, 2015). Although these constructs have been widely discussed in the management literature, they are often investigated separately or through isolated relationships. Consequently, our understanding of how organizations transform intangible resources into sustainable performance outcomes remains fragmented. To address this gap, the present study proposes an integrated framework that links these constructs within a single developmental pathway. Rather than viewing organizational success as the result of one capability alone, viewed through the lens of Dynamic Capabilities Theory, the framework explains how organizational culture initiates a capability-building process that supports sensing, seizing, and transforming activities, ultimately leading to superior competitive performance. Viewed through the complementary perspectives of the Resource-Based View, organizational learning theory, and Dynamic Capabilities Theory, the proposed framework explains how strategic organizational resources are progressively transformed into higher-order organizational capabilities that support sustainable competitive performance (Larabi, 2025).

The proposed framework positions organizational culture as the foundation upon which other organizational capabilities are built. A supportive culture encourages market-oriented behaviors, facilitates knowledge sharing, and promotes continuous learning throughout the organization. Market orientation provides access to valuable external information regarding customer needs and competitive conditions, while organizational learning enables firms to convert that information into actionable knowledge (García-Morales et al., 2012). Over time, these processes contribute to the development of dynamic capabilities that allow organizations to sense opportunities, respond to environmental changes, and reconfigure resources effectively (Awwad et al., 2022). Through this sequence, firms become better equipped to improve operational effectiveness, strengthen innovation, and achieve superior competitive performance in increasingly dynamic business environments.

Figure 1. Proposed conceptual framework illustrating the sequential development of organizational capabilities from organizational culture to competitive performance. The framework further acknowledges that environmental turbulence may influence the effectiveness of market orientation, organizational learning, and dynamic capabilities in shaping organizational outcomes. Although environmental turbulence is recognized as an important contextual influence within Dynamic Capabilities Theory, it is intentionally treated as an external boundary condition rather than an explicit component of the present conceptual framework. This decision allows the study to maintain its primary focus on capability development while providing a foundation for future empirical research examining the moderating role of environmental turbulence.

Figure 1. Proposed Conceptual Framework



Note: P8 represents the overall mediated effect of Organizational Culture on Competitive Performance through Market Orientation, Organizational Learning, and Dynamic Capabilities

Although the framework emphasizes a progressive capability-development sequence, it does not assume that all organizational effects occur exclusively through sequential mediation. The proposed model incorporates both sequential and direct relationships that are theoretically supported in the literature. Consequently, market orientation, organizational learning, and dynamic capabilities function as complementary organizational capabilities that jointly transmit the influence of organizational culture on competitive performance through multiple interconnected pathways.

The integrated framework extends existing literature by demonstrating that competitive performance is not the result of a single organizational capability. Rather, it emerges through a sequence of interconnected organizational processes that collectively enhance organizational adaptability and effectiveness. For clarity, Table 2 summarizes the propositions developed throughout the conceptual framework together with their primary theoretical foundations.

Table 2. Summary of propositions and supporting theoretical foundations.

Proposition	Relationship	Key Supporting Literature
P1	Organizational Culture → Market Orientation	(Jaworski & Kohli, 1993; Kohli & Jaworski, 1990)
P2	Organizational Culture → Organizational Learning	(Camps et al., 2016; Lis et al., 2014)
P3	Market Orientation → Organizational Learning	(Borazon et al., 2022; Jaworski & Kohli, 2017)
P4	Organizational Learning → Dynamic Capabilities	(Jerez-Gomez et al., 2005; Teece, 2007)
P5	Market Orientation → Dynamic Capabilities	(Ahmadimousaabad et al., 2013; Teece, 2007)
P6	Dynamic Capabilities → Competitive Performance	(Ning & Yao, 2023; Wilden & Gudergan, 2015)

P7	Organizational Learning → Competitive Performance	(Huber & McDaniel, 1986); Huber (1991)
P8	Sequential capability development pathway	Authors' conceptual integration

4. Discussion and Implications

The purpose of this paper was to develop an integrated framework linking organizational culture, market orientation, organizational learning, dynamic capabilities, and competitive performance. Although previous studies have examined these constructs individually or through isolated relationships, limited attention has been devoted to understanding how they collectively contribute to organizational success. The proposed framework addresses this gap by illustrating how organizational culture serves as a foundational resource that facilitates market-oriented behaviors, supports learning processes, and ultimately contributes to the development of dynamic capabilities that enhance competitive performance.

4.1 Theoretical Implications

This paper offers several theoretical contributions to the strategic management and organizational behavior literature. First, it integrates four important research streams that have often evolved independently. More specifically, the framework integrates three complementary theoretical perspectives. The Resource-Based View explains why organizational culture constitutes a valuable strategic resource, organizational learning theory explains how organizations acquire and develop knowledge-based capabilities, and Dynamic Capabilities Theory explains how these capabilities are mobilized to sense opportunities, seize strategic opportunities, and transform organizational resources. By combining these perspectives, the framework provides a more comprehensive theoretical explanation of organizational capability development than any individual perspective alone. While organizational culture, market orientation, organizational learning, and dynamic capabilities have each received substantial scholarly attention, studies frequently examine these constructs in separate contexts. By bringing these research streams together within a single framework, this paper extends existing theory by providing a more integrated explanation of how organizations transform intangible organizational resources into competitive performance through interconnected capability-development processes.

Second, the framework extends Dynamic Capabilities Theory by identifying organizational culture as an important antecedent of capability development (Sharma et al., 2025). The framework also distinguishes organizational learning from dynamic capabilities by positioning learning as an antecedent capability that generates and refines organizational knowledge, while dynamic capabilities represent the higher-order processes through which that knowledge is mobilized to sense opportunities, seize emerging possibilities, and transform organizational resources. Existing research often focuses on the role of dynamic capabilities in achieving competitive advantage but provides less explanation regarding the organizational conditions that facilitate their emergence. The proposed model suggests that dynamic capabilities do not develop in isolation (Schilke, 2014). Instead, they evolve through organizational cultures that support market awareness and continuous learning. This perspective contributes to a deeper understanding of capability formation and organizational adaptation.

Third, the framework highlights the mediating roles of market orientation and organizational learning in translating organizational culture into performance outcomes. Prior studies have frequently examined direct relationships between culture and performance. However, organizational outcomes are often produced through intermediate organizational processes rather than direct effects alone. The proposed framework therefore provides a more nuanced explanation of how cultural values influence organizational effectiveness through a sequence of interconnected capabilities.

Finally, the framework contributes to the growing literature on organizational competitiveness by emphasizing the cumulative nature of capability development.

Competitive performance is presented not as the outcome of a single organizational resource but as the result of multiple reinforcing processes that collectively enhance organizational adaptability, responsiveness, and strategic effectiveness. The framework also highlights the importance of considering environmental conditions when examining organizational capabilities and performance relationships. While the proposed model presents a general capability development pathway, its effectiveness may vary depending on the level of environmental turbulence faced by organizations. Recognizing such contextual influences extends the applicability of the framework and provides opportunities for future theory development and empirical validation.

Although the proposed propositions describe the primary capability-development relationships identified in the existing literature, the present framework does not assume that these relationships operate uniformly across all organizational contexts. Their strength and direction may vary according to factors such as environmental turbulence, digital maturity, organizational size, industry characteristics, and competitive intensity. Consequently, the framework provides a foundational theoretical explanation that future empirical studies can extend by examining boundary conditions, moderating influences, nonlinear relationships, and threshold effects.

An important contribution of this paper is its emphasis on capability development as a sequential organizational process rather than a collection of independent organizational attributes. The framework suggests that competitive performance emerges through the progressive interaction of organizational culture, market orientation, organizational learning, and dynamic capabilities (Girod & Whittington, 2017). By highlighting this developmental pathway, the study provides a more integrated explanation of how intangible organizational resources are transformed into sustainable organizational outcomes. The major theoretical contributions of the proposed framework relative to existing literature are summarized in Table 3.

Table 3. Theoretical Contributions of the Proposed Framework

Existing Literature	**Limitation**	**Contribution of This Study**
Organizational Culture	Often linked directly to performance	Identifies culture as capability foundation
Market Orientation	Usually examined independently	Positions MO within capability development sequence
Organizational Learning	Studied as isolated capability	Connects learning to dynamic capability formation
Dynamic Capabilities	Focuses on outcomes	Explains antecedent capability-building process
Competitive Performance	Often treated as direct outcome	Explains sequential pathway to performance

4.2 Managerial Implications

The proposed framework also offers several practical implications for managers and organizational leaders. First, the framework suggests that efforts to improve organizational performance should begin with organizational culture. Leaders often focus on operational improvements, technological investments, or strategic initiatives while overlooking the cultural foundations that support these activities. Developing a culture characterized by openness, collaboration, customer focus, and continuous improvement can create conditions that facilitate capability development throughout the organization.

Second, managers should recognize the importance of market orientation as a source of organizational learning and strategic adaptation. Organizations that systematically gather and disseminate market intelligence are better positioned to identify emerging opportunities and respond effectively to changing customer needs. Encouraging employees to engage with customers, monitor competitors, and share

market knowledge can strengthen organizational responsiveness and improve decision-making.

Third, organizations should invest in learning mechanisms that support knowledge acquisition, knowledge sharing, and organizational development. Training programs, cross-functional collaboration, knowledge management systems, and continuous improvement initiatives can help organizations develop stronger learning capabilities. These investments not only enhance employee competencies but also contribute to organizational adaptability and innovation.

Finally, managers should view dynamic capabilities as strategic assets that require continual development. The ability to sense environmental changes, seize opportunities, and reconfigure resources is increasingly important in volatile business environments. Organizations that successfully integrate culture, market orientation, and learning processes are more likely to develop the adaptive capabilities necessary to sustain competitive performance over time.

Collectively, these implications suggest that sustainable organizational success depends on the effective alignment of cultural values, market awareness, learning processes, and adaptive capabilities. Organizations that manage these elements as an integrated system are likely to achieve stronger and more enduring performance outcomes than those that address them independently.

5. Future Research Directions

Although the proposed framework offers a comprehensive perspective on the relationships among organizational culture, market orientation, organizational learning, dynamic capabilities, and competitive performance, several opportunities exist for future research. First, empirical studies are needed to validate the proposed relationships and propositions. Researchers may employ survey-based methodologies, longitudinal research designs, or mixed-method approaches to examine the strength and direction of the proposed relationships across different organizational contexts.

Second, future research should examine the boundary conditions under which the proposed relationships operate. Although the present framework advances a general capability-development pathway, the magnitude and direction of individual relationships may differ according to environmental turbulence, digital maturity, organizational size, industry characteristics, competitive intensity, and institutional conditions. Future studies may also investigate nonlinear relationships, threshold effects, interaction effects, and alternative mediation structures that could further refine and extend the theoretical propositions developed in this study. In particular, environmental turbulence represents a theoretically important moderator that may strengthen or weaken the influence of dynamic capabilities on competitive performance and therefore warrants explicit empirical examination.

Third, future research could examine the framework in different cultural and geographical contexts. Organizational culture and learning practices may vary significantly across countries and industries, potentially affecting the development of market orientation and dynamic capabilities. Comparative studies involving organizations from developed and emerging economies could provide valuable insights into the generalizability of the proposed model.

Fourth, researchers may explore additional outcomes beyond competitive performance. Variables such as organizational resilience, innovation performance, sustainability performance, employee engagement, and success of digital transformation may further enrich understanding of the value generated through the interaction of these organizational capabilities.

Finally, future studies may investigate alternative pathways and reciprocal relationships among the constructs. While the present framework proposes a sequential process, organizational capabilities often evolve simultaneously and influence one another over time. Longitudinal studies would be particularly valuable in capturing the dynamic nature of these relationships and enhancing understanding of capability development processes.

Future research may also explore the applicability of the proposed framework within contemporary organizational contexts shaped by digital transformation and artificial intelligence. As organizations increasingly rely on digital technologies to support decision-making, customer engagement, and knowledge management, the relationships among organizational culture, market orientation, organizational learning, and dynamic capabilities may evolve in important ways. Researchers could examine whether digitally mature organizations develop these capabilities more effectively than less technologically advanced firms and whether artificial intelligence enhances or alters the capability development process proposed in this study.

Additional research could investigate the framework across different organizational settings, including small and medium-sized enterprises, large multinational corporations, public-sector organizations, and firms operating in emerging economies. Resource availability, organizational structure, and institutional conditions may influence how capabilities develop and contribute to competitive performance. Comparative studies across industries and countries would provide valuable insights into the robustness and generalizability of the proposed framework.

By addressing these research opportunities, future studies can strengthen the empirical foundation of the proposed framework and advance knowledge regarding the mechanisms through which organizations achieve and sustain superior performance in dynamic business environments.

6. Conclusion

Organizations operating in today's competitive and rapidly evolving business environment face increasing pressure to develop capabilities that support long-term success. While previous research has established the importance of organizational culture, market orientation, organizational learning, and dynamic capabilities, these constructs have often been examined independently (Albannai et al., 2025; Ambrosini & Bowman, 2009). This paper addressed this limitation by proposing an integrated conceptual framework that explains how these organizational resources and capabilities collectively contribute to competitive performance.

The proposed framework positions organizational culture as the foundational organizational resource that shapes market-oriented behaviors and learning processes. These capabilities, in turn, facilitate the development of dynamic capabilities that enable organizations to sense opportunities, seize emerging possibilities, and reconfigure resources in response to environmental change. Through this sequential process, organizations become better equipped to enhance adaptability, strengthen competitiveness, and achieve superior performance outcomes. Throughout this study, competitive performance is considered at the firm level, representing the overall competitive outcomes generated through the interaction of organizational capabilities rather than isolated functional or departmental performance measures.

The paper contributes to literature in several ways. First, it integrates multiple theoretical perspectives into a unified framework that provides an integrated theoretical explanation of organizational performance. Second, it extends Dynamic Capabilities Theory by highlighting the roles of organizational culture, market orientation, and organizational learning as important antecedents of capability development. Third, it offers a set of theoretically grounded propositions that can guide future empirical research.

From a managerial perspective, the framework emphasizes that sustainable performance is unlikely to result from isolated initiatives or individual capabilities. Instead, organizations should adopt a holistic approach that aligns cultural values, market awareness, learning processes, and adaptive capabilities. Managers who successfully develop and integrate these elements are more likely to create organizations capable of responding effectively to environmental challenges and maintaining long-term competitiveness.

In conclusion, competitive performance is not merely the outcome of possessing valuable resources but rather the result of an organization's ability to continuously learn, adapt, and transform those resources into strategic advantages. The framework presented in this paper provides a foundation for future research and offers practical insights for organizations seeking to enhance performance in increasingly dynamic and uncertain business environments.

References

1. Abu-Rumman, A., Al Shraah, A., Al-Madi, F., & Alfalah, T. (2021). Entrepreneurial networks, entrepreneurial orientation, and performance of small and medium enterprises: are dynamic capabilities the missing link? *Journal of Innovation and Entrepreneurship*, *10*(1), 29.
2. Ahmadimousaabad, A., Bajuri, N., Jahanzeb, A., Karami, M., & Rehman, S. (2013). Trade-off theory, pecking order theory and market timing theory: a comprehensive review of capital structure theories. *International Journal of Management and Commerce Innovations*, *1*(1), 11-18.
3. Albannai, N. A., Raziq, M. M., Malik, M., Scott-Kennel, J., & Igoe, J. (2025). Unraveling the role of digital leadership in developing digital dynamic capabilities for the digital transformation of firms. *Benchmarking: An International Journal*, *32*(6), 2250-2275.
4. Alegre, J., & Chiva, R. (2013). Linking entrepreneurial orientation and firm performance: The role of organizational learning capability and innovation performance. *Journal of small business management*, *51*(4), 491-507.
5. Ambrosini, V., & Bowman, C. (2009). What are dynamic capabilities and are they a useful construct in strategic management? *International Journal of Management Reviews*, *11*(1), 29-49.
6. Anjum, M. J., Ali, S. M., Sadiq, M., Karami, M., & Khan, S. (2012). Exploring the nexus: management practices, innovation and firm performance. *World Applied Sciences Journal*, *19*(6), 785-794.
7. Awwad, A. S., Ababneh, O. M. A., & Karasneh, M. (2022). The mediating impact of IT capabilities on the association between dynamic capabilities and organizational agility: the case of the Jordanian IT sector. *Global Journal of Flexible Systems Management*, *23*(3), 315-330.
8. Bianchi, G., Testa, F., Tessitore, S., & Iraldo, F. (2022). How to embed environmental sustainability: The role of dynamic capabilities and managerial approaches in a life cycle management perspective. *Business Strategy and the Environment*, *31*(1), 312-325.
9. Borazon, E. Q., Huang, Y.-C., & Liu, J.-M. (2022). Green market orientation and organizational performance in Taiwan's electric and electronic industry: the mediating role of green supply chain management capability. *Journal of Business & Industrial Marketing*, *37*(7), 1475-1496.
10. Camps, J., Oltra, V., Aldás-Manzano, J., Buenaventura-Vera, G., & Torres-Carballo, F. (2016). Individual performance in turbulent environments: The role of organizational learning capability and employee flexibility. *Human resource management*, *55*(3), 363-383.
11. Carpenter, G. S. (2017). Market orientation: reflections on field-based, discovery-oriented research. *AMS Review*, *7*(1), 13-19.
12. Cordero Paez, L. C., Pinho, J. C., & Prange, C. (2022). Dynamic capabilities configurations: the firm lifecycle and the interplay of DC dimensions. *International Journal of Entrepreneurial Behavior & Research*, *28*(4), 910-934.
13. Corrales-Estrada, A. M., Gómez-Santos, L. L., Bernal-Torres, C. A., Rodriguez-López, J. E., & Sandoval-Reyes, J. (2025). Dynamic capabilities contribution to organizational performance: the mediator role of business continuity ordinary capabilities. *Cogent Business & Management*, *12*(1), 2493315.
14. Dobrovnik, M., Herold, D. M., & Kummer, S. (2025). Exploring supply chain managers' complex perceptions of dynamic capabilities for digital transformation. *Digital Business*, *5*(1), 100098.
15. Durman, S., Iyiola, K., Alzubi, A. B., & Aljuhmani, H. Y. (2025). Dynamic capabilities in action: digital capability, business model innovation and absorptive capacity. *Management Decision*, 1-36.
16. Ekmekcioglu, E. B., & Öner, K. (2024). Servant leadership, innovative work behavior and innovative organizational culture: the mediating role of perceived organizational support. *European Journal of Management and Business Economics*, *33*(3), 272-288.
17. El Baz, J., & Ruel, S. (2024). Achieving social performance through digitalization and supply chain resilience in the COVID-19 disruption era: An empirical examination based on a stakeholder dynamic capabilities view. *Technological Forecasting and Social Change*, *201*, 123209.
18. García-Morales, V. J., Jiménez-Barrionuevo, M. M., & Gutiérrez-Gutiérrez, L. (2012). Transformational leadership influence on organizational performance through organizational learning and innovation. *Journal of business research*, *65*(7), 1040-1050.

19. Ghasemi, R., Azmi Mohamad, N., Karami, M., Hafiz Bajuri, N., & Asgharizade, E. (2016). The mediating effect of management accounting system on the relationship between competition and managerial performance. *International Journal of Accounting and Information Management*, *24*(3), 272-295.
20. Girod, S. J., & Whittington, R. (2017). Reconfiguration, restructuring and firm performance: Dynamic capabilities and environmental dynamism. *Strategic management journal*, *38*(5), 1121-1133.
21. Grego, M., Bartosiak, M., Palese, B., Piccoli, G., & Denicolai, S. (2025). Disentangling the 'digital': A critical review of information technology capabilities, information technology–enabled capabilities and digital capabilities in business research. *International Journal of Management Reviews*, *27*(2), 238-260.
22. Huber, G. P., & McDaniel, R. R. (1986). The decision-making paradigm of organizational design. *Management science*, *32*(5), 572-589.
23. Jaworski, B. J., & Kohli, A. K. (1993). Market orientation: antecedents and consequences. *Journal of marketing*, *57*(3), 53-70.
24. Jaworski, B. J., & Kohli, A. K. (2017). Conducting field-based, discovery-oriented research: Lessons from our market orientation research experience. *AMS Review*, *7*(1), 4-12.
25. Jerez-Gomez, P., Céspedes-Lorente, J., & Valle-Cabrera, R. (2005). Organizational learning capability: a proposal of measurement. *Journal of business research*, *58*(6), 715-725.
26. Johnson, T., Newman, M., & Shamroukh, S. (2025). Perceptions of organizational culture among non-patient-facing health system employees. *Journal of Health Organization and Management*, *39*(9), 96-123.
27. Karami, M. (2026). Digital Readiness and Market Orientation as Drivers of Sustainable Supply Chain Performance: A Dynamic Capability Perspective.
28. Karami, M., Hozhabri, A. A., Ghasemi, R., & Bakar, A. H. A. (2016). Market orientation and performance relationship with respect to the manufacturing industry. *International Journal of Business Performance and Supply Chain Modelling*, *8*(4), 348-370.
29. Kohli, A. K., & Jaworski, B. J. (1990). Market orientation: the construct, research propositions, and managerial implications. *Journal of marketing*, *54*(2), 1-18.
30. Larabi, C. (2025). Linking Innovation Capability, Strategic Orientation, and Strategic Renewal to Sustainable Performance: A Dynamic Capabilities Perspective in Saudi Small and Medium Enterprises. *Business Strategy and the Environment*.
31. Li, B., Teece, D. J., Baskaran, A., & Chandran, V. (2025). Dynamic Knowledge Management: A dynamic capabilities approach to knowledge management. *Technovation*, *147*, 103316.
32. Linde, L., Sjödin, D., Parida, V., & Wincent, J. (2021). Dynamic capabilities for ecosystem orchestration A capability-based framework for smart city innovation initiatives. *Technological Forecasting and Social Change*, *166*, 120614.
33. Lis, A., Glińska-Neweś, A., & Kalińska, M. (2014). The role of leadership in shaping interpersonal relationships in the context of positive organizational potential. *Journal of Positive Management*, *5*(4), 28-49.
34. Ludwikowska, K., & Tworek, K. (2022). Dynamic capabilities of IT as a factor shaping servant leadership influence on organizational performance. *Procedia Computer Science*, *207*, 34-43.
35. Majhi, S. G., Mukherjee, A., & Anand, A. (2023). Business value of cognitive analytics technology: a dynamic capabilities perspective. *VINE Journal of Information and Knowledge Management Systems*, *53*(6), 1231-1249.
36. Manzoor, U., Baig, S. A., Hashim, M., Sami, A., Rehman, H.-U., & Sajjad, I. (2022). The effect of supply chain agility and lean practices on operational performance: a resource-based view and dynamic capabilities perspective. *The TQM Journal*, *34*(5), 1273-1297.
37. Masa'deh, R. e., Al-Henzab, J., Tarhini, A., & Obeidat, B. Y. (2018). The associations among market orientation, technology orientation, entrepreneurial orientation and organizational performance. *Benchmarking: An International Journal*, *25*(8), 3117-3142.
38. Matysiak, L., Rugman, A. M., & Bausch, A. (2018). Dynamic capabilities of multinational enterprises: the dominant logics behind sensing, seizing, and transforming matter! *Management International Review*, *58*(2), 225-250.
39. Migdadi, M. M. (2021). Organizational learning capability, innovation and organizational performance. *European Journal of Innovation Management*, *24*(1), 151-172.
40. Mobarakabadi, H., & Karami, M. (2014). Investigation of relationship among the organizational culture and creativity. *Research Journal of Applied Sciences, Engineering and Technology*, *7*(19), 4069-4071.
41. Mohamad, N. A., Karami, M., Bajuri, N. H., & Asgharizade, E. (2015). The relationship among strategy, competition and management accounting systems on organizational performance. *European Online Journal of Natural and Social Sciences*, *4*(3), pp. 565-581.
42. Mohammadi, M. A. D., Khan, M. N. A. A., Karami, M., & Sadatifar, S. R. (2016). Perceived Organizational Support and Perceived Organizational Performance Mediated by Corporate Entrepreneurship. *Sains Humanika*, *8*(1).

43. Ning, L., & Yao, D. (2023). The impact of digital transformation on supply chain capabilities and supply chain competitive performance. *Sustainability*, *15*(13), 10107.
44. Nugroho, M. A. (2018). The effects of collaborative cultures and knowledge sharing on organizational learning. *Journal of Organizational Change Management*, *31*(5), 1138-1152.
45. Park, S., & Kim, E.-J. (2018). Fostering organizational learning through leadership and knowledge sharing. *Journal of Knowledge Management*, *22*(6), 1408-1423.
46. Pitelis, C. N., Teece, D. J., & Yang, H. (2024). Dynamic capabilities and MNE global strategy: A systematic literature review-based novel conceptual framework. *Journal of Management Studies*, *61*(7), 3295-3326.
47. Rakthin, S., Calantone, R. J., & Wang, J. F. (2016). Managing market intelligence: The comparative role of absorptive capacity and market orientation. *Journal of business research*, *69*(12), 5569-5577.
48. Schilke, O. (2014). On the contingent value of dynamic capabilities for competitive advantage: The nonlinear moderating effect of environmental dynamism. *Strategic management journal*, *35*(2), 179-203.
49. Sharma, M., Vadalkar, S., Singh, A., & Tsagarakis, K. P. (2025). Navigating smart practices through dynamic capabilities for sustainable performance: A mixed-method approach. *Computers & Industrial Engineering*, 111215.
50. Shuen, A., Feiler, P. F., & Teece, D. J. (2014). Dynamic capabilities in the upstream oil and gas sector: Managing next generation competition. *Energy Strategy Reviews*, *3*, 5-13.
51. Sita Nirmala Kumaraswamy, K., & Chitale, C. (2012). Collaborative knowledge sharing strategy to enhance organizational learning. *Journal of Management Development*, *31*(3), 308-322.
52. Stadtfeld, G. M., & Gruchmann, T. (2024). Dynamic capabilities for supply chain resilience: a meta-review. *The International Journal of Logistics Management*, *35*(2), 623-648.
53. Teece, D. J. (2007). Explicating dynamic capabilities: the nature and microfoundations of (sustainable) enterprise performance. *Strategic management journal*, *28*(13), 1319-1350.
54. Teece, D. J., Pisano, G., & Shuen, A. (1997). Dynamic capabilities and strategic management. *Strategic management journal*, *18*(7), 509-533.
55. Tripathi, S., Bachmann, N., Brunner, M., & Jodlbauer, H. (2025). Harnessing dynamic capabilities for data-driven business model innovation in incumbents. *Digital Business*, *5*(2), 100124.
56. Varadarajan, R. (2017). Research on market orientation: Some lessons shared and issues discussed in a doctoral seminar. *AMS Review*, *7*(1), 26-35.
57. Verbeke, W., Volgering, M., & Hessels, M. (1998). Exploring the conceptual expansion within the field of organizational behaviour: Organizational climate and organizational culture. *Journal of Management Studies*, *35*(3), 303-329.
58. Wilden, R., & Gudergan, S. P. (2015). The impact of dynamic capabilities on operational marketing and technological capabilities: investigating the role of environmental turbulence. *Journal of the academy of marketing science*, *43*(2), 181-199.
59. Zada, M., Khan, S., Zada, S., & Dhar, B. K. (2025). Driving sustainable development through CSR leadership: Insights into organizational learning and technological innovation. *Sustainable Development*, *33*(3), 4060-4074.

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Does FinTech Promote or Hinder Climate Action? Evidence from Asian Countries[1]

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Abstract: This study examines the effects of FinTech (FIN), institutional quality (IQ), and renewable energy consumption (REC) on climate action (SDG13) in five major Asian economies (China, India, Indonesia, South Korea, and Japan) over the period 2012–2024. Given the growing role of digital finance in sustainable development, the study investigates whether FinTech acts as a driver or a barrier to climate action. The empirical analysis employs the Augmented Mean Group (AMG) estimator, and the findings are validated using the Common Correlated Effects Mean Group (CCEMG) estimator. The results reveal that the impact of FIN on SDG13 is heterogeneous across countries. FIN significantly hinders progress toward SDG13 in China and India, while it promotes SDG13 in South Korea and Japan. No significant effect is found for Indonesia. In contrast, REC consistently enhances climate action across all countries. IQ also exerts a positive and significant effect in all countries except Japan. Overall, the findings suggest that FIN alone is insufficient to advance climate action, its environmental benefits depend on the quality of institutions and the transition toward renewable energy.

Keywords: FinTech; Climate Action; SDG13; Sustainability; AMG; CCEMG

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1. Introduction

In recent years, concerns about climate change have increased significantly both within the scientific community and on the international policy agenda. The ever-increasing levels of greenhouse gas (GHG) emissions compared to pre-industrial levels are making the goal of keeping the temperature rise within the 1.5–2 °C range an increasingly difficult task with each passing year. This scenario has raised concerns regarding "Climate Action" –which 13th Goal of the United Nations Sustainable Development Goals – and moved climate change to the forefront of the global environmental policy agenda [1]. Nowadays, indeed, the destructive effects of climate change are regarded not only as an environmental problem, but also as a significant risk factor affecting multiple factors such as food security, public health, migration and economic instability concurrently [2]. Hence, the multidimensional structure and cascading effects of this phenomenon require a holistic and rigorous approach to assessing all mechanisms and policies that could promote climate action at both academic and institutional levels. At this point, the rapid development of financial technologies is gaining greater attention due to its potential to reshape financial systems and accelerate sustainability-focused efforts.

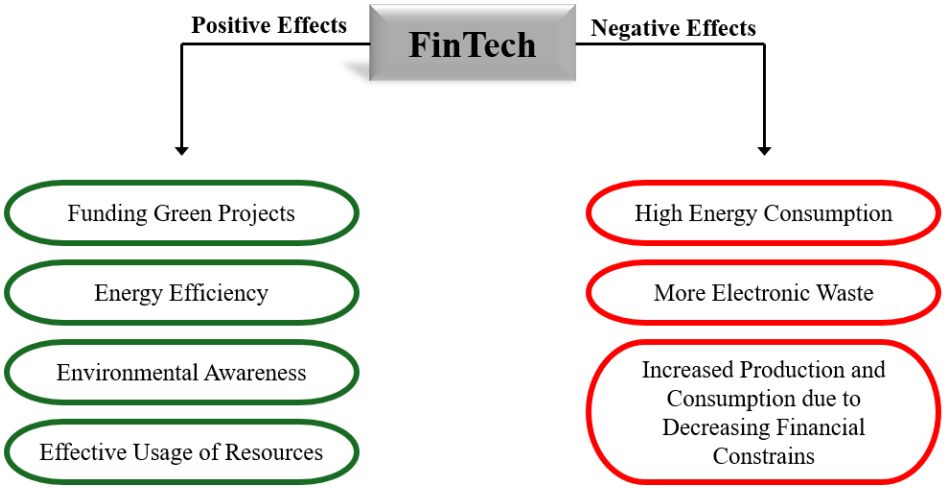
Over the past decade, financial technology (hereafter FinTech), which has emerged at the intersection of finance and digital technology, has become a key component of sustainability discussions. Within the wave of digitalization ushered in by the Fourth Industrial Revolution, FinTech is reshaping the way financial services are offered and has become a powerful instrument that facilitates financial inclusion, decreases transaction costs, and redirects capital towards green investments via mobile banking, digital payment systems, online investment platforms, and blockchain-

[1] This study is derived from the PhD thesis titled "FinTech Adaptasyonunun Sürdürülebilir Kalkınma Hedeflerine Etkisi: Kıtalararası Bir Analiz", written by Serkan ERYILMAZ under the supervision of Prof. Dr. Feyyaz ZEREN at the Department of International Trade and Finance, Graduate School of Yalova University.

based solutions [3]. The growing literature in this field indicates that FinTech contributes to environmental quality through several channels. One of them is the expansion of access to green financing instruments through digital platforms. This means that green bond issuances and online investment platforms can reach small-scale investors who were previously outside the reach of the traditional banking system, enabling these investors to channel their funds into sustainable projects [4]. Second, big data analytics and artificial intelligence tools contribute to the tracking and reporting of environmental risks. These technologies enable institutions and regulators to monitor indicators such as carbon footprint and natural resource utilization more transparently and to design appropriate action plans accordingly [5]. Third, FinTech increases efficiency in the allocation of green funds by reducing information asymmetry and accelerating access to financing for low-carbon projects [6]. These channels illustrate that FinTech can influence environmental quality not only through indirect effects but also directly through financing, monitoring, and information management mechanisms. Despite this promising background, the environmental impacts of FinTech are still controversial. Whether the development of FinTech will ultimately reinforce efforts to mitigate the effects of climate change, or whether it will generate undesirable environmental costs, is an empirical question that requires additional investigation.

The potential positive and negative impacts of FinTech on the environment are illustrated in Figure 1.

Figure 1. The Potential Impacts of FinTech on Environment



Source: Uzar et al. (2026) [12]

The current literature focusing on FinTech and its environmental effects includes evidence that these effects are usually favorable. For instance, [7] found that green FinTech practices promote green investments and optimize resource allocation, thereby improving carbon emission efficiency. Similarly, [8] claims that the adoption of FinTech supports environmental performance of corporations and that this effect is further increased by green finance practices. However, the literature also includes findings indicating that the impact of FinTech on the environment is neither linear nor time-invariant. In this line, [9] suggest that the proliferation of digital payment systems in developing Asian countries could lead to higher CO_2 emissions due to increased energy consumption linked to digital infrastructure. Similarly, [10] points out that electricity consumption is rising sharply due to the increase in Bitcoin mining and that this increase could lead to serious environmental degradation in countries where the energy supply relies heavily on fossil fuels. Furthermore, [11] states that there are serious concerns that rising consumer spending—driven by FinTech's role in increasing financial inclusion and alleviating resource constraints—could lead to serious environmental problems. In total, these contradictory findings demonstrate that the relationship between FinTech and the environment is not linear or there is no one-size-fits-all model, but rather changes based on a country's development level and its financial and energy infrastructure.

The potential that FinTech offers in terms of environmental sustainability is particularly significant for the Asian region, which is home to more than half of the world's population and is a major GHG emitter [13]. On the one hand, fossil fuel consumption in this region is quite high and has increased dramatically over the past few decades. Even in terms of global coal consumption alone, Asia accounts for over 80 percent of the total [14]. Of course, such a sharp upward trend is

reasonable given the rapid economic growth of Asian countries in recent years. On the other hand, there is remarkable heterogeneity among the region's countries in terms of economic and financial development. For instance, while China and India are characterized by rapid industrialization and high energy demand, Japan and South Korea stand out as economies with developed financial markets and advanced digital infrastructure [15, 16]. Indonesia, on the other hand, is a developing economy where fossil fuels still dominate the energy mix and which has a less developed economic and financial structure compared to others. Furthermore, the rapid industrialization process and growing energy needs make the region's economies both the most critical and the most challenging actors in reducing GHG emissions. Unfortunately, current trajectory indicates that regional emissions will continue to rise in the coming years if effective decarbonization policies are not implemented. Given the heterogeneous structure of Asian countries and their rapid economic growth trends, unlocking the sustainability synergies of FinTech development in these nations serves as a source of motivation.

The current literature on this field has some gaps, particularly regarding Asian countries. For instance, studies on ASEAN countries [17], Central Asian economies [18], or the BRICS group [19], demonstrate that FinTech shapes environmental quality through its interactions with financial inclusion, renewable energy use, and natural resource management. However, a significant part of this research remains limited to a specific subregion, and studies that collectively address large economies at varying levels of development —representing East, South, and Southeast Asia— remain relatively few. Furthermore, there is no clear consensus in the literature regarding the indicators used to measure FinTech. Some studies use digital financial inclusion indices, others rely on composite indicators based on mobile and internet access, and still others use the volume of FinTech investments as the primary measure. This methodological diversity limits the comparability of findings while also opening the space for exploring different measurement strategies in future studies.

Considering the literature gap presented above, this study aims to examine the effect of FinTech on Sustainable Development Goal 13 (Climate Action) via a panel data consisting of China, Indonesia, India, South Korea, and Japan. The justification for analyzing these five economies simultaneously is to incorporate the region's heterogeneity in terms of development levels and energy consumption patterns into the analysis, thereby providing a more comprehensive perspective on the relationship between FinTech and climate action. To do this, this study employs the Augmented Mean Group (AMG) coefficient estimator. The findings reveal that FinTech's impact on SDG 13 is negative for China and India, yet positive for South Korea and Japan. However, the coefficients for Indonesia are not statistically significant. Furthermore, the Common Correlated Effects Mean Group (CCE) estimator, which was used to robust the findings, confirms the results obtained from the AMG estimator. In light of these findings, the study provides insightful implications for both climate policymakers and practitioners.

The following sections of this study are structured as follows: The second section provides an overview of the literature and presents empirical evidence regarding the link between FinTech and SDG 13. The third presents data sources and methodological prescription. The fourth and fifth present empirical findings and conclusions, respectively. Finally, in the sixth section, a discussion is carried out based on the empirical findings and the previous literature relevant to FinTech and environmental sustainability.

2. Literature Review

In recent decades, the accelerating melting of glaciers, rising land temperatures and their catastrophic disasters have elevated the combating climate change to the top of the global agenda as a foremost challenge of the 21st century [20]. Governments and global organizations across the world are striving to mitigate the effects of climate change and to achieve the target set out in the Paris Climate Agreement of limiting global temperature rise to between 1.5-2 °C [21]. In this regard, reducing GHG emissions, the main cause of climate change, is crucial and is closely associated with the increased use of renewable energy and improvements in resources and energy efficiency [22]. As such, UN Climate Change Conference, a call was made for "all countries to stop providing funding or subsidies for new coal-fired power plants" [23]. However, renewable energy transition and eco-friendly technologies require substantial investment in deployment, maintenance, and R&D. Yet, there is a huge funding gap, and it is a roadblock to mitigate effects of climate change [24].

Against this backdrop, FinTech is receiving greater attention as a new catalyst for tackling climate change in the recent literature. On the one hand, for instance, Sreenu (2024) [25] indicates that FinTech and green bonds are among the key drivers in advancing the renewable energy transition in India. Especially, it underscores that FinTech has highly leveraged the financial efficiency of renewable energy projects, eased access to finance, and increased investor confidence. In the same vein, Li et al. (2022) [26] emphasize that FinTech platforms create new opportunities for

financing renewable energy projects through green bonds and can improve resource allocation for these projects. From another perspective, Dar and Jaiswal (2025) [27] suggest that FinTech can reduce resource consumption and carbon emissions arising from financial transactions by promoting digital payment systems, internet banking and online financial services as alternatives to cash and hard copy-based financial transactions. Moreover, they point out that FinTech can promote sustainable economic transition and foster environmental awareness by encouraging eco-friendly practices. Indeed, these arguments are supported by empirical studies. Kashif et al. (2026) [28], found that FinTech contributed to climate action and the achievement of net-zero carbon objectives in their study focusing on G-20 countries over the period 2010–2022. Similarly, the findings of Eyuboglu and Uzar (2026) [29], revealed that FinTech improves resources efficiency, facilitates access to eco-friendly investments and encourages sustainable financial behaviour in Brazil. The findings of Qin and Tan (2025) [30] shown that FinTech improves renewable energy transition in China, especially developed eastern and midland cities. Ayaydın et al. (2025) [31] findings indicate that FinTech indirectly decrease ecological footprint by facilitating green energy transition in BRICS-T countries.

On the other hand, the environmental effects of FinTech are not entirely favorable. The widespread use of digital financial services requires more energy consumption for data centers, cloud computing infrastructure and high-speed communication networks, which may lead to higher carbon emissions [32]. Also, energy-intensive activities like blockchain-based applications and cryptocurrency mining reduce the service life of electronic devices and cause more electronic waste [33]. If these wastes cannot be properly managed, hazardous chemicals could become additional strain sources for the environment and natural resources [34]. For instance, in their study using data from 2013 to 2023, Liu et al. (2024) [35] found that the growing FinTech ecosystem has led to environmental degradation. The authors imply that this is particularly associated with energy-intensive cryptocurrency mining. Similarly, investigating the relationship between FinTech and CO_2 emissions from 2000 to 2021 across 17 developed countries Ali et al. (2025) [36], reported that FinTech has an upward effect on CO_2 emissions in the short-run. As another study, Lisha et al. (2023) [32] found that FinTech and natural resources adversely affect environmental sustainability across all quantiles in BRICS. Similar findings confirmed by Bai et al. (2025) [33], their findings reveal that FinTech negatively affect environmental quality and this effect more apparent especially at higher quantiles.

The current literature is far from reaching a broad consensus on the impact of FinTech on environmental sustainability or climate change and paints a polarized picture around two opposing viewpoints. These mixed findings indicate that the environmental impacts of FinTech change depending on the sample, countries' development levels, time, and how FinTech variable is structured. Indeed, many studies use proxy variables like number of ATMs per 100,000 people, the number of broadband or mobile subscribers to establish a FinTech index. However, these are mostly linked to digital infrastructure and not adequately proper to represent FinTech. In this sense, this study adds also cashless payments and SWIFT participation in the FinTech index to more accurately capture FinTech adoption. By doing this, the study introduces a novel FinTech index to the literature. On the other hand, this study uses countries' SDG13 scores as a proxy for environmental sustainability. Compared with conventional environmental indicators (e.g. CO_2 emissions, ecological footprint, etc.), SDG 13 provides a more comprehensive assessment by reflecting not only environmental quality but also climate policies, institutional capacity, and climate finance. Furthermore, by focusing on five major Asian economies with different levels of FinTech development and institutional quality, this study provides new evidence on whether the relationship between FinTech and climate action differs across heterogeneous economic and institutional contexts. To sum up, this study is original because it uses SDG 13 as a proxy for environmental sustainability, proposes a new FinTech index and examines Asian countries that have received relatively less attention, and thus has the potential to make a significant contribution to the literature.

3. Data, Model and Methodology

3.1. Data and Model Specification

The current study aims to uncover the impact of FinTech, institutional quality, and renewable energy consumption on SDG 13 in Asian countries (China, India, Indonesia, Korea, and Japan) from 2012 to 2024. To realize this, secondary data was obtained from various sources. The 12-year time span of the study is justified by data availability. All data are taken from the publicly available World Development Indicators (WDI), Bank for International Settlements (BIS) and Sustainable Development Solutions Network (SDSN) databases. Table 1 presents detailed information on the variables.

In this study, SDG13 score of Asian countries using as proxy for environmental sustainability instead of CO_2 emissions or ecological footprint. Because CO_2 emissions [34,35,36] and the ecological footprint [37,38,39] are single-dimensional indicators that measure specific aspects of environmental sustainability, whereas the SDG13 score is a multidimensional indicator that assesses performance in combating climate change alongside its economic, institutional and governance dimensions. Therefore, usage of SDG13 as a proxy for environmental sustainability reflects not only current environmental outcomes but also countries' capacity to formulate and implement sustainable climate policies. Particularly, when assessing the impacts of phenomena with multiple impact mechanisms like FinTech, the comprehensive approach offered by SDG13 enables a more effective analysis of the climate dimension of environmental sustainability [40].

Table 1. Data Description

Abb.	Variable	Description	Source
SDG13	Sustainable Development Goal 13 Country Rankings	SDG 13 progress scores for each country	SDSN
IQ	Institutional Quality	Arithmetic means of World Governance Indicators (from -2.5 to 2.5)	WDI
REC	Renewable Energy Consumption	Per capita renewable energy consumption (kWh)	Our World in Data
FIN	FinTech	Volume of cashless payments and withdrawal/ deposit transactions (millions; total for the year)	BIS
		Participation in SWIFT by domestic institutions (total number of SWIFT users)	BIS
		Automated teller machines (ATMs) (per 100,000 adults)	WDI
		Mobile cellular subscriptions (per 100 people)	WDI
		Individuals using the Internet (% of population)	WDI

On the other hand, the main explanatory variable, FinTech, was generated through Principal Component Analysis (PCA). It is a data reduction method that transforms many interrelated variables into a smaller number of independent variables, while maintaining as much of the information in the data as possible. In this way, it eliminates the multicollinearity problem and makes the analyses easier to interpret [41]. To structure a composite FinTech index, volume of cashless payments and withdrawal/ deposit transactions (millions; total for the year) [12], Participation in SWIFT by domestic institutions (total number of SWIFT users) [12], Automated teller machines (ATMs) (per 100,000 adults) [42], Mobile cellular subscriptions (per 100 people) [43], and individuals using the Internet (% of population) variables [44] are used. These are common variables that are used to construct for FinTech index in literature.

The environmental degradation caused by economic growth in a country is closely linked to environmental protection policies implemented by policymakers. In fact, environmental regulation prompts companies and individuals to adopt eco-friendly practices to protect the environment. However, strict environmental regulations must be maintained at an optimal level to avoid hindering economic growth, thereby requiring a higher-level institutional quality [45]. Thus, IQ variable, representing institutional quality, was also adopted as another explanatory variable.

Finally, in line with the broad consensus in the literature on environmental and energy economics, REC is employed as a control variable as a proxy for renewable energy consumption. Numerous studies in the literature affirm the positive relationship between renewable energy consumption and environmental sustainability [46,47].

In this respect, the empirical model of the study is formulated as shown in Eq. (1):

$$SDG13_{it} = \alpha_0 + \beta_1 FIN_{it} + \beta_2 IQ_{it} + \beta_3 REC_{it} + \varepsilon_{it} \quad (1)$$

where $SDG13$ is Climate Action scores, FIN is financial technologies, IQ is institutional quality and REC is per capita renewable energy consumption (kWh) of countries. $i = 1, \dots, N$ indicate countries; $t = 1, \dots, T$ symbolize time span; $\beta_1, \dots, \beta_3$ are parameters the coefficients that quantify the impact of the explanatory variables on the exploratory variable; and ε_{it} denote error term for country i at time t. Also, to eliminate heteroscedasticity and get more reliable coefficients, the REC variable was incorporated into the model with natural logarithm transform.

3.2. Methodology

A four-stage estimation methodology was employed to investigate the influence of FIN, IQ and REC on SDG13 in Asian countries. The methodological flowchart is illustrated in Fig. 2.

3.2.1. Preliminary Tests

In the first stage of the empirical procedure, the multicollinearity problem amongst the independent variables, cross-sectional dependence (CSD), and slope heterogeneity are checked. In this respect, initially, Variance Inflation Factor (VIF) was carried out to check whether there is a multicollinearity problem amongst the variables. The VIF produces a value from 1 to 10 for each variable. According to the literature, if the VIF values obtained for each independent variable are less than 5, this indicates that these variables have a unique effect on the dependent variable and that there is no problem of multicollinearity [48].

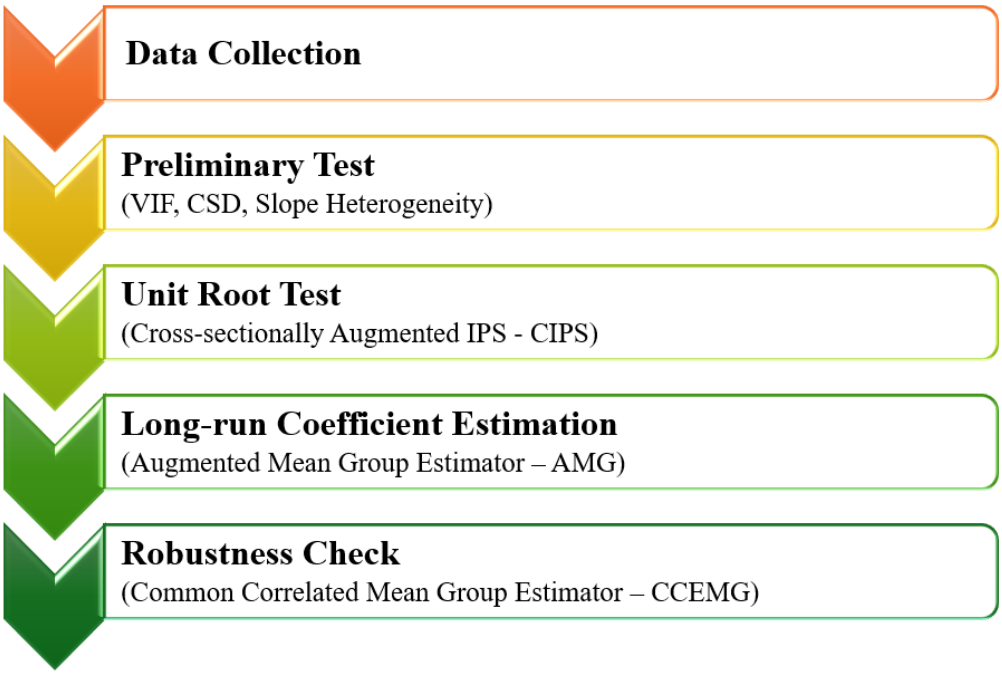


Figure 2. Methodological Flowchart

Secondly, to investigate whether there is cross-sectional dependence (CSD) amongst the units composing the panel. Early econometric literature largely assumed the independence of cross-sections [49]. However, interactions across countries, institutions and even individuals have increased significantly. Hence, spatial factors, spillover effects or unobserved common factors may arise amongst the units [50]. For this reason, Pesaran (2004) CD LM [51] and Friedman (1937) [52] rank test employed to check CSD.

Finally, to test slope heterogeneity, the tests proposed by Pesaran and Yamagata (2008) [53] and Blomquist and Westerlund (2013) [54] are applied to test for slope heterogeneity. As is well known, standard panel data regression models, such as those with fixed effects and random effects, assume that the parameter of interest is homogeneous. However, this is often not real, and a shock occurring in any one unit does not affect all the others to the same degree. Therefore, testing for heteroscedasticity is essential in panel data analysis.

3.2.2. Unit Root Test

Stationarity of series plays a vital role in panel data and time series analysis. In fact, analyses performed with non-stationary series can lead to spurious regression and biased results. Therefore, the CIPS unit root tests, introduced by Pesaran (2007) [55], are employed to identify the integration order of the series.

In the CADF unit root test introduced by Pesaran (2007), test statistics are calculated for each unit separately using Monte Carlo simulation. Then, the CIPS test statistics are calculated by taking the arithmetic mean of the CADF critical values calculated for each unit, as shown in Eq. (2).

The calculated test statistics are compared to critical values given in Table II(a), II(b) or II(c) in Pesaran's (2007) study to decide whether the series are stationary. If the calculated CIPS test

statistics are lower than the critical values given in the tables, the null hypothesis is rejected and concluded that the series are stationary.

3.2.3. Augmented Mean Group Estimator

Finally, we apply the Augmented Mean Group (AMG) coefficient estimator proposed by Eberhardt and Bond (2009) [56] and Eberhardt and Teal (2010) [57] to estimate long-run coefficients.

The choice of the AMG coefficient estimator is justified by several advantages. Firstly, it allows for CSD, and slope heterogeneity issues frequently encountered in panel data [58]. By incorporating common dynamic processes into the model via time-dummy coefficients derived from first-difference regression, it controls for the effects of unobservable common factors and thus allows for CSD. Secondly, the AMG estimator can provide reliable results even when the variables are non-stationary and have a robust structure that is resilient to whether the panel is cointegrated [59].

The AMG procedure is applied in three steps: In the first step, a pooled regression model augmented with year dummy variables is estimated using first-difference OLS, and the coefficients relating to the (differenced) year dummy variables are aggregated; Next, the group-specific regression model is extended using this estimated process; and the group-specific model parameters are averaged across the panel (weights may be applied) [60].

4. Results and Discussion

Before the presentation of the empirical findings, it is essential to explain the statistical properties of the variables. Descriptive statistics are presented in Table 2.

Table 2. Descriptive Statistics

	SDG13	FIN	IQ	REC
Mean	83.56813	1.54E-07	61.56409	7.223735
Max.	96.84933	3.84658	81.94857	8.69412
Min.	66.32367	-0.52446	44.75792	5.6151
Std. Dev.	10.67765	2.212811	12.79515	0.944296
Skewness	-0.29283	2.595739	0.482193	-0.16619
Kurtosis	1.612387	8.824255	1.49803	1.5463
Jarque-Bera	6.143793	164.8655	8.628628	6.022589
Prob.	(0.0463)	(0.0000)	(0.0133)	(0.0492)
Obs.	65	65	65	65

As shown in Table 2, SDG13 and IQ exhibit a relatively wide distribution around the mean, while FIN and REC have more limited variability. The skewness and kurtosis values indicate that, except FIN, the series have close to a normal distribution, and the Jarque-Bera test statistics also support this. As a results, the data are appropriate for further econometric estimation.

The pairwise correlation matrix is presented in Table 3.

Table 3. Pairwise Correlation Matrix

Variable	SDG13	FIN	IQ	REC
SDG13	1.0000			
FIN	0.0884	1.0000		
IQ	0.7992	0.3015	1.0000	
REC	0.5673	0.4504	0.4753	1.0000

According to Table 3, there is a high level of positive correlation between IQ and SDG13, which indicates that institutional quality may be a significant determinant of climate action performance, as expected. Similarly, the relatively positive correlation between REC and SDG13 is consistent with the literature. However, FIN is found to have a weak correlation with SDG13, which implies that the effect of FinTech on climate action may occur through indirect or interactive mechanisms rather than a linear relationship.

Following the identification of the statistical properties of the variables, the VIF test results, which were carried out to test for multicollinearity, are reported in Table 4.

Table 4. Variance Inflation Factors

Variable	VIF	1/VIF
FIN	2.20	0.4537
IQ	2.27	0.4405
REC	2.59	0.3863
Mean VIF	2.35	

Regarding the concern of multicollinearity, VIF values of 10 or higher are usually considered an indication of serious multicollinearity. However, based on Table 4, the VIF values for all independent variables are lower than 5. These results clearly suggest that there is no multicollinearity problem in the empirical model.

Table 5. Cross-sectional Dependency and Slope Heterogeneity

Test	Cross-Sectional Dependency			
Pesaran	28.732 [a]		(0.000)	
Friedman	52.992 [a]		(0.000)	
	Pesaran and Yamagata (2008)		**Blomquist and Westerlund (2013)**	
Delta	3.376 [a]	(0.001)	2.786 [a]	(0.005)
Delta adj.	4.304 [a]	(0.000)	3.552 [a]	(0.000)

Note: [a] and [b] symbolize 0.01 and 0.05 statistical significance, respectively. Critical values are presented in parentheses.

The results presented in Table 5 indicate the existence of a high degree of CSD among the units. This means that the countries in the panel are not independent of one another and are affected by common shocks. Furthermore, Delta and adjusted Delta adj. test statistics obtained from Pesaran and Yamagata (2008) and Blomquist and Westerlund (2013) tests were statistically significant at the 1% and it indicates that the slope coefficients are heterogeneous across the units in the panel and that a shock occurring in one country affects the others to different degrees. These findings suggest that further tests, such as unit root and cointegration, must be second-generation which consider CSD and slope heterogeneity.

Relying on CSD and slope heterogeneity results, we use a second-generation unit root test, CIPS, to check stationary properties of variables. The CIPS test results are tabulated in Table 6.

Table 6. CIPS Unit Root Test

Variable	Level	First Diff.	Results
SDG13	-0.512	-3.003 [a]	I_1
FIN	-1.119	-2.394 [b]	I_1
IQ	-2.175	-3.378 [a]	I_1
REC	-1.506	-2.748 [a]	I_1

Note: Critical values are -2.66, -2.37 and -2.22 for 0.01, 0.05 and 0.1, respectively

According to Table 6, as none of the variables in the model are lower than the critical value of -2.22, which denotes a 10% statistical significance, they are non-stationary at level. However, all variables become stationary at %1 statistical significance, as their critical values are less than the critical value of -2.66 at the first difference, except FIN. The FIN is stationary at 5%, as its critical value is between -2.22 and -2.37.

After identifying the integration orders of the variables, we run the AMG estimator to estimate the long-run coefficients. The results are tabulated in Table 7.

Looking at the results in Table 7, a 1-unit increase in FIN decreases SDG13 by -0.678 and -0.557 in China and India, respectively. By contrast, in Korea and Japan, it raises SDG13 by 8.265 and 7.419. As for Indonesia, even though the coefficient is 6.086, it is not statistically significant as the critical value is 0.192. On the other hand, the effect of IQ on SDG13 is positive in all countries except Japan. Finally, as expected, REC also has a positive effect on SDG13 in all countries.

Table 7. AMG Coefficient Estimations

Country	FIN	IQ	REC
China	-0.678 [a]	0.072 [b]	0.486 [a]
	(0.008)	(0.037)	(0.003)
Indonesia	6.086	0.062 [a]	0.641 [a]
	(0.192)	(0.006)	(0.006)
India	-0.557 [b]	0.087 [a]	0.609 [a]
	(0.021)	(0.003)	(0.009)
Korea	8.265 [b]	0.112 [c]	1.904 [a]
	(0.025)	(0.076)	(0.002)
Japan	7.419 [b]	-0.016	4.087 [b]
	(0.011)	(0.900)	(0.023)
Panel	0.534 [b]	0.002 [b]	0.064 [a]
	(0.033)	(0.048)	(0.005)

Note: [a], [b] and [c] denote 0.01, 0.05 and 0.1 statistical significance, respectively.

To get deeper insight and ensure the robustness of the findings, robustness analysis was conducted using the Common Correlated Effects Mean Group (CCEMG) estimator proposed by Pesaran (2006) [61], which accounts for CSD and slope heterogeneity. The CCEMG results are shown in Table 8.

Table 8. CCEMG Coefficient Estimations

Country	FIN	IQ	REC
China	-1.086 [b]	0.087 [b]	2.362 [c]
	(0.041)	(0.019)	(0.054)
Indonesia	8.613	0.096 [b]	0.629 [c]
	(0.726)	(0.016)	(0.053)
India	-0.622 [b]	0.006 [c]	1.947 [b]
	(0.032)	(0.092)	(0.024)
Korea	6.723 [c]	0.091 [b]	2.852 [b]
	(0.071)	(0.045)	(0.027)
Japan	11.216 [b]	0.146	1.967 [b]
	(0.031)	(0.246)	(0.049)
Panel	6.192 [c]	0.013 [c]	0.061 [c]
	(0.082)	(0.079)	(0.065)

Note: See in Table 7

The coefficients obtained from the CCEMG estimator are shown in Table 8. According to this, FIN has a negative effect on SDG 13 in China and India, while the opposite is found in Korea and Japan. Also, the coefficient is insignificant in Indonesia. Furthermore, the whole panel result indicates that FIN promotes SDG13. Moreover, IQ has a positive impact on climate action in all countries except Japan. Similarly, the contribution of REC to climate action is also verified by the CCEMG model.

The findings suggest that FinTech hinders climate action in China and India but acts as a catalyst in Korea and Japan. In this regard, they are partly consistent with Sreenu (2024) [25], who argues that FinTech supports renewable energy by providing greater accessibility, transparency, and lower transaction costs. However, as pointed out by Liang and George (2024) [62], although FinTech has a stimulating effect on economic activity, if the increase in production and consumption is not balanced by improved efficiency, it can also lead to adverse effects such as higher energy consumption and CO_2 emissions. In fact, FinTech's potential in the context of climate action is closely linked to countries' energy mix and the stringency of their environmental regulations [63]. As Ali et al. (2019) [64] suggests, this highlights institutional quality as a balancing and regulatory factor in the relationship between FinTech and climate action.

5. Conclusion

The study analyzed how FinTech (FIN), institutional quality (IQ), and renewable energy consumption influenced progress toward climate action (SDG13) in five major Asian countries (China, India, Indonesia, South Korea and Japan) during the 2012–2024 period. Results from the AMG coefficient estimator, proposed by Eberhardt and Bond (2009) and Eberhardt and Teal (2010), indicate that the effect of FinTech on climate action is mixed. As such, while it has a significantly negative effect on SDG13 in China and India, it has positive effect in Korea and Japan. In Indonesia, however, there is no statistically significant effect. In addition, the AMG estimator results are also validated by the CCEMG.

On the other hand, the effects of institutional quality and renewable energy consumption are much more consistent. In fact, institutional quality has a positive and statistically significant effect on SDG13 in all countries except Japan. We attribute the insignificant result in Japan to the fact that the already high level of institutional quality limits the marginal effect on climate actions. Meanwhile, renewable energy consumption improves climate actions across the whole panel. To sum up, these results imply that only FinTech cannot ensure progress on climate actions, and that its environmental contributions heavily depend on countries' energy mix and the effectiveness of the institutional environment that drives it.

6. Policy Implications and Limitations

The results of the study, which examines the impact of FinTech on climate action in Asian countries, provide some insightful policy implications. Firstly, the country-specific effects of FinTech demonstrate that FinTech policies must be tailored to each country's unique conditions rather than relying on a one-size-fits-all model. For instance, in China and India, where FinTech has a negative impact on climate action, policymakers can reduce GHG emissions by easing financial constraints on companies that prioritize sustainability and by incentivizing green innovation. To achieve this, they could introduce regulations that encourage FinTech platforms to finance projects that reduce carbon emissions. Also, the credit scoring systems used in digital banking applications provided by FinTech can be re-arranged to support companies with better environmental practices. In this way, FinTech development in these countries can be aligned with climate goals. Furthermore, policymakers could impose fiscal instruments on energy-intensive activities like cryptocurrency mining, which generate large amounts of e-waste. The revenue yielded in this way could be allocated to eco-friendly projects to mitigate the adverse environmental effects [65]. In South Korea and Japan, where FinTech has shown a positive impact on SDG 13, further incentivizing green financing tools and providing greater support for eco-friendly R&D projects will enhance the synergy between FinTech and climate action. In Indonesia, where FinTech has no significant impact on SDG 13, priority should be made to establishing infrastructure for basic digital financial access. Indeed, increasing financial inclusion through FinTech has the potential to advance climate action in the long-term.

The progressive effect of institutional quality on SDG 13 implies that environmental regulations are a primary climate policy tool rather than a secondary one. Indeed, Wang et al. (2023) [66] point out that weak environmental regulations and poor institutional quality increase the ecological footprint resulting from consumption, whereas stronger institutions and technological innovation improve environmental quality. This indicates that, in addition to regulations related to FinTech in China, India, and Indonesia, environmental regulations must also be enforced more rigorously. Therefore, the formulation of strict environmental regulations is crucial for ensuring that FinTech and green finance policies function as planned.

As renewable energy consumption improves SDG 13 performance across all five Asian countries, regardless of FinTech adoption or levels of institutional development, sustained investment in clean energy must remain one of the top priorities across the region. However, considering that reliance on natural resource revenues can harm environmental quality, Asian countries with developed mining sectors could allocate a part of their revenues specifically towards renewable energy projects, combating deforestation, and increasing soil quality [67]. To sum up, all countries must empower regulatory authorities, increase investments in renewable energy, and use natural resource revenues to finance eco-friendly projects.

Furthermore, to turn into these macro-level insights into operational instruments, regional policymakers should establish standardized Green FinTech Taxonomies and mandatory ESG-integrated algorithm audits for digital financial institutions. Specifically, central banks and financial regulatory authorities in fast-growing digital economies (e.g. China and India) can mandate that FinTech providers integrate automated carbon footprint tracking APIs into corporate digital payment platforms. This would enable real-time tracking of emissions associated with funded projects and allow commercial banks to adjust credit interest rates dynamically based on verified climate

compliance. Additionally, to prevent regulatory arbitrage across heterogeneous Asian economies, regional framework agreements should be established to facilitate cross-border green data sharing, harmonize green digital asset standards, and allocate targeted subsidies for FinTech startups operating in emerging markets like Indonesia.

Like any study, this study suffers from several limitations. First, the panel consist of five Asian countries, and time frame is 2012–2024. Although this reflects a meaningful diversity in financial and institutional development, the generalizability of the findings is poor. Second, institutional quality was calculated as the arithmetic mean of the WGI's six sub-components. This may obscure the effects of factors such as regulatory quality and control of corruption that could have varied importance for climate actions. Finally, while the AMG and CCEMG estimators effectively account for CSD and slope heterogeneity in panel data, they cannot adequately deal with potential reverse causality. Therefore, further studies can contribute to literature by employing cutting-edge panel data techniques that address the limitations of these methods, as well as by conducting research that addresses other limitations.

References

1. S. R. Sethi, "From Climate Finance to Sustainable Green Growth: The Role of Innovation and Technology Adoption," *Sustainable Development*, May 2026, doi: 10.1002/sd.71239.
2. C. Tuholske, M. A. Di Landro, W. Anderson, R. J. van Duijne, and A. de Sherbinin, "A framework to link climate change, food security, and migration: unpacking the agricultural pathway," *Popul. Environ.*, vol. 46, no. 1, p. 8, Mar. 2024, doi: 10.1007/s11111-024-00446-7.
3. D. Nassiry, "The Role of Fintech in Unlocking Green Finance: Policy Insights for Developing Countries," 883, Nov. 2018.
4. T. Puschmann and V. Khmarskyi, "Green fintech: Developing a research agenda," *Corp. Soc. Responsib. Environ. Manag.*, vol. 31, no. 4, pp. 2823–2837, Jul. 2024, doi: 10.1002/csr.2675.
5. R. Fatima and R. Carè, "Exploring the role of emerging technologies in advancing sustainable development goals (SDGs) in developing countries: a comprehensive review," *Curr. Opin. Environ. Sustain.*, vol. 79, p. 101606, Apr. 2026, doi: 10.1016/j.cosust.2026.101606.
6. Q. Liu and Y. You, "FinTech and Green Credit Development—Evidence from China," *Sustainability*, vol. 15, no. 7, p. 5903, Mar. 2023, doi: 10.3390/su15075903.
7. C. Qiao, W. Cai, and S. Chen, "Green fintech contributes to environmental sustainability—based on empirical evidence from China," *Humanit. Soc. Sci. Commun.*, vol. 12, no. 1, p. 1895, Dec. 2025, doi: 10.1057/s41599-025-06159-y.
8. Z. Guang-Wen and A. B. Siddik, "The effect of Fintech adoption on green finance and environmental performance of banking institutions during the COVID-19 pandemic: the role of green innovation," *Environmental Science and Pollution Research*, vol. 30, no. 10, pp. 25959–25971, Nov. 2022, doi: 10.1007/s11356-022-23956-z.
9. M. Saikat and Md. A. Hossain, "Assessing the impact of digital finance on inequality, poverty and carbon emissions in developing Asian countries using structural equation model," *SSRN Electronic Journal*, 2026, doi: 10.2139/ssrn.6657441.
10. J. Truby, "Decarbonizing Bitcoin: Law and policy choices for reducing the energy consumption of Blockchain technologies and digital currencies," *Energy Res. Soc. Sci.*, vol. 44, pp. 399–410, Oct. 2018, doi: 10.1016/j.erss.2018.06.009.
11. P. J. Morgan, "Fintech and Financial Inclusion in Southeast Asia and India," *Asian Economic Policy Review*, vol. 17, no. 2, pp. 183–208, Jul. 2022, doi: 10.1111/aepr.12379.
12. U. Uzar, Ö. F. Kömürcüoğlu, and E. D. Kömürcüoğlu, "The Impact of FinTech on Environmental Sustainability: Empirical Evidence Based on a Novel FinTech Index," *Bus. Strategy Environ.*, 2026, doi: 10.1002/bse.70546.
13. H. Liu and Y. Liu, "Agricultural carbon footprints, renewable energy and sustainable development in Asia," *Sci. Rep.*, vol. 15, no. 1, p. 34429, Oct. 2025, doi: 10.1038/s41598-025-17491-3.
14. N. Asghar, M. T. Majeed, M. W. Khan, and A. Anwar, "Biomass energy consumption and sustainable development: empirical evidence from Asian economies," *Environmental Science and Pollution Research*, vol. 30, no. 1, pp. 145–160, Jan. 2023, doi: 10.1007/s11356-022-22132-7.
15. M. Adnan, B. Xiao, P. Xiao, P. Zhao, and S. Bibi, "Heavy Metal, Waste, COVID-19, and Rapid Industrialization in This Modern Era—Fit for Sustainable Future," *Sustainability*, vol. 14, no. 8, p. 4746, Apr. 2022, doi: 10.3390/su14084746.
16. B.-K. Jo, "Local flexibility markets in the energy transition: A comparative review and framework for future development," *Renewable and Sustainable Energy Reviews*, vol. 229, p. 116614, Apr. 2026, doi: 10.1016/j.rser.2025.116614.
17. D. H. Husaini and H. H. Lean, "Digitalization and Energy Sustainability in ASEAN," *Resour. Conserv. Recycl.*, vol. 184, p. 106377, Sep. 2022, doi: 10.1016/j.resconrec.2022.106377.
18. K. Rukshar and S. M. A. H. Gillani, "Renewable Energy Consumption, Financial Inclusion and Fintech as Drivers of Environmental Quality: The Moderating Role of Green Finance in selected South Asian Economies," *Journal of Sustainable and Economic Development*, vol. 4, no. 1, pp. 109–120, 2026.
19. H. Shan *et al.*, "Fintech innovation for sustainable environment: Understanding the role of natural resources and human capital in BRICS using MMQR," *Resources Policy*, vol. 88, p. 104468, Jan. 2024, doi: 10.1016/j.resourpol.2023.104468.
20. J. Xu *et al.*, "The Melting Himalayas: Cascading Effects of Climate Change on Water, Biodiversity, and Livelihoods," *Conservation Biology*, vol. 23, no. 3, pp. 520–530, Jun. 2009, doi: 10.1111/j.1523-1739.2009.01237.x.
21. E. Bulmer and B. Yáñez-Araque, "Tackling Climate Change through Multi-Stakeholder Partnerships: Promoting SDG 17 to Combat Climate Change," *Energies (Basel).*, vol. 16, no. 9, p. 3777, Apr. 2023, doi: 10.3390/en16093777.
22. T.-Y. Lin, Y. Chiu, C.-H. Chen, and L. Ji, "Renewable energy consumption efficiency, greenhouse gas emission efficiency, and climate change in Europe," *Geoenergy Science and Engineering*, vol. 247, p. 213665, Apr. 2025, doi: 10.1016/j.geoen.2025.213665.
23. M. Beckmann, G. Zöttl, V. Grimm, T. Becker, M. Schober, and O. Zipse, "Setting the Course for Net Zero," in *Road to Net Zero*, O. Zipse, J. Hornegger, T. Becker, M. Beckmann, M. Bengsch, I. Feige, and M. Schober, Eds., Cham: Springer International Publishing, 2023, pp. 17–59. doi: 10.1007/978-3-031-42224-9_2.

24. O. Zin Lin, D. Juchelkova, L. Štěpanec, H. Y. Aye, and K. B. Adam, "Bridging the Energy Gap in ASEAN: Scaling Green Finance and Carbon Markets for a Sustainable Transition," *WIREs Energy and Environment*, vol. 15, no. 1, Mar. 2026, doi: 10.1002/wene.70020.
25. N. Sreenu, "The impact of Fintech and green bonds on the Indian renewable energy production," *Renew. Energy*, vol. 237, p. 121807, Dec. 2024, doi: 10.1016/j.renene.2024.121807.
26. N. Li, X. Pei, Y. Huang, J. Qiao, Y. Zhang, and R. H. Jamali, "Impact of financial inclusion and green bond financing for renewable energy mix: implications for financial development in OECD economies," *Environmental Science and Pollution Research*, vol. 29, no. 17, pp. 25544–25555, Apr. 2022, doi: 10.1007/s11356-021-17561-9.
27. B. I. Dar and S. Jaiswal, "Reducing the Carbon Footprint of Transactions," in *Financial Innovation for Global Sustainability*, Wiley, 2025, pp. 203–225. doi: 10.1002/9781394311682.ch9.
28. M. Kashif, A. Ullah, S. Ullah, and N. Qian, "Financial technology (FinTech) and green economy synergies for climate resilience and net-zero goals: evidence from G20 countries," *Financial Innovation*, vol. 12, no. 1, p. 95, Mar. 2026, doi: 10.1186/s40854-026-00912-1.
29. K. Eyuboglu and U. Uzar, "FinTech and Environmental Sustainability: Evidence From Brazil," *Sustainable Development*, Mar. 2026, doi: 10.1002/sd.70918.
30. Q. Qin and L. Tan, "Lighting a green future: The role of FinTech in the renewable energy transition," *Sci. Prog.*, vol. 108, no. 1, Jan. 2025, doi: 10.1177/00368504251323566.
31. H. Ayaydın, T. Ergün, A. Barut, A. Erdem, and A. Pilatin, "FinTech driven green energy transition foreign direct investment and ecological footprint in BRICST countries," *Sci. Rep.*, vol. 15, no. 1, p. 34838, Oct. 2025, doi: 10.1038/s41598-025-18898-8.
32. L. Lisha, S. Mousa, G. Arnone, I. Muda, R. Huerta-Soto, and Z. Shiming, "Natural resources, green innovation, fintech, and sustainability: A fresh insight from BRICS," *Resources Policy*, vol. 80, p. 103119, Jan. 2023, doi: 10.1016/j.resourpol.2022.103119.
33. Y. Bai, B. S. Eweade, S. Aghazadeh, R. O. Bamidele, and Y. Xu, "Pathways to environmental sustainability: Do fintech, natural resources, and environmental patents matter in E−7 nations?," *Renew. Energy*, vol. 247, p. 122987, Jul. 2025, doi: 10.1016/j.renene.2025.122987.
34. M. Azam, A. Q. Khan, H. Bin Abdullah, and M. E. Qureshi, "The impact of CO2 emissions on economic growth: evidence from selected higher CO2 emissions economies," *Environmental Science and Pollution Research*, vol. 23, no. 7, pp. 6376–6389, Apr. 2016, doi: 10.1007/s11356-015-5817-4.
35. G. C. Aye and P. E. Edoja, "Effect of economic growth on CO2 emission in developing countries: Evidence from a dynamic panel threshold model," *Cogent Economics & Finance*, vol. 5, no. 1, p. 1379239, Jan. 2017, doi: 10.1080/23322039.2017.1379239.
36. X. Liu, K. Latif, Z. Latif, and N. Li, "Relationship between economic growth and CO2 emissions: does governance matter?," *Environmental Science and Pollution Research*, vol. 27, no. 14, pp. 17221–17228, May 2020, doi: 10.1007/s11356-020-08142-3.
37. P. B. Eregha, S. P. Nathaniel, and X. V. Vo, "Economic growth, environmental regulations, energy use, and ecological footprint linkage in the Next-11 countries: Implications for environmental sustainability," *Energy & Environment*, vol. 34, no. 5, pp. 1327–1347, Aug. 2023, doi: 10.1177/0958305X221084293.
38. Z. Ahmed, M. Ahmad, H. Rjoub, O. A. Kalugina, and N. Hussain, "Economic growth, renewable energy consumption, and ecological footprint: Exploring the role of environmental regulations and democracy in sustainable development," *Sustainable Development*, vol. 30, no. 4, pp. 595–605, Aug. 2022, doi: 10.1002/sd.2251.
39. M. Ahmad, P. Jiang, A. Majeed, M. Umar, Z. Khan, and S. Muhammad, "The dynamic impact of natural resources, technological innovations and economic growth on ecological footprint: An advanced panel data estimation," *Resources Policy*, vol. 69, p. 101817, Dec. 2020, doi: 10.1016/j.resourpol.2020.101817.
40. M. Sibt-e-Ali, X. Xia, W. Yi, and L. Vasa, "Quantifying the role of digitalization, financial technology, governance and SDG13 in achieving environment conservation in the perspective of emerging economies," *Environ. Dev. Sustain.*, Jan. 2025, doi: 10.1007/s10668-024-05940-4.
41. B. Li, X. Gui, and Q. Zhou, "Construction of Development Momentum Index of Financial Technology by Principal Component Analysis in the Era of Digital Economy," *Comput. Intell. Neurosci.*, vol. 2022, pp. 1–12, Jun. 2022, doi: 10.1155/2022/2244960.
42. H. Jangid, N. V. M. Rao, and D. P. Bal, "Analysing the role of fintech and resource use in shaping environmental outcomes using load capacity factor in G20 countries," *Discover Sustainability*, vol. 6, no. 1, p. 625, Jul. 2025, doi: 10.1007/s43621-025-01511-3.
43. A. K. Kamara and B. Yu, "The Impact of FinTech Adoption on Traditional Financial Inclusion in Sub-Saharan Africa," *Risks*, vol. 12, no. 7, p. 115, 2024, doi: 10.3390/risks12070115.
44. S. A. Apostu, M. Panait, V. Vasile, G. D. Sharma, and R. Vasile, "FinTechs and financial inclusion—Balkan experience: Digital perspectives on financial markets," *THE ELECTRONIC JOURNAL OF INFORMATION SYSTEMS IN DEVELOPING COUNTRIES*, vol. 89, no. 2, Mar. 2023, doi: 10.1002/isd2.12257.
45. F. Halldén, A. Hultberg, A. Ahmed, G. S. Uddin, M. Yahya, and V. Troster, "The role of institutional quality on public renewable energy investments," *Renewable and Sustainable Energy Reviews*, vol. 215, p. 115585, Jun. 2025, doi: 10.1016/j.rser.2025.115585.
46. L. Wu, T. S. Adebayo, X.-G. Yue, and A. Umut, "The role of renewable energy consumption and financial development in environmental sustainability: implications for the Nordic Countries," *International Journal of Sustainable Development & World Ecology*, vol. 30, no. 1, pp. 21–36, Jan. 2023, doi: 10.1080/13504509.2022.2115577.
47. T. S. Adebayo, "Renewable Energy Consumption and Environmental Sustainability in Canada: Does Political Stability Make a Difference?," *Environmental Science and Pollution Research*, vol. 29, no. 40, pp. 61307–61322, Aug. 2022, doi: 10.1007/s11356-022-20008-4.
48. J. A. Afolabi, "From chaos to clarity: the role of innovation in tackling uncertainty in Africa," *Technol. Anal. Strateg. Manag.*, pp. 1–16, Oct. 2025, doi: 10.1080/09537325.2025.2568875.
49. V. Sarafidis and T. Wansbeek, "Cross-Sectional Dependence in Panel Data Analysis," *Econom. Rev.*, vol. 31, no. 5, pp. 483–531, Sep. 2012, doi: 10.1080/07474938.2011.611458.
50. G. Everaert and T. De Groote, "Common Correlated Effects Estimation of Dynamic Panels with Cross-Sectional Dependence," *Econom. Rev.*, vol. 35, no. 3, pp. 428–463, Mar. 2016, doi: 10.1080/07474938.2014.966635.
51. M. H. Pesaran, "General Diagnostic Tests for Cross Section Dependence in Panels," 2004.
52. M. Friedman, "The Use of Ranks to Avoid the Assumption of Normality Implicit in the Analysis of Variance," *J. Am. Stat. Assoc.*, vol. 32, no. 200, pp. 675–701, Dec. 1937, doi: 10.1080/01621459.1937.10503522.

53. M. Hashem Pesaran and T. Yamagata, "Testing slope homogeneity in large panels," *J. Econom.*, vol. 142, no. 1, pp. 50–93, Jan. 2008, doi: 10.1016/j.jeconom.2007.05.010.
54. J. Blomquist and J. Westerlund, "Testing slope homogeneity in large panels with serial correlation," *Econ. Lett.*, vol. 121, no. 3, pp. 374–378, Dec. 2013, doi: 10.1016/j.econlet.2013.09.012.
55. M. H. Pesaran, "A simple panel unit root test in the presence of cross-section dependence," *Journal of Applied Econometrics*, vol. 22, no. 2, pp. 265–312, Mar. 2007, doi: 10.1002/jae.951.
56. M. Eberhardt and S. Bond, "Cross-section dependence in nonstationary panel models: a novel estimator," 2009.
57. M. Eberhardt and F. Teal, "Productivity Analysis in Global Manufacturing Production," 2010.
58. L. C. Voumik, S. Md. Nafi, F. V. Bekun, and M. I. Haseki, "Modeling Energy, Education, Trade, and Tourism-Induced Environmental Kuznets Curve (EKC) Hypothesis: Evidence from the Middle East," *Sustainability*, vol. 15, no. 6, p. 4919, Mar. 2023, doi: 10.3390/su15064919.
59. C. Işik *et al.*, "An Evaluation of the Tourism-Induced Environmental Kuznets Curve (T-EKC) Hypothesis: Evidence from G7 Countries," *Sustainability*, vol. 12, no. 21, p. 9150, Nov. 2020, doi: 10.3390/su12219150.
60. A. Erdem, E. Okoth, N. Demirtas, Y. Sogut, and S. Erdogan, "Do fiscal policies, energy productivity, and renewable energy generation contribute to environmental sustainability in EU countries? Evidence from new panel data estimators," *Renew. Energy*, vol. 262, p. 125453, Apr. 2026, doi: 10.1016/j.renene.2026.125453.
61. M. H. Pesaran, "Estimation and Inference in Large Heterogeneous Panels with a Multifactor Error Structure," *Econometrica*, vol. 74, no. 4, pp. 967–1012, Jul. 2006, doi: 10.1111/j.1468-0262.2006.00692.x.
62. M. Liang and E. George, "Environmental Sustainability and Sustainable Development: Insights From FinTech, Green Finance, and Natural Resource Dynamics in Emerging Economies," *Sustainable Development*, 2025, doi: 10.1002/sd.70512.
63. H. Yang and L. Li, "The role of technological-driven finance in promoting low-carbon energy expansion: Evidence from China with mediating and moderating channels," *Green Technologies and Sustainability*, vol. 4, no. 4, p. 100419, Oct. 2026, doi: 10.1016/j.grets.2026.100419.
64. H. S. Ali *et al.*, "Does quality institutions promote environmental quality?," *Environmental Science and Pollution Research*, vol. 26, no. 11, pp. 10446–10456, Apr. 2019, doi: 10.1007/s11356-019-04670-9.
65. S. Hebous and N. Vernon-Lin, "Cryptocarbon: How much is the corrective tax?," *Energy Econ.*, vol. 138, p. 107827, Oct. 2024, doi: 10.1016/j.eneco.2024.107827.
66. S. Wang, J. Li, and A. Razzaq, "Do environmental governance, technology innovation and institutions lead to lower resource footprints: An imperative trajectory for sustainability," *Resources Policy*, vol. 80, p. 103142, Jan. 2023, doi: 10.1016/j.resourpol.2022.103142.
67. C. Sun, "How are green finance, carbon emissions, and energy resources related in Asian sub-regions?," *Resources Policy*, vol. 83, p. 103648, Jun. 2023, doi: 10.1016/j.resourpol.2023.103648.