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# Economics




High School Students' Intentions

Community Action for Climate Change

Highlights

Credit Card Interest Rate Regulation

Educational Aspirations and Inequality

Discovering Thoughts, Inventing Future

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# Educational Aspirations and Inequality: Determinants of High School Students' Intentions to Pursue Higher Education Across Selected Countries

By Débora da Silva Antonio & Marina Silva da Cunha
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*Abstract-* Educational aspirations shape students' life trajectories yet remain unequally distributed across socioeconomic and family contexts. This article investigates determinants of high-school students' intentions to pursue higher education using 2022 PISA data. A multinomial logit model estimates the effects of individual, family, school, and regional factors across ten countries, covering developed and developing contexts. Students with greater cultural and socioeconomic capital, higher academic performance, stronger family and school support, and clearer vocational goals are more likely to aspire to higher education. Cross-national differences reflect institutional, cultural, and economic variation, with notable contrasts between Latin American countries, Finland, and South Korea. Grounded in Human Capital and Social Reproduction theories, the study advances understanding of how structural inequalities and individual expectations interact in shaping educational aspirations. These findings underscore the importance of targeted public policies and early interventions to ensure social origin does not determine educational opportunities.

*Keywords: higher education, educational aspirations, socioeconomic inequality, human capital, multinomial logit.*

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# Educational Aspirations and Inequality: Determinants of High School Students' Intentions to Pursue Higher Education Across Selected Countries

Débora da Silva Antonio [α] & Marina Silva da Cunha [σ]

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## I. Introduction

High school represents a pivotal stage in students' educational trajectories, during which decisions are made that have direct impacts on their life plans, such as continuing their studies or entering the workforce. Although higher education is widely recognized as a strategic factor for economic and social development, not all students intend to pursue further studies after this stage, particularly in contexts marked by significant educational and socioeconomic inequality.

In Brazil, data from the Higher Education Census indicate that only 27% of high school graduates in 2022 enrolled in higher education in 2023, with considerable variation according to the type of school: 58% in federal schools, 59% in private schools, and only 21% in state schools (Brazil, 2024). Furthermore, according to the Brazilian Institute of Geography and Statistics (IBGE), in 2023, only 21.6% of young people aged 18 to 24 were enrolled in undergraduate programs, with a higher enrollment rate among women (33.4%) than among men (27.7%).

These inequalities reflect not only differences in immediate access but also factors that influence the continuation of studies. Among young people aged 15 to 29 with a complete high school education or incomplete higher education, the main reason for not continuing their studies was the need to work, especially among men (54.9%) and white individuals (47.6%). Other relevant factors include the perception of having already reached the desired educational level, lack of interest, and insufficient financial resources. Among women, 14% cited household chores or caregiving responsibilities, while only 0.3% of men mentioned this reason (IBGE, 2023).

Understanding these factors requires engagement with the literature, which mobilizes two central theoretical frameworks. First, Human Capital Theory, which views education as an investment that increases productivity and income, generating both private and social benefits and guiding educational choices based on expected returns (Schultz, 1961; Becker, 1993). Second, the Theory of Social Reproduction (Bourdieu, 1986), which emphasizes how economic, social, and cultural capital, as well as embodied dispositions (habitus), shape life trajectories and reproduce inequalities, often under the guise of meritocracy (Bourdieu & Passeron, 1992). In this study, these theories are not tested as competing hypotheses but are employed as conceptual lenses to interpret how structural constraints and individual expectations interact in shaping educational intentions.

At the empirical level, studies indicate consistent effects of socioeconomic background and parental education, type of school, and academic performance or progression, with grade repetition acting as a barrier, particularly in Latin America (Sena, 2021; Zonta et al., 2022; Souza & Vazquez, 2015). Evidence also highlights gender inequalities in aspirations and informational constraints, such as limited knowledge of access mechanisms and financial aid, which reduce the intention to pursue higher education, especially among vulnerable groups (Deming & Dynarski, 2009; Perna, 2006; Amador, Cowan & Nillesen, 2022).

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From a comparative perspective, the influence of these determinants varies across countries, reflecting the specific institutional arrangements and educational pathways in each country. For instance, differences emerge between Latin American countries, Finland, with its distinction between academic and vocational tracks, and South Korea, where competitive dynamics shape aspirations (Varjo et al., 2020; Tolonen & Aapola-Kari, 2022; Choi, 2020; Kim & Kim, 2025).

Despite this evidence, the literature still presents limitations. National or local studies predominate, analyzing determinants of educational continuation in isolation. There is a relative scarcity of comparative investigations using standardized and recent data to contrast the Brazilian case with countries at different levels of development. This gap is particularly relevant, as it allows identification of whether the factors shaping educational intentions in Brazil, characterized by substantial inequalities, are reproduced in more equitable contexts or, conversely, reveal specific patterns. This is the space in which this article is situated, proposing a comparative analysis between Brazil and developed and developing countries.

In light of this scenario, this study seeks to answer the following question: How do social, educational, and familial inequalities shape high school students' intentions to enter higher education? Moreover, to what extent do these relationships differ between Brazil and other countries with different educational contexts and levels of development? The study is guided by the hypothesis that students with higher cultural and socioeconomic capital, better academic performance, greater vocational clarity, access to information, and family and school support are more likely to express the intention to pursue higher education.

To address this question, the objective of this study is to analyze the determinants of high school students' intention to enter higher education, based on data from the 2022 Programme for International Student Assessment (PISA), using logistic regression models. Specifically, the study aims to identify the socio-economic and academic profile of students considering their intentions to continue their studies; estimate the influence of socioeconomic, academic, and familial variables on these intentions; and compare the determinants of this intention between Brazil and high-income countries (United States, Finland, South Korea, Portugal, Chile, and Uruguay) and upper-middle-income countries (Argentina, Mexico, and Colombia).

The primary contribution of this research is to link the Brazilian case to different national realities, enabling an examination of how socioeconomic, academic, and familial variables interact in diverse contexts. In addition, focusing on intention, rather than solely on enrollment, enables identification of inequalities at early stages of the educational trajectory, enhancing understanding of the relationship between expectations and structural conditions. The results aim to provide support for the formulation of more effective public policies focused on promoting educational aspirations, reducing informational barriers, and strengthening support for vulnerable groups.

Beyond this introduction, the article is organized as follows: Section 2 presents the theoretical frameworks (Human Capital Theory and the Theory of Social Reproduction) and the empirical review on determinants of aspirations; Section 3 details the data, variables, and multinomial logit model; Section 4 presents descriptive statistics and model results; Section 5 discusses the findings, and Section 6 provides the concluding remarks.

## II. Theoretical and Empirical Framework

The decision to enter higher education is a complex phenomenon involving multiple theoretical and empirical dimensions. Over the past decades, different schools of thought have sought to explain how economic, social, cultural, and institutional factors shape individuals' educational aspirations and trajectories. In this context, it becomes essential to revisit classical theories and recent evidence that help to understand the mechanisms of social mobility associated with schooling and the barriers that limit access to and persistence in education for specific groups.

Initially, Human Capital Theory, developed by Schultz (1961) and Becker (1993), views education as an individual investment that increases productivity and generates future economic returns, considering both direct and opportunity costs. Schultz (1961) identifies five forms of investment in human capital—health, on-the-job training, formal education, adult education, and migration—highlighting education and training as decisive for economic development. Becker (1993) expands this perspective by including the social returns of schooling, such as health, civic participation, and family stability, reinforcing the need for public policies to reduce inequalities and promote educational equity.

In a critique of the economistic perspective on education, the Theory of Social Reproduction, developed by Bourdieu and Passeron (1992), highlights that schools are neither neutral nor meritocratic but act to perpetuate inequalities by valuing the cultural, economic, and social capital of dominant classes. Cultural capital, in its embodied form (dispositions acquired through family socialization, such as language and habits), objectified form (ownership of cultural goods), and institutionalized form (educational credentials), directly influences academic success. At the same time, habitus, formed by internalized dispositions of individuals, guides educational

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trajectories, favoring students whose families share the values legitimized by the school (Bourdieu, 1986; 2013).

The belief in merit as the sole determinant of academic success contributes to the maintenance of inequalities, as evidenced by phenomena such as "credential inflation," in which expanded access to education reduces the distinctive value of degrees and frustrates expectations of social mobility (Bourdieu, 1986; Bourdieu et al., 1992). Furthermore, the interaction between economic, cultural, and social capital explains the different strategies adopted by social classes. Elites, with greater resources, can prolong education or use it to reinforce their position; middle classes invest in schooling as a means of upward mobility; and lower-income groups, facing financial constraints and limited support networks, encounter greater barriers to advancing in education (Bourdieu et al., 1992).

In this sense, the decision to continue studies is influenced by multiple socioeconomic and cultural factors, as evidenced by national and international research. Studies in South Korea indicate that students from higher-income and more educated families tend to attend more prestigious high schools, thereby increasing their chances of admission to selective universities (Kim & Kim, 2025). Similar findings are observed in Brazil, where parental income and education are key determinants of the intention to pursue higher education (Sena, 2021; Zonta et al., 2022). Students' own perceptions reinforce this pattern: in São Paulo, students from lower-income backgrounds perceive their chances of access as limited, particularly to public universities (Souza & Vazquez, 2015). In the United States, Jacob and Wilder (2010) observed that while students from advantaged backgrounds tend to maintain or raise their expectations throughout schooling, those from disadvantaged backgrounds tend to lower them.

The structure of each country's education system is also a fundamental predictor of students' aspirations. In contexts of high inequality between school networks, such as in Brazil, the distinction between public and private schools creates divergent pathways: students in private schools tend to receive earlier and more targeted preparation for university, whereas public school students face more challenging paths (Teixeira, 2019). In other contexts, the primary differentiation occurs through the study tracks offered within the system itself. In South Korea, the choice between general and vocational high school is decisive, to the point that the factors influencing continuation of studies change drastically depending on the chosen track: academic performance prevails for students in the general track, while economic factors become more critical for those in the vocational track (Choi, 2020). The importance of the study track takes on an even deeper dimension in Finland, where qualitative research shows that the choice between academic and vocational paths is a complex process in which young people assess their own "value" and construct futures that reflect and reinforce their class origins (Varjo et al., 2020; Tolonen & Aapola-Kari, 2022).

Alongside school structure, individual academic performance and history emerge as consistent predictors. In his analysis of Latin America, Sena (2021) shows that higher scores in reading and mathematics increase aspirations, while grade repetition drastically reduces them, with significant differences between public and private networks. In Brazil, age-grade lag, often associated with grade repetition, also decreases the intention to continue studying (Zonta et al., 2022). Moreover, Carneiro and Heckman (2002), using data from the United States, argue that cognitive ability developed in childhood is more relevant than short-term financial constraints, reinforcing the importance of the entire educational trajectory.

Beyond material and academic resources, family and social influences shape educational choices. In South Korea, Park and Kim (2020) found that parental expectations have more influence on first-year students. In contrast, students seeking reentry place greater value on the social prestige of the university. In Brazil, explicit family encouragement is one of the most significant positive factors in young people's educational decisions (Braga & Xavier, 2016). Additionally, peer networks serve as a powerful channel of influence. In an experiment conducted in Mexico, Amador, Cowan, and Nillesen (2022) demonstrated that aspirations are malleable and that exposure to peers with higher expectations tends to expand students' own horizons, indicating that social interactions can both reinforce and redirect educational trajectories.

The literature also points to clear gender differences. In some countries, being female increases the likelihood of aspiring to higher educational levels, as noted by Sena (2021) in Latin America and Zonta et al. (2022) in Brazil, where female students were 9.2% more likely to intend to pursue higher education. In the United States, Goyette (2008) linked the rise in female expectations to the pursuit of careers that require higher levels of education. However, this advantage in aspirations does not eliminate inequalities, as studies such as Braga and Xavier (2016) in Brazil indicate that women, despite studying longer, still concentrate in fields with lower social prestige.

Financial constraints and access to information are decisive barriers. In the United States, Deming and Dynarski (2009) demonstrated that scholarships and financial aid causally increase enrollment rates among low-income students. However, access to these resources is often hindered by a lack of information. Perna (2006) highlighted that many young people underestimate the availability of financial aid, reducing their chances of entry. This issue is particularly acute in Brazil: in Barra do Bugres (MT), Obara et al. (2018)



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found that while the need to work is the main obstacle, few students are aware of student assistance programs. Similarly, Souza and Vazquez (2015) found that many students are unfamiliar with access mechanisms, including the National High School Exam (Enem) (23.2%), the University for All Program (Prouni) (35.5%), and the Unified Selection System (Sisu) (45.7%). Teixeira (2019) also found that private school students tend to have greater familiarity with these selection instruments, revealing informational inequalities between school networks.

The combined analysis of these studies reveals that the interaction between socioeconomic background, school trajectory, and access to information shapes the intention to pursue higher education. However, much of this research focuses on specific national or local contexts. Thus, a gap remains in the literature regarding quantitative, comparative studies that use recent and standardized data to investigate how these determinants operate across different education systems and levels of development. It is precisely this gap that the present article seeks to address through the methodology presented in the following section.

## III. Methodology

In this study, data from the 2022 Programme for International Student Assessment (PISA), made available by the Organization for Economic Co-operation and Development (OECD), were used. PISA is an international comparative study conducted every three years to evaluate the performance of 15-year-old students, an age at which basic compulsory education is generally expected to be completed in most countries. In addition to measuring skills in reading, mathematics, and science, PISA collects information on students' socioeconomic context, their attitudes toward learning, and factors that influence their performance both inside and outside the school environment (Brazil, 2025).

PISA results allow participating countries to assess their students' knowledge and skills in comparison with those of other nations. These data are essential for countries to learn from educational policies and practices adopted in different contexts and also serve as a basis for formulating policies and educational programs aimed at improving the quality and equity of learning outcomes (Brazil, 2025).

Since its first edition in 2000, the number of participating countries and economies in PISA has increased significantly. In 2022, 81 countries and economies participated in the program, including 37 OECD member countries and 44 partner countries/economies. Brazil has participated in PISA since its first edition, contributing to international comparative analysis and using the results to guide public education policies (OECD, 2023). For this study, in addition to Brazil, the following countries were selected for analysis: Argentina, Chile, Colombia, Mexico, Uruguay, and Portugal, due to their regional and cultural proximity to Brazil; the United States, for having a federal system and large territorial extension similar to Brazil; and South Korea and Finland, as developed countries that generally exhibit high PISA performance.

The analytical method selected is the multinomial logit (MNL) model, suitable for dependent variables with more than two unordered categories (Wooldridge, 2002). In this context, the dependent variable (y) corresponds to students' educational expectations, obtained from question ST327 of the 2022 PISA student questionnaire, based on the International Standard Classification of Education (ISCED) of the United Nations Educational, Scientific, and Cultural Organization (UNESCO). The original responses, which range from "less than ISCED 2" to ISCED 8, were grouped into three categories: (i) Basic education (ISCED 0 to 4), (ii) Associate degree (ISCED 5), and (iii) Higher education (ISCED 6 to 8). When more than one option was selected, only the highest level reported by the student was considered. Thus, the MNL models the probability that an individual i chooses alternative $j$ ($j = 0, 1, 2$) as:

$$P(y = j \mid x) = \exp(x\beta_j) / [1 + \sum \exp(x\beta h)] \quad (1)$$

Where $y$ is a random variable that takes values $\{0,1, \ldots, j\}$ for $J$ categories; $x$ is a vector of observable individual characteristics; and $\beta_j$ are the parameters estimated for each alternative $j$, with $\beta_0 = 0$ (reference category).

The interpretation of the parameters in the multinomial logit model is carried out through the relative *odds ratios*, as expressed in the equation:

$$\text{Log } [p_j(x, \beta) / p_h(x, \beta)] = x(\beta_j - \beta_h) \quad (2)$$

Therefore, the direction of the partial effects in the multinomial model is not determined solely by the coefficient $\beta j$, unlike in the binary case ($J = 1$). The estimated coefficients represent effects relative to the reference category (basic education), where a relative risk ratio (RRR) greater than 1 indicates that, for a one-unit increase in the independent variable, the relative likelihood of belonging to the analyzed category (associate degree or higher education) compared to the reference category (basic education) increases. Conversely, a relative risk ratio below 1 suggests a reduction in this relative likelihood.

The explanatory variables were defined based on the literature, encompassing individual, family, and school characteristics of the students. At the individual level, gender and wealth were considered (an index capturing the material resources and goods available at home, serving as a proxy for family wealth). Regarding



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family characteristics, parental education was included (ranging from "1," less than ISCED 1, to "10," corresponding to ISCED 8) as well as family support (an index measuring the frequency of support received in relation to school life and emotional well-being).

Additionally, a variable indicating whether the student has clarity about their future occupation was included, along with two further indices: career information-seeking (measuring the extent to which the student seeks information about professional options) and growth mindset (assessing the student's belief in their ability to develop skills through effort, persistence, and practical strategies).

Concerning school characteristics, the following were considered: PISA performance, grade repetition history, school management type (public or private), school belonging index (measuring socioemotional well-being within the school environment), and weekly frequency of study or homework outside of school hours (on a scale from 0, none, to 10, ten or more study sessions per week). Finally, control variables related to student nationality were included, based on the information available in the PISA database.

*Chart 1:* Description of Explanatory Variables

| Variable | Description |
|---|---|
| *Career and Mindset Indices* | |
| Vocational clarity | Equals 1 if the student has a clear idea about their future job and 0 otherwise. |
| Information seeking | Index measuring the extent to which students seek information about future careers. |
| Growth mindset | Index measuring students' mindset regarding the development of their skills. |
| *Individual Characteristics* | |
| Gender | Equals 1 for male and 0 otherwise. |
| Wealth | Index measuring the level of material resources and assets available in the student's household. |
| *Family Characteristics* | |
| Mother's education | Mother's level of education. |
| Father's education | Father's level of education. |
| Family support | Index measuring the frequency of family support perceived by students. |
| *School Characteristics* | |
| Grade repetition | Equal to 1 if the student has repeated a grade at least once, and 0 otherwise. |
| Math performance | Student's performance in mathematics. |
| Reading perform. | Student's performance in reading. |
| Science perform. | Student's performance in science. |
| School type | Equal to 1 if the school is public, and 0 otherwise. |
| School belonging | Index measuring socioemotional well-being in the school environment. |
| Studying at home | Frequency with which students study or do homework outside school hours. |
| *Regional Characteristics* | |
| Argentina | Equal to 1 if residing in Argentina, 0 otherwise. |
| Brazil | Equal to 1 if residing in Brazil, 0 otherwise. |
| Chile | Equal to 1 if residing in Chile, 0 otherwise. |
| Colombia | Equal to 1 if residing in Colombia, 0 otherwise. |
| South Korea | Equal to 1 if residing in South Korea, 0 otherwise. |
| United States | Equal to 1 if residing in the United States, 0 otherwise. |
| Finland | Equal to 1 if residing in Finland, 0 otherwise. |
| Mexico | Equal to 1 if residing in Mexico, 0 otherwise. |
| Portugal | Equal to 1 if residing in Portugal, 0 otherwise. |
| Uruguay | Equal to 1 if residing in Uruguay, 0 otherwise |

*Source: Author's elaboration.*



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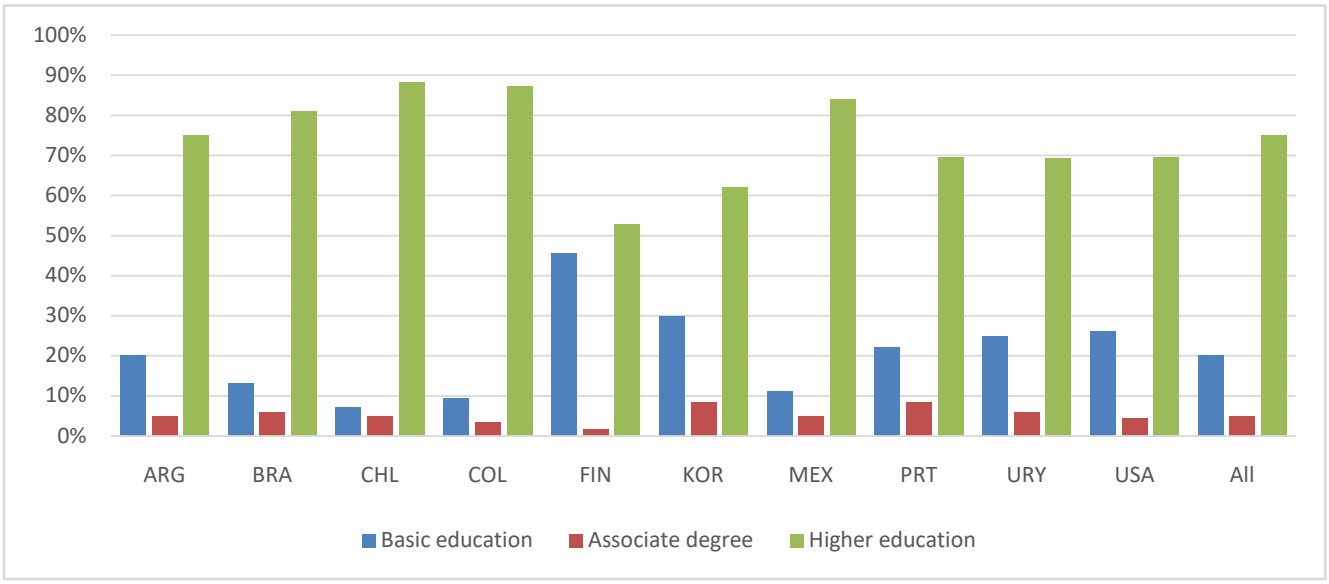
To ensure the robustness of the results, the Wald test was conducted to examine combinations of the dependent variable categories, and the Hausman test was applied to verify the validity of the independence of irrelevant alternatives (IIA) assumption. This assumption establishes that the odds ratio between any two choices is independent of the presence or absence of other alternatives in the choice set, a fundamental requirement for using the multinomial logit model (Hausman & McFadden, 1984; Wooldridge, 2002). After excluding observations with missing values in any of the selected variables, the final sample consisted of 46,875 students distributed across the ten countries analyzed.

## IV. Results

### a) *Descriptive Statistics*

Figure 1 shows the distribution of educational expectations among high school students in the countries analyzed. In all contexts, there is a predominance of aspirations toward higher education, although with varying intensity. In Brazil, approximately 81% of students report an intention to pursue higher education, a proportion similar to that observed in other Latin American countries. In Finland and South Korea, however, the distribution is more balanced across categories, suggesting a greater appreciation for alternative educational paths. These results confirm the dominance of higher education as the main educational goal but reveal relevant differences between countries, possibly associated with institutional, cultural, and economic factors.




*Source: Authors' elaboration based on PISA 2022 data.*

*Figure 1:* Educational Expectation by Selected Country

Table 1 presents the descriptive statistics of the explanatory variables, providing an overview of the student profile according to their intention to continue studying. The results show that students who aspire to higher education tend to have greater vocational clarity, seek more information about careers, and exhibit a more developed growth mindset compared to those who intend to pursue only basic education. In addition, they display more favorable socioeconomic conditions, reflected in higher wealth indices. It is also observed that the male presence is more pronounced among those who plan to complete only basic education or opt for technological-level courses.

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*Table 1:* Descriptive Statistics of the Explanatory Variables

| Variable | Basic Education | | Associate degree | | Higher Education | | All | |
|---|---|---|---|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D | Mean | S.D. | Mean | S.D. |
| *Career and Mindset Indices* | | | | | | | | |
| Vocational clarity | 0.75 | 0.01 | 0.88 | 0.01 | 0.89 | 0.00 | 0.86 | 0.004 |
| Information seeking | -0.32 | 0.02 | -0.15 | 0.04 | 0.02 | 0.01 | -0.05 | 0.01 |
| Growth mindset | 0.08 | 0.02 | 0.13 | 0.03 | 0.21 | 0.01 | 0.18 | 0.01 |
| *Individual Characteristics* | | | | | | | | |
| Gender | 0.59 | 0.01 | 0.59 | 0.02 | 0.43 | 0.00 | 0.47 | 0.004 |
| Wealth | -0.43 | 0.03 | -0.53 | 0.04 | -0.31 | 0.02 | -0.34 | 0.021 |
| *Family Characteristics* | | | | | | | | |
| Mother's education | 5.59 | 0.07 | 5.78 | 0.11 | 6.40 | 0.04 | 6.21 | 0.042 |
| Father's education | 5.29 | 0.07 | 5.36 | 0.08 | 6.12 | 0.05 | 5.92 | 0.043 |
| Family support | -0.18 | 0.02 | -0.13 | 0.04 | 0.13 | 0.01 | 0.05 | 0.012 |
| *School Characteristics* | | | | | | | | |
| Grade repetition | 0.13 | 0.01 | 0.10 | 0.01 | 0.09 | 0.00 | 0.10 | 0.004 |
| Math performance | 433.77 | 2.98 | 436.60 | 4.30 | 449.96 | 2.31 | 446.04 | 2.19 |
| Reading performance | 460.58 | 3.46 | 466.64 | 4.71 | 486.41 | 2.41 | 480.23 | 2.291 |
| Science performance | 462.41 | 3.48 | 463.16 | 4.82 | 480.10 | 2.54 | 475.71 | 2.367 |
| Study. at home | 4.17 | 0.07 | 4.98 | 0.13 | 5.81 | 0.05 | 5.44 | 0.046 |
| School type | 0.92 | 0.01 | 0.88 | 0.01 | 0.85 | 0.01 | 0.86 | 0.008 |
| School belonging | -0.32 | 0.02 | -0.27 | 0.04 | -0.12 | 0.01 | -0.17 | 0.011 |
| *Regional Characteristics* | | | | | | | | |
| Argentina | 0.04 | - | 0.04 | - | 0.04 | - | 0.04 | - |
| Brazil | 0.11 | - | 0.21 | - | 0.19 | - | 0.17 | - |
| Chile | 0.01 | - | 0.02 | - | 0.02 | - | 0.02 | - |
| Colombia | 0.03 | - | 0.04 | - | 0.07 | - | 0.06 | - |
| South Korea | 0.09 | - | 0.10 | - | 0.05 | - | 0.06 | - |
| United States | 0.61 | - | 0.41 | - | 0.43 | - | 0.47 | - |
| Finland | 0.02 | - | 0.00 | - | 0.00 | - | 0.01 | - |
| Mexico | 0.09 | - | 0.16 | - | 0.18 | - | 0.16 | - |
| Portugal | 0.01 | - | 0.02 | - | 0.01 | - | 0.01 | - |
| Uruguay | 0.00 | - | 0.00 | - | 0.00 | - | 0.00 | - |
| Total | 1 | - | 1 | - | 1 | - | 1 | - |

*Source: Authors' elaboration based on 2022 PISA data.*

Students aspiring to higher education also exhibit advantages in family and school contexts: they have parents with higher educational attainment, report higher levels of support, and stand out for lower rates of grade repetition, higher academic performance, greater dedication to studying, and a stronger sense of school belonging. Additionally, the lower presence of students from public schools in this group suggests inequalities in access and opportunity.

In regional terms, the composition of the final sample is uneven. Countries such as Brazil and Mexico contribute a high number of observations (see Table 2). However, when sample weights are applied to ensure population representativeness, the United States becomes the most influential in the weighted sample, reflecting its vast student population.

Thus, Table 1 shows that the intention to pursue higher education is not randomly distributed. It is strongly associated with a student profile that has more resources (economic, cultural, and support-related), a more successful school trajectory, and a more future-oriented and planned attitude.

Table 2 presents the descriptive statistics of the independent variables for the ten selected countries. A comparative analysis of the data reveals significant particularities regarding the context of Brazilian students relative to other countries.

Regarding the career and mindset indices, Brazil shows notably distinct values. The country ranks highest in vocational clarity and growth mindset, surpassing even highly developed nations. However, these findings coexist with one of the lowest scores in



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seeking career information, falling far behind Finland's performance. This discrepancy suggests that Brazilian students' professional clarity, although high, may be more subjective than based on concrete information.

Furthermore, the analysis of individual and family characteristics highlights pronounced socio-economic vulnerability. Brazil records the second-lowest family wealth index among the selected countries, exceeded only by Colombia. This condition is compounded by low parental education levels, indicating lower cultural and educational capital in the home environment, a pattern similar to that observed in other Latin American countries. Additionally, the perceived family support indicator is the lowest across the group, which may imply a lower perception of parental support for academic and personal matters.

School-related variables also reveal a challenging scenario. Brazil shows the second-highest rate of grade repetition, in contrast to the virtually nonexistent rates in high-performing educational systems such as those of Finland and South Korea. Academic performance in mathematics, Portuguese, and science is consistently low, aligning the country with other Latin American nations and highlighting a significant learning gap. Interestingly, the high dedication to studying at home does not translate into better academic outcomes. Moreover, the pre-dominance of students from the public school system in the sample indicates that these challenges largely reflect the reality of the country's public education system. From a broader perspective, this proportion is lower than in almost entirely public systems, such as those of Finland and the United States, but drastically higher than in Chile, where private school participation is the highest in the sample. Finally, the sense of school belonging is also unfavorable, with Brazil presenting one of the lowest indicators, suggesting a weaker connection of students to the school environment.

In summary, the profile of Brazilian students, when compared to those in other countries, is characterized by a contrast between subjective optimism (high vocational clarity and a growth mindset) and the reality of structural disadvantages (low wealth, low parental education, limited family support, and high rates of grade repetition). It is therefore concluded that the analysis of determinants of higher education intentions must incorporate structural inequalities between countries, as these factors vary substantially and can influence young people's educational aspirations in different ways.



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*Table 2:* Descriptive Statistics of the Explanatory Variables by Selected Country

| Variable | ARG | | BRA | | CHL | | COL | | FIN | | KOR | | MEX | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Mean | S.D. | Mean | S.D. | Mean | S.D. | Mean | S.D. | Mean | S.D. | Mean | S.D. | Mean | S.D. |
| *Career and Mindset Indices* | | | | | | | | | | | | | | |
| Vocational clarity | 0.86 | 0.01 | 0.94 | 0.00 | 0.84 | 0.01 | 0.91 | 0.00 | 0.62 | 0.01 | 0.88 | 0.01 | 0.90 | 0.01 |
| Information seeking. | -0.20 | 0.02 | -0.16 | 0.02 | 0.06 | 0.02 | 0.18 | 0.01 | 0.45 | 0.01 | -0.20 | 0.02 | -0.03 | 0.02 |
| Growth mindset | 0.23 | 0.02 | 0.31 | 0.02 | 0.19 | 0.02 | 0.09 | 0.02 | -0.01 | 0.02 | -0.02 | 0.02 | 0.05 | 0.02 |
| *Individual Characteristics* | | | | | | | | | | | | | | |
| Gender | 0.47 | 0.01 | 0.46 | 0.01 | 0.50 | 0.01 | 0.47 | 0.01 | 0.48 | 0.01 | 0.50 | 0.02 | 0.47 | 0.01 |
| Wealth | -0.67 | 0.03 | -1.08 | 0.02 | -0.52 | 0.03 | -1.22 | 0.04 | 0.30 | 0.01 | 0.41 | 0.03 | -0.95 | 0.03 |
| *Family Characteristics* | | | | | | | | | | | | | | |
| Mother's education | 6.39 | 0.07 | 5.72 | 0.05 | 6.29 | 0.06 | 5.59 | 0.07 | 7.28 | 0.04 | 6.21 | 0.06 | 5.21 | 0.07 |
| Father's education | 5.88 | 0.09 | 5.36 | 0.05 | 6.15 | 0.06 | 5.25 | 0.08 | 6.81 | 0.05 | 6.33 | 0.06 | 5.33 | 0.07 |
| Family support | -0.06 | 0.02 | -0.09 | 0.02 | -0.03 | 0.02 | 0.35 | 0.02 | 0.05 | 0.02 | 0.09 | 0.02 | 0.00 | 0.02 |
| *School Characteristics* | | | | | | | | | | | | | | |
| Grade repetition | 0.08 | 0.01 | 0.15 | 0.01 | 0.12 | 0.01 | 0.34 | 0.01 | 0.01 | 0.00 | 0.03 | 0.00 | 0.06 | 0.01 |
| Math performance | 409.19 | 2.62 | 397.90 | 2.00 | 428.51 | 2.25 | 399.86 | 2.81 | 499.11 | 1.99 | 536.75 | 3.50 | 407.32 | 2.37 |
| Reading performance | 441.34 | 2.94 | 437.60 | 2.58 | 466.12 | 2.91 | 430.21 | 3.57 | 511.15 | 2.27 | 524.74 | 3.19 | 431.08 | 3.18 |
| Science performance | 442.54 | 2.59 | 428.12 | 2.44 | 464.30 | 2.67 | 430.70 | 3.36 | 528.99 | 2.59 | 538.85 | 3.26 | 423.20 | 2.57 |
| Studying at home | 4.51 | 0.06 | 6.13 | 0.05 | 4.39 | 0.06 | 7.33 | 0.06 | 5.00 | 0.06 | 5.57 | 0.09 | 6.84 | 0.06 |
| School type | 0.56 | 0.02 | 0.84 | 0.02 | 0.34 | 0.02 | 0.77 | 0.02 | 0.95 | 0.01 | 0.68 | 0.03 | 0.85 | 0.02 |
| School belonging | -0.11 | 0.02 | -0.15 | 0.02 | -0.20 | 0.02 | -0.14 | 0.02 | 0.13 | 0.01 | 0.29 | 0.02 | -0.15 | 0.02 |
| N° observations | 5,393 | | 5,031 | | 3,767 | | 5,079 | | 6,540 | | 5,352 | | 4,442 | |

*Source: Authors' elaboration based on PISA 2022 data.*

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*b) Estimation Results*

The estimation results of the multinomial logit model are presented in Tables 3 and 4, where the dependent variable represents students' educational aspirations, categorized as basic education, associate degree, and higher education, with basic education as the reference category. Initially, the model was estimated using only the career- and mindset-related indices as explanatory variables (Model 1). In the next step, variables related to individual, family, and school characteristics were incorporated (Model 2). Finally, regional variables were added to capture potential contextual effects (Model 3). Subsequently, the full model was estimated using replicate weights, following OECD methodological recommendations, both for the overall sample and for each country disaggregated.

To verify the model's fit, two statistical tests were conducted. First, the Wald test for the combination of dependent variable categories rejected the null hypothesis that the coefficients are equal to zero, confirming the suitability of the multinomial logit model to capture differences in aspirations between basic education, associate degree, and higher education. Second, the Hausman test confirmed the independence of irrelevant alternatives (IIA) assumption, indicating that the multinomial logit model is the most suitable for analyzing the data, as it captures heterogeneity across educational aspiration categories.

Overall, the results in Table 3 indicate that career- and mindset-related indices have a significant influence on the intention to pursue higher education. Vocational clarity exhibited the most potent effects across all models, showing that having a defined vision of one's future profession more than doubles a student's relative likelihood of aspiring to university over basic education. While active career information seeking and a growth mindset are also positively associated with higher aspirations, their effects are comparatively modest, reinforcing that concrete life planning is the main individual driver of educational expectations.

Among individual characteristics, being male nearly halves the likelihood of aspiring to higher education, whereas family wealth increases it. In the family domain, parental education and perceived family support also raise the relative probability of aiming for university. Although these effects are smaller than those of vocational clarity, they demonstrate that the family environment continues to shape youth opportunities and expectations.

School characteristics also exerted a strong influence. Among the factors with a negative impact, grade repetition is one of the strongest, reducing the probability of aspiring to higher education by more than 32%. Attending a public school also decreases this likelihood. Conversely, study time at home and a sense of school belonging increase the probability. Academic performance, while significant, had a relatively small magnitude of effect.

Finally, important cross-country differences were observed. Compared to students from the United States, those from Latin American countries and Portugal have higher odds of aspiring to higher education, which is often viewed as the primary pathway to social mobility. In contrast, Finland exhibits a greater appreciation for alternative pathways, while South Korea demonstrates a distinct preference for associate degree programs, reflecting the specific characteristics of their respective educational systems.

*Table 3:* Estimated Effects on Educational Aspirations, Associate degree (A) and Higher Education (H)

| Variable | Model 1 | | Model 2 | | Model 3 | | Model 3 (With Replicate Weights) | |
|---|---|---|---|---|---|---|---|---|
| | A | H | A | H | A | H | A | H |
| *Career and Mindset Indices* | | | | | | | | |
| Voca. clarity | 2.241$^{\Delta}$ | 2.467$^{\Delta}$ | 2.138$^{\Delta}$ | 2.297$^{\Delta}$ | 1.897$^{\Delta}$ | 2.077$^{\Delta}$ | 1.903$^{\Delta}$ | 2.073$^{\Delta}$ |
| Info. seeking | 1.201$^{\Delta}$ | 1.464$^{\Delta}$ | 1.193$^{\Delta}$ | 1.371$^{\Delta}$ | 1.214$^{\Delta}$ | 1.370$^{\Delta}$ | 1.210$^{\Delta}$ | 1.366$^{\Delta}$ |
| Growth mind | 1.055 | 1.155$^{\Delta}$ | 1.043 | 1.138$^{\Delta}$ | 1.043 | 1.112$^{\Delta}$ | 1.043$^{\Delta}$ | 1.116$^{\Delta}$ |
| *Individual Characteristics* | | | | | | | | |
| Gender | | | 1.091 | 0.545$^{\Delta}$ | 1.061 | 0.506$^{\Delta}$ | 1.018$^{\Delta}$ | 0.497$^{\Delta}$ |
| Wealth | | | 0.838$^{\Delta}$ | 0.808$^{\Delta}$ | 1.015 | 1.092$^{O}$ | 1.004$^{\Delta}$ | 1.089$^{\Delta}$ |
| *Family Characteristics* | | | | | | | | |
| Mother's education | | | 1.053$^{O}$ | 1.101$^{\Delta}$ | 1.069$^{\Delta}$ | 1.112$^{\Delta}$ | 1.068$^{\Delta}$ | 1.112$^{\Delta}$ |
| Father's education | | | 1.004 | 1.099$^{\Delta}$ | 1.004 | 1.092$^{\Delta}$ | 1.003$^{\Delta}$ | 1.093$^{\Delta}$ |
| Family support | | | 0.987 | 1.149$^{\Delta}$ | 1.013 | 1.178$^{\Delta}$ | 1.019$^{\Delta}$ | 1.179$^{\Delta}$ |
| *School Characteristics* | | | | | | | | |
| Grade repetition | | | 0.652$^{\Delta}$ | 0.730$^{\Delta}$ | 0.615$^{\Delta}$ | 0.671$^{\Delta}$ | 0.626$^{\Delta}$ | 0.679$^{\Delta}$ |
| Math performance | | | 1.000 | 1.001$^{O}$ | 0.999 | 1.002$^{\Delta}$ | 1.000$^{\Delta}$ | 1.002$^{\Delta}$ |

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| | | | | | | |
|---|---|---|---|---|---|---|
| Reading performance | 1.002$^{\Delta}$ | 1.002$^{\Delta}$ | 1.003$^{\Delta}$ | 1.002$^{\Delta}$ | 1.001$^{\Delta}$ | 1.001$^{\Delta}$ |
| Science performance | 0.997* | 0.998* | 0.998$^{O}$ | 0.998* | 0.998$^{\Delta}$ | 0.999$^{\Delta}$ |
| Studying at home | 1.069$^{\Delta}$ | 1.140$^{\Delta}$ | 1.033* | 1.092$^{\Delta}$ | 1.033$^{\Delta}$ | 1.092$^{\Delta}$ |
| School type | 0.632$^{\Delta}$ | 0.572$^{\Delta}$ | 0.858 | 0.795$^{\Delta}$ | 0.858$^{\Delta}$ | 0.792$^{\Delta}$ |
| School belonging | 1.026 | 1.175$^{\Delta}$ | 1.003 | 1.183$^{\Delta}$ | 1.002$^{\Delta}$ | 1.183$^{\Delta}$ |
| *Regional Characteristics* | | | | | | |
| Argentina | | | 1.687$^{\Delta}$ | 2.129$^{\Delta}$ | 1.673$^{\Delta}$ | 2.105$^{\Delta}$ |
| Brazil | | | 3.301$^{\Delta}$ | 4.034$^{\Delta}$ | 3.317$^{\Delta}$ | 4.012$^{\Delta}$ |
| Chile | | | 4.751$^{\Delta}$ | 6.891$^{\Delta}$ | 4.730$^{\Delta}$ | 6.854$^{\Delta}$ |
| Colombia | | | 2.751$^{\Delta}$ | 5.658$^{\Delta}$ | 2.687$^{\Delta}$ | 5.558$^{\Delta}$ |
| South Korea | | | 1.593$^{\Delta}$ | 0.534$^{\Delta}$ | 1.520$^{\Delta}$ | 0.543$^{\Delta}$ |
| United States | | | 1 | 1 | 1 | 1 |
| Finland | | | 0.196$^{\Delta}$ | 0.287$^{\Delta}$ | 0.191$^{\Delta}$ | 0.287$^{\Delta}$ |
| Mexico | | | 2.982$^{\Delta}$ | 4.495$^{\Delta}$ | 2.977$^{\Delta}$ | 4.517$^{\Delta}$ |
| Portugal | | | 2.382$^{\Delta}$ | 1.129$^{O}$ | 2.320$^{\Delta}$ | 1.144$^{\Delta}$ |
| Uruguay | | | 1.587$^{\Delta}$ | 1.442$^{\Delta}$ | 1.579$^{\Delta}$ | 1.440$^{\Delta}$ |
| *Statistics* | | | | | | |
| Number of observations | 46.875 | 46.875 | | 46.875 | | 46.875 |
| Pseudo $R^2$ | 0.0323 | 0.1015 | | 0.1382 | | - |
| Prob > chi2 | 0.0000 | 0.0000 | | 0.0000 | | - |

*Source: Authors' elaboration based on PISA 2022 data.*

*Note: (Δ) Significant at 1%; (*) Significant at 5%; (O) Significant at 10%.*

The analysis of the country-specific estimates (Table 4) shows how the determinants of educational expectations vary across national contexts. Career- and mindset-related factors are influential in most countries. In Brazil, vocational clarity, information-seeking, and a growth mindset are positively associated with the intention to pursue higher education. However, the magnitude of these effects is generally more modest compared to countries such as Argentina, the United States, and Mexico, where career planning appears even more decisive.

Individual and family characteristics also vary in impact. In Brazil, as in Chile and Portugal, a gender divide is observed, with men more inclined toward associate degrees and women toward higher education. Socioeconomic factors, such as family wealth and parental education, are significant in Brazil, but they exert less influence than in countries like Portugal, Finland, and the United States, where family social and educational capital carries greater weight. Additionally, perceived family support had a positive impact in Brazil, but again with a smaller magnitude than in Mexico, Portugal, and the United States, where family support proves particularly relevant in shaping educational aspirations.

Regarding school characteristics, a history of grade repetition in Brazil significantly reduces the chances of aspiring to higher education, a trend similar to other Latin American countries, contrasting with Finland and South Korea, where the effect is positive. Similarly, attending a public school reduces the aspiration for higher education in Brazil and the United States, but has the opposite effect in Mexico, Colombia, and Portugal, possibly reflecting higher relative quality or value of public schools in these contexts. Furthermore, school belonging and study time are positive in Brazil, but with lower intensity than in other contexts. Interestingly, academic performance alone has a low impact across all countries.

In summary, the analysis reveals a key finding regarding the development of educational aspirations. A student's decision to pursue higher education is shaped by both their socioeconomic context and personal initiatives. On the one hand, factors such as parental education, family wealth, and the type of school attended confirm that background conditions continue to significantly influence educational trajectories. On the other hand, the most notable finding of this study is the substantial impact of vocational clarity. Having a defined career plan shows a consistently stronger association with the intention to pursue higher education than many socioeconomic variables, indicating that career planning can be a decisive factor in overcoming the disadvantages of origin. However, the student's school trajectory directly affects this process: the substantial negative impact of grade repetition demonstrates that academic failure can limit the young person's potential for initiative, reinforcing existing barriers.



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*Table 4:* Estimated Effects on Educational Expectations by Selected Country, Associate degree (A) and Higher Education (H)

| Variable | ARG | | BRA | | CHL | | COL | | FIN | | KOR | | MEX | | PRT | | URY | | USA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | H | A | H | A | H | A | H | A | H | A | H | A | H | A | H | A | H | A | H |
| *Career and Mindset Indices* | | | | | | | | | | | | | | | | | | | | |
| Voca. clarity | 2.459$^{\Delta}$ | 2.004$^{\Delta}$ | 1.171$^{\Delta}$ | **1.942$^{\Delta}$** | 1.380$^{\Delta}$ | 1.935$^{\Delta}$ | 1.400$^{\Delta}$ | 1.885$^{\Delta}$ | 1.286$^{\Delta}$ | 1.783$^{\Delta}$ | 2.139$^{\Delta}$ | 1.198$^{\Delta}$ | 1.118$^{\Delta}$ | 2.035$^{\Delta}$ | 1.255$^{\Delta}$ | 2.044$^{\Delta}$ | 1.592* | 1.564$^{\Delta}$ | 2.485$^{\Delta}$ | 2.202$^{\Delta}$ |
| Info. seeking | 1.287$^{\Delta}$ | 1.404$^{\Delta}$ | 0.983$^{\Delta}$ | **1.208$^{\Delta}$** | 1.077$^{\Delta}$ | 1.279$^{\Delta}$ | 1.442$^{\Delta}$ | 1.433$^{\Delta}$ | 1.362$^{\Delta}$ | 1.137$^{\Delta}$ | 0.973$^{\Delta}$ | 1.171$^{\Delta}$ | 1.200$^{\Delta}$ | 1.304$^{\Delta}$ | 0.980$^{\Delta}$ | 1.080$^{\Delta}$ | 1.270$^{\Delta}$ | 1.229$^{\Delta}$ | 1.388$^{\Delta}$ | 1.525$^{\Delta}$ |
| Growth mindset | 1.066$^{\Delta}$ | 1.076$^{\Delta}$ | 1.042$^{\Delta}$ | **1.099$^{\Delta}$** | 0.936$^{\Delta}$ | 1.109$^{\Delta}$ | 1.038$^{\Delta}$ | 1.041$^{\Delta}$ | 0.902$^{\Delta}$ | 1.054$^{\Delta}$ | 0.984$^{\Delta}$ | 1.012$^{\Delta}$ | 0.947$^{\Delta}$ | 1.043$^{\Delta}$ | 1.020$^{\Delta}$ | 1.000$^{\Delta}$ | 0.929$^{\Delta}$ | 1.026$^{\Delta}$ | 1.123$^{\Delta}$ | 1.206$^{\Delta}$ |
| *Individual Characteristics* | | | | | | | | | | | | | | | | | | | | |
| Gender | 0.723$^{\Delta}$ | 0.572$^{\Delta}$ | 1.254$^{\Delta}$ | **0.534$^{\Delta}$** | 1.037$^{\Delta}$ | 0.526$^{\Delta}$ | 1.537$^{\Delta}$ | 0.548$^{\Delta}$ | 1.154$^{\Delta}$ | 0.593$^{\Delta}$ | 0.937$^{\Delta}$ | 0.830$^{\Delta}$ | 0.950$^{\Delta}$ | 0.466$^{\Delta}$ | 1.133$^{\Delta}$ | 0.579$^{\Delta}$ | 0.937$^{\Delta}$ | 0.510$^{\Delta}$ | 0.958$^{\Delta}$ | 0.442$^{\Delta}$ |
| Wealth | 1.060$^{\Delta}$ | 1.084$^{\Delta}$ | 1.304$^{\Delta}$ | **1.156$^{\Delta}$** | 0.930$^{\Delta}$ | 1.077$^{\Delta}$ | 0.969$^{\Delta}$ | 1.038$^{\Delta}$ | 1.484$^{\Delta}$ | 1.085$^{\Delta}$ | 1.343$^{\Delta}$ | 1.182$^{\Delta}$ | 0.935$^{\Delta}$ | 1.225$^{\Delta}$ | 1.108$^{\Delta}$ | 1.441$^{\Delta}$ | 0.969$^{\Delta}$ | 1.190$^{\Delta}$ | 0.926$^{\Delta}$ | 1.042$^{\Delta}$ |
| *Family Characteristics* | | | | | | | | | | | | | | | | | | | | |
| Mother's edu. | 1.044$^{\Delta}$ | 1.063$^{\Delta}$ | 0.973$^{\Delta}$ | **1.058$^{\Delta}$** | 1.185$^{\Delta}$ | 1.107$^{\Delta}$ | 1.052$^{\Delta}$ | 1.091$^{\Delta}$ | 0.931$^{\Delta}$ | 1.110$^{\Delta}$ | 1.050$^{\Delta}$ | 1.302$^{\Delta}$ | 1.102$^{\Delta}$ | 1.090$^{\Delta}$ | 0.971$^{\Delta}$ | 1.116$^{\Delta}$ | 0.949$^{\Delta}$ | 1.050$^{\Delta}$ | 1.128$^{\Delta}$ | 1.116$^{\Delta}$ |
| Father's edu. | 1.025$^{\Delta}$ | 1.060$^{\Delta}$ | 1.073$^{\Delta}$ | **1.074$^{\Delta}$** | 0.954$^{\Delta}$ | 1.033$^{\Delta}$ | 0.926$^{\Delta}$ | 0.984$^{\Delta}$ | 1.229$^{\Delta}$ | 1.094$^{\Delta}$ | 1.095$^{\Delta}$ | 1.306$^{\Delta}$ | 0.902$^{\Delta}$ | 1.033$^{\Delta}$ | 1.078$^{\Delta}$ | 1.116$^{\Delta}$ | 0.978$^{\Delta}$ | 1.035$^{\Delta}$ | 0.985$^{\Delta}$ | 1.114$^{\Delta}$ |
| Family support | 1.040$^{\Delta}$ | 1.144$^{\Delta}$ | 1.034$^{\Delta}$ | **1.122$^{\Delta}$** | 1.312$^{\Delta}$ | 1.176$^{\Delta}$ | 1.000$^{\Delta}$ | 1.176$^{\Delta}$ | 0.883$^{\Delta}$ | 1.150$^{\Delta}$ | 0.891$^{\Delta}$ | 0.988$^{\Delta}$ | 1.170$^{\Delta}$ | 1.226$^{\Delta}$ | 1.080$^{\Delta}$ | 1.218$^{\Delta}$ | 0.932$^{\Delta}$ | 1.080$^{\Delta}$ | 0.928$^{\Delta}$ | 1.208$^{\Delta}$ |
| *School Characteristics* | | | | | | | | | | | | | | | | | | | | |
| Grade repetition | 0.514$^{\Delta}$ | 0.702$^{\Delta}$ | 0.778$^{\Delta}$ | **0.703$^{\Delta}$** | 0.729$^{\Delta}$ | 0.660$^{\Delta}$ | 0.745$^{\Delta}$ | 0.937$^{\Delta}$ | 1.408 | 1.259$^{\Delta}$ | 1.480$^{\Delta}$ | 1.190$^{\Delta}$ | 0.626$^{\Delta}$ | 0.511$^{\Delta}$ | 0.893$^{\Delta}$ | 0.524$^{\Delta}$ | 0.874$^{\Delta}$ | 0.789$^{\Delta}$ | 0.391* | 0.711$^{\Delta}$ |
| Math perform. | 1.001$^{\Delta}$ | 1.000$^{\Delta}$ | 0.998$^{\Delta}$ | **1.001$^{\Delta}$** | 0.995$^{\Delta}$ | 1.002$^{\Delta}$ | 1.003$^{\Delta}$ | 1.005$^{\Delta}$ | 1.003$^{\Delta}$ | 1.004$^{\Delta}$ | 1.001$^{\Delta}$ | 1.002$^{\Delta}$ | 1.001$^{\Delta}$ | 1.001$^{\Delta}$ | 0.999$^{\Delta}$ | 1.004$^{\Delta}$ | 1.001$^{\Delta}$ | 1.004$^{\Delta}$ | 1.001$^{\Delta}$ | 1.001$^{\Delta}$ |
| Reading perform | 0.999$^{\Delta}$ | 1.001$^{\Delta}$ | 1.004$^{\Delta}$ | **1.003$^{\Delta}$** | 1.000$^{\Delta}$ | 1.001$^{\Delta}$ | 1.004$^{\Delta}$ | 1.002$^{\Delta}$ | 0.997$^{\Delta}$ | 1.001$^{\Delta}$ | 1.000$^{\Delta}$ | 1.001$^{\Delta}$ | 1.001$^{\Delta}$ | 1.003$^{\Delta}$ | 0.998$^{\Delta}$ | 1.001$^{\Delta}$ | 1.001$^{\Delta}$ | 1.003$^{\Delta}$ | 1.001$^{\Delta}$ | 1.001$^{\Delta}$ |
| Science perform. | 1.001$^{\Delta}$ | 1.001$^{\Delta}$ | 1.001$^{\Delta}$ | **1.002$^{\Delta}$** | 1.002$^{\Delta}$ | 1.001$^{\Delta}$ | 0.999$^{\Delta}$ | 1.001$^{\Delta}$ | 0.998$^{\Delta}$ | 0.999$^{\Delta}$ | 0.997$^{\Delta}$ | 1.000$^{\Delta}$ | 1.002$^{\Delta}$ | 1.000$^{\Delta}$ | 0.998$^{\Delta}$ | 1.000$^{\Delta}$ | 1.001$^{\Delta}$ | 1.000$^{\Delta}$ | 0.998$^{\Delta}$ | 0.999$^{\Delta}$ |
| Study. at home | 0.958$^{\Delta}$ | 1.030$^{\Delta}$ | 1.023$^{\Delta}$ | **1.064$^{\Delta}$** | 1.043$^{\Delta}$ | 1.091$^{\Delta}$ | 1.042$^{\Delta}$ | 1.071$^{\Delta}$ | 1.029$^{\Delta}$ | 1.019$^{\Delta}$ | 1.091$^{\Delta}$ | 1.133$^{\Delta}$ | 1.045$^{\Delta}$ | 1.067$^{\Delta}$ | 0.947$^{\Delta}$ | 1.105$^{\Delta}$ | 1.003$^{\Delta}$ | 1.025$^{\Delta}$ | 1.011$^{\Delta}$ | 1.103$^{\Delta}$ |
| School type | 1.283$^{\Delta}$ | 0.846$^{\Delta}$ | 1.008* | **0.883$^{\Delta}$** | 1.209$^{\Delta}$ | 0.875$^{\Delta}$ | 1.980$^{\Delta}$ | 1.062$^{\Delta}$ | 1.316 | 0.776$^{\Delta}$ | 0.846$^{\Delta}$ | 0.872$^{\Delta}$ | 3.282* | 1.390$^{\Delta}$ | 0.706$^{\Delta}$ | 1.077$^{\Delta}$ | 1.482* | 0.946$^{\Delta}$ | 0.324* | 0.464$^{\Delta}$ |
| School belong. | 1.068$^{\Delta}$ | 1.073$^{\Delta}$ | 0.959$^{\Delta}$ | **1.070$^{\Delta}$** | 1.046$^{\Delta}$ | 1.018$^{\Delta}$ | 1.032$^{\Delta}$ | 1.048$^{\Delta}$ | 1.079$^{\Delta}$ | 1.066$^{\Delta}$ | 1.085$^{\Delta}$ | 1.076$^{\Delta}$ | 1.071$^{\Delta}$ | 1.183$^{\Delta}$ | 1.054$^{\Delta}$ | 1.065$^{\Delta}$ | 1.050$^{\Delta}$ | 1.043$^{\Delta}$ | 0.885$^{\Delta}$ | 1.267$^{\Delta}$ |
| *Statistics* | | | | | | | | | | | | | | | | | | | | |
| N$^{o}$ observations | 5.393 | | 5.031 | | 3.767 | | 5.079 | | 6.540 | | 5.352 | | 4.442 | | 4.809 | | 2.924 | | 3.538 | |
| Pseudo $R^2$ | 0.078 | | 0.101 | | 0.098 | | 0.105 | | 0.092 | | 0.193 | | 0.098 | | 0.179 | | 0.105 | | 0.142 | |
| Prob > chi2 | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | | 0.000 | |

*Source: Authors' elaboration based on PISA 2022 data.*
*Notes: ($^{\Delta}$) Significant at 1%; (*) Significant at 5%*

## V. Discussion

This study analyzes the determinants of students' intentions to enter higher education from a comparative cross-country perspective. The results, while corroborating established evidence in the literature, reveal significant contextual differences, demonstrating how individual, family, and school factors interact differently across countries.

Vocational clarity and the active search for information emerged as the most consistent factors explaining students' intentions to pursue higher education. This finding aligns with Human Capital Theory (Becker, 1993; Schultz, 1961), suggesting that educational decisions are a rational process of information gathering and expectation formation regarding the returns to education, rather than random acts. These results are consistent with recent literature emphasizing the importance of information in educational decision-making, especially in contexts of high uncertainty and inequality (Perna, 2006; Amador, Cowan, & Nillesen, 2022).

From another perspective, the findings are supported by Bourdieu's Social Reproduction Theory (1986), revealing how socioeconomic and cultural conditions shape educational aspirations. Parental education, school type, and family wealth illustrate the role of economic, social, and cultural capital in reproducing educational inequalities, corroborating studies focused on Brazil (Zonta et al., 2022; Teixeira, 2019), South Korea (Kim & Kim, 2025), and Finland (Tolonen & Aapola-Kari, 2022). This reinforces Bourdieu's argument that, although schools may appear as meritocratic spaces, they frequently function as mechanisms for reproducing social structures, favoring those who already possess higher levels of cultural and economic capital (Bourdieu & Passeron, 1992).

Grade repetition also emerges as a relevant barrier, especially in Latin America, where it is often perceived not only as academic delay but also as a negative signal associated with student failure. This stigmatizing effect is associated with limited future opportunities and a higher risk of dropout (Sena, 2021; Souza & Vazquez, 2015). Gender differences also persist: women exhibit higher educational aspirations but still tend to concentrate in lower-prestige courses (Braga & Xavier, 2016).

The central contribution of this study lies in its comparative analysis across countries, which reveals how the influence of these determinants varies according to the national context. Grade repetition, which is negatively associated with students' trajectories in Brazil and other countries, takes on a different meaning in countries such as Finland and South Korea, where it may represent a reorientation of the educational trajectory rather than an indication of academic failure. The effect of attending a public school also varies: in Brazil and the United States, it was negative, but in other contexts, it was positive or not significant, possibly reflecting the higher quality or relative prestige of public schools in those countries. These differences highlight that it is not only the factor itself that matters but also how it is embedded in each country's institutional structure.

The analysis of specific cases, such as Finland and South Korea, further deepens the understanding of these contextual dynamics. In Finland, the main decision occurs during the transition to upper secondary education, between academic (lukio) and vocational (ammattikoulu) tracks. In this model, immediate entry into higher education is less pressing, as both pathways offer good labor market prospects (Varjo, Kalalahti, & Jahnukainen, 2020; Chen, 2024). In South Korea, although higher education remains highly valued as a mechanism for social mobility and a requirement for prestigious jobs, diploma saturation and the strengthening of technical alternatives have led to a more balanced distribution of educational aspirations (Choi, 2020; Park & Kim, 2020; Kim & Kim, 2024). Additionally, the high costs associated with private education and extracurricular preparation (hagwons) create barriers for many students, especially from lower-income families, who may consider pathways outside higher education (Kim & Kim, 2024).

These results offer insights with potential implications for education policy aimed at promoting equity and social justice. First, the strong association between vocational clarity and aspirations suggests that investing in career guidance programs in secondary schools is a high-potential strategy. Providing high-quality information about courses, professions, and the labor market is not a complement but a central tool for helping young people, particularly those from more vulnerable backgrounds, to build ambitious and realistic life projects, mitigating information barriers (Perna, 2006; Obara et al., 2018). Second, the persistence of origin-related barriers shows that guidance alone is insufficient. It is essential to strengthen and simplify access to student support policies, such as scholarships and financial aid, which have been shown to increase enrollment rates among low-income students (Deming & Dynarski, 2009). Finally, the findings are consistent with the literature that highlights the role of early childhood and basic education in reducing skill inequalities that form very early in life (Carneiro & Heckman, 2002).

The rationale for these measures is further strengthened by recognizing that, in addition to the economic returns often highlighted by Human Capital Theory, education also generates non-monetary benefits, such as better health, higher civic engagement, and greater life satisfaction. Oreopoulos and Salvanes (2011) show that these external effects of education enhance its social value, reinforcing the need



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for policies that promote not only access but also persistence and completion of higher education. In this sense, the policies mentioned are justified not only by their impact on individuals' future income but also by their potential to produce broader social gains, with positive effects on social cohesion and collective well-being.

For academic discussion, this study offers two main contributions. First, by analyzing ten countries with different realities, it provides a robust external validity test for theories of educational inequality, such as the theory of effectively maintained inequality (Kim & Kim, 2025), showing that mechanisms of social reproduction operate consistently across multiple contexts. Second, the findings underscore the need for quantitative models to incorporate social and informational factors more systematically. The literature already indicates that peer networks are crucial in shaping aspirations (Amador, Cowan, & Nillesen, 2022), and the strength of variables such as "information seeking" in our models suggests that integrating these elements is an important step toward a more comprehensive understanding of educational decisions.

However, this study has some limitations that must be acknowledged. The main limitation concerns the cross-sectional nature of PISA data, which provides only a snapshot of students' educational intentions. Consequently, it is not possible to track the evolution of these aspirations over time or verify whether they translate into higher education enrollment and subsequent career trajectories. In addition, the analysis relied on self-reported information from PISA questionnaires, which does not capture more subjective aspects, such as implicit social pressures, psychological motivations, or the impact of mental health on educational decisions. Another important limitation relates to causal inference: although the multinomial logit model used is robust for identifying associations, the results cannot be interpreted as direct causal effects.

Another point to consider is the absence of direct household income variables, which required the use of proxies, such as the household wealth index. Similarly, institutional school factors—such as teaching quality, teacher performance, academic climate, and vocational guidance programs—were not explored in depth. This limited understanding of how intra-school dynamics shape young people's aspirations. It was also not possible to examine in detail the nature of higher education course choices, including the influence of gender and social class on career segmentation.

These limitations open important avenues for future research. Longitudinal studies would be particularly useful to track students from secondary education through entry into the labor market, allowing an assessment of the extent to which their intentions are realized and how they evolve. Mixed-methods investigations, combining large-scale quantitative analyses with qualitative case studies, could deepen the understanding of the subjective mechanisms influencing the formation of aspirations, including perceptions of the returns of different courses, peer and teacher influence, and the impact of public policies such as affirmative action programs. Moreover, it would be relevant to develop studies that examine the nature of higher education course choices in depth, exploring how gender and social class shape career segmentation. Future research could also examine the role of vocational guidance and the communication of inclusion policies more closely, as well as the relationship between associate degrees and higher education, considering how these trajectories interact or compete in different national contexts.

In summary, this study demonstrates that the intention to enter higher education is influenced by the interaction between vocational, family, school, and contextual factors, with varying effects across countries. Clarity about future careers and access to information emerge as central determinants, while socioeconomic, school, and gender inequalities remain significant barriers. These findings reinforce the importance of integrated educational policies that combine vocational guidance, financial support, and investments in basic education, and provide valuable insights for understanding the dynamics of social reproduction in different contexts. They also indicate directions for future research to explore further the temporal, subjective, and institutional aspects of educational choices.

## VI. Final Considerations

The transition from secondary to higher education represents a decisive moment in young people's trajectories, yet the intention to pursue this path remains unequal across different social and national contexts. This study analyzed the factors determining the intention to enter higher education among secondary school students, based on 2022 PISA data, considering a set of ten countries with varying levels of development and educational structures. By applying multinomial logit models, it was possible to identify the significant influence of socioeconomic, academic, and family-related variables on the educational aspirations of young people.

The results confirm the central hypothesis of the study: students with higher cultural and socioeconomic capital, better academic performance, greater perception of family and school support, as well as higher vocational clarity and access to information, are more likely to express an intention to pursue higher education. An educational stratification was also observed among the analyzed countries, where the intention to enroll in higher education is more pronounced in Latin American countries, reflecting a search for social mobility in that context. In contrast,

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countries such as Finland and South Korea revealed a greater appreciation for technical pathways and a more balanced distribution of educational options, reflecting distinct cultural and institutional patterns.

Additionally, the findings provide a dual diagnosis of educational inequality. On the one hand, the strong influence of socioeconomic and cultural capital, as well as school type, corroborates the Theory of Social Reproduction, showing that origin structures continue to shape trajectories. On the other hand, the predictive power of vocational clarity and information seeking indicates that aspirations are also a rational calculation, as postulated by Human Capital Theory, in which the perception of future returns guides present decisions.

This study contributes to the literature by adopting a comparative cross-country approach to educational intentions, demonstrating how universal determinants have their impact modulated by distinct institutional contexts and shedding light on the stage before actual higher education enrollment. It is acknowledged, however, that the cross-sectional nature of the data provides only a snapshot, not allowing for causal inference. In this regard, future research would benefit from longitudinal studies to track the realization of these aspirations over time.

In summary, the results of this study suggest that educational opportunity inequality emerges long before the competition for a university place, being rooted in the very formation of aspirations. Socioeconomic factors, cultural capital, school trajectory, and access to information create an unequal horizon of possibilities. To address this reality, coordinated public policies are necessary to promote the development of broader and more equitable aspirations from early education, expand access to quality information on higher education and the labor market, provide vocational guidance, strengthen school and family support, reduce economic inequalities, and ensure inclusive educational pathways. Such measures are essential for higher education to cease being merely a distant dream and become a tangible possibility for all young people, allowing their future to be determined by individual potential rather than social origin.

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# Does Digital Financial Inclusion Affect Economic Development and the Environment Differently? Evidence from India using Robust Least Square Model

By Rayees Ahmad Hajam & Dr. Abdul Azeez N. P.

*Abstract-* This study employs a Robust Least Squares Regression model to examine the effects of digital financial inclusion (FI) on economic development and environmental quality in India from 2004 to 2023. The study focuses on how better access to financial resources through digital financial inclusion is essential for both economic growth and poverty reduction. The positive relationship between GDP and digital financial inclusion is emphasized in this research, supported by strong statistical evidence, including a high R-squared value that shows the independent variables significantly influence GDP variability. The study also examines the potential environmental impacts of increased financial inclusion, noting that while it may stimulate economic growth, it may also lead to increased pollution and energy consumption.

*Keywords: digital financial inclusion, economic development, environmental quality, robust least squares, VAR estimates.*

*GJHSS-E Classification: LCC Code: HD72-88, HG, HC79.E5*




*Strictly as per the compliance and regulations of:*

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# Does Digital Financial Inclusion Affect Economic Development and the Environment Differently? Evidence from India using Robust Least Square Model

Rayees Ahmad Hajam [α] & Dr. Abdul Azeez N. P. [σ]

*Abstract-* This study employs a Robust Least Squares Regression model to examine the effects of digital financial inclusion (FI) on economic development and environmental quality in India from 2004 to 2023. The study focuses on how better access to financial resources through digital financial inclusion is essential for both economic growth and poverty reduction. The positive relationship between GDP and digital financial inclusion is emphasized in this research, supported by strong statistical evidence, including a high R-squared value that shows the independent variables significantly influence GDP variability. The study also examines the potential environmental impacts of increased financial inclusion, noting that while it may stimulate economic growth, it may also lead to increased pollution and energy consumption.

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## I. Introduction

Digital financial inclusion increases access to financial services, which is crucial for fostering economic activity and prosperity. It has a positive short-term impact for South Asian economic growth, especially in India, according to empirical research (Thathsarani et al., 2021). Financial inclusion (FI), which focusses on the most impoverished segments of society, guarantees equitable access to necessary financial services that they might not otherwise have. As a result, FI is considered a key concept in worldwide development plans. Recognising the vital role an effective financial system plays in lowering extreme poverty and generating opportunities for all is the main driving force for this endeavour (Wang et al. 2022). Consequently, FI has garnered significant attention from scholars and policymakers due to its effectiveness in accomplishing the Sustainable Development Goals (SDGs), which were set forth by the United Nations in 2015, promoting social justice in certain nations, bringing poverty down to a manageable level, and generating a range of socioeconomic advantages (Ozili 2021). At the present time, governments are investing a lot of money in programs that try to lessen financial marginalisation. Thanks to the incredible advancements in mobile phones and the internet since the start of the twenty-first century, global financial inclusion is now more feasible than ever. The frequency and convenience of these transactions have significantly increased due to the widespread use of financial services technology, or FinTech (Ouma et al. 2017). Financial systems are now easy to access through digital internet platforms as a result of stakeholders' recent review of modern digital financial services as a viable route to FI. Therefore, the implementation and utilisation of digital services may influence and mould regular financial activities, thereby fostering economic development within a community. Thus, it would appear that the twin aims of fostering a wealthier community and reducing poverty are among the primary objectives of FI programs in many emerging nations (Koomson and Danquah 2021). Improved financial inclusion through digital channels (DFI), or the use of reasonably priced digital technology to empower financially excluded and disadvantaged individuals, is now more important than ever due to the COVID-19 pandemic and its aftermath (World Bank 2022).

In this context, the effects of (FI) on numerous determinants have been extensively studied. For instance, Shahbaz et al. (2022) investigated the impact of FI on China's attempts to reduce carbon emissions and pollution. Additionally, Hu et al. (2021) looked at how China's agriculture sector has improved its total factor productivity. Chen et al. (2018) also suggested that FI might lead to a decrease in non-performing loans. The Middle East and North Africa region served as the backdrop for Rojas Cama and Emara's (2022) investigation of the FI phenomena. According to Von Fintel and Orthofer's (2020) claims, FI can reduce income and wealth disparities. Scholars have recently focused a lot of attention on the connection between economic growth and equitable financial development (Kassi et al. 2021).

However, the concept of digital financial inclusion, or DFI, is relatively new. DFI is one of the most well-known areas of international development metrics at the moment, claim Duvendack and Mader (2019). Increased financial inclusion, the capacity to provide economically disadvantaged communities with convenient, safe, and reasonably priced banking services, and the potential for GDP development in

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digitalised economies are only a few of the many benefits of digital finance (Peng and Mao, 2023). The still-largely-uncertain effects of digital financial inclusion on economic growth in emerging economies need to be thoroughly understood via both theoretical and empirical research (Liu et al., 2021; Ozili, 2018). Few studies provide insight at how DFI impacts economic growth, even though the body of current research has described the relationship between DFI and income (Kim et al. 2018; Neaime and Gaysset 2018; Sethi and Acharya 2018; ZHANG et al. 2019). Arner et al. (2020) examined the relationship between digital financial inclusion and economic advancement in China and discovered that, despite the region's comparatively low DFI levels, they had a favourable effect on economic growth.

Considering the vital role of FI, the urgent question facing empirical researchers and policymakers is how this phenomena will impact countries' economic growth paths. Financial inclusion is commonly defined as "the possession of some form of financial accessibility, such as maintaining an account at a formal financial institution that enables individuals to engage in borrowing, saving, and investing." Theoretically, both consumers (individuals and enterprises) and financial service providers (banks and other financial institutions) gain from financial inclusion (Anand and Chhikara, 2013; Saydaliyev et al., 2020). It is a crucial way for people to get the money they need to buy necessities including consumer goods, healthcare, and education (Kim et al., 2018). Conversely, it is anticipated that the financial system will grow more stable as more people join it. As financial institutions strive for consistent revenue growth, this is fuelled by the development of new credit products and other business endeavours that facilitate the introduction of a broad range of financial services and products (Radcliffe and Voorhies, 2012). Additionally, FI can lessen the impact of some macroeconomic issues, such as poverty and economic inequality (Park and Mercado, 2015).

Despite the fact that many studies have shown how financial inclusion boosts economic growth, little is known about how it affects environmental quality (Khan and Ozturk, 2021; Le et al., 2021). Environmental quality may benefit or suffer from financial inclusion, depending on the theoretical framework. FI can lower CO2 emissions by increasing the accessibility of financial services for individuals and companies seeking to invest in sustainable and eco-friendly technology. According to Ozturk and Ullah's (2022) research, for instance, DFI boosts economic growth but also degrades environmental quality by raising CO2 emissions. Financial inclusion may therefore improve environmental quality and reduce its impact on climate change by establishing a framework that promotes accessibility, cost effectiveness, and the adoption of more ecologically friendly behaviours (Qin et al., 2021). Since farmers and agriculturalists might not have the funds or credit available to them to invest in renewable energy sources like solar energy, which is less expensive and emits less carbon dioxide, financial inclusivity is particularly crucial for financially disadvantaged groups (Nizam et al., 2020; Usman et al., 2021). However, advancements in the financial sector and financial inclusion could hasten the economy's manufacturing and industrialisation, which could result in higher greenhouse gas emissions and warmer temperatures (Jensen, 1996). Therefore, increased financial availability and funding for consumption-related projects may incentivise consumers to purchase more energy-intensive products, such as automobiles and household appliances. Additionally, an inclusive system may benefit economic expansion, which would increase the usage of non-renewable energy sources and worsen the state of the environment (Frankel and Romer, 1999).

To the best of our knowledge, we have embarked on a thorough investigation into the complex interrelationships among financial inclusion (FI), environmental factors, and economic growth, all within the complex context of the Indian economy. In the process, we have used the fascinating study carried out by Ozturk and Ullah in 2022 as a starting point for our further analysis. We came to the conclusion after carefully reviewing the abundance of existing literature that the important role that DFI plays in promoting environmental sustainability and economic advancement has not been fully explored, and the empirical results that have been obtained up to this point are, at best, ambiguous and inconclusive. The majority of study so far has been conducted mostly in advanced nations, where the impact of DFI on different macroeconomic variables is evaluated and examined. Additionally, to the best of the authors' knowledge, there are not many pertinent studies that particularly address India's particular situation in this area. As a result, it is imperative that the significant influence that DFI can have on the economic development and environmental sustainability of the dynamic Indian economy be fully investigated and analysed.

Although financial inclusion has the potential to boost a country's economy and lessen the harsh reality of extreme poverty and financial inequality, more research is needed to determine how it affects environmental quality (Ozturk & Ullah, 2022). This study is a step in that direction since we want to examine how financial inclusion affects India's economic development and environmental health, particularly in view of its growing ecological problems. India is one of the most polluted countries in the world, and its cities are frequently near the top of lists of the most polluted cities in the world. According to a 2018 WHO survey, 14 out of the 15 dirtiest cities in the world were located inside India. India is expected to surpass China in population by mid-2023, with a growing population approaching 1.4 billion people (UN Population, 2023). Fuelled by a

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vibrant and rapidly growing financial sector that has maintained an impressive growth rate of 6% over recent decades, India is the second-fastest growing trillion-dollar economy and the fifth largest economy in the world, with a nominal GDP of $2.94 trillion (Sehrawat et al., 2015). This South Asian superpower proudly holds the third position when comparing GDP to purchasing power parity ($11.33 trillion). In 2010, India accounted for 5.9% of global CO2 emissions, making it the third-largest contributor after the United States and China (Zafar et al., 2023). In addition to that, it is the fourth-largest greenhouse gas emitter in the world. But because of its enormous population, India continues to have one of the lowest per capita greenhouse emissions in the world (Alam et al., 2011). India also has a number of international accords that are geared towards protecting the environment. By 2030, the Indian government aims to reduce greenhouse gas emissions by more than 30% compared to 2005 levels. The country, on the other hand, keeps building new coal plants and importing more crude oil to meet its growing energy needs as its population becomes more affluent. Additionally, it is the fourth-largest energy consumer globally (Zafar et al., 2023). India is one of the biggest users of fossil fuels in South Asia, with fossil fuels providing a sizable and dominant portion of this energy need (Xue et al., 2021).

In order to perform a thorough and rigorous empirical analysis, we collected data from 2004 to 2023 and then used the Robust Least Square model, which is well-known for its ability to handle problems with outliers and heteroscedasticity in empirical data. The impetus behind this research is firmly anchored in the current and increasingly pertinent discussion of financial inclusion, especially given the dearth of empirical data that clarifies the intricate and crucial connections among financial inclusion, environmental sustainability, and the more general phenomenon of economic growth. The present study is specifically intended to fill this highlighted gap in the literature by providing a number of noteworthy additions that seek to deepen our comprehension of these interrelated fields. In particular, the study uses different analytical models that enable a nuanced investigation of these interactions in order to investigate how FI affects economic growth and environmental sustainability. Additionally, the study carefully takes into account the relevant problem of endogeneity in the models used, acknowledging its possible influence on the validity and trustworthiness of the results. In conclusion, the study offers insightful information to stakeholders and policymakers alike by outlining pertinent policy implications that are critical for advancing environmental sustainability and economic growth in the Indian context. Furthermore, this study is an essential tool for making well-informed decisions on the creation and application of financial inclusion policies that can produce favourable results.

Following on the work of Khanday et al. (2023), the current study makes use of annual time-series data related to India from 2004 to 2023. The constraints related to the accessibility of financial inclusion statistics were the primary factor in the selection of this particular time period. The World Bank's (WDI) database is the source of the information on GDP, carbon dioxide emissions, automated teller machines, debit transactions, internet penetration, industrialisation, foreign direct investment, and inflationary tendencies. Furthermore, the International Monetary Fund's (IMF) FAS provided the data on the dimensions of DFI, particularly with regard to ATMs and debit transactions.

The majority of the existing work on financial inclusion typically focusses on either the demand side or the supply side. Studies that simultaneously look at the supply and demand sides of FI are few in number. This study takes into account both the supply and demand side aspects of FI, which is consistent with the research done by Ozturk & Ullah (2022). The number of ATMs is chosen from a demand perspective, and the number of debit cards issued by financial institutions is the focus of a supply viewpoint. DFI is represented by this combination of dimensions.

Consistent with the enlightening work of Le et al. (2020) and the follow-up study by Zaidi et al. (2021), we have prudently chosen to include a number of control variables in our analysis, including a number of important variables like the number of internet users, the level of industrialisation, energy consumption, foreign direct investment, and inflation rates. While the data on industrialisation is measured as the value added by industries as a percentage of the Gross Domestic Product (GDP), which includes the construction industry, the internet user metric is expressed as (% of the total population), clearly illustrating digital access. In order to ensure a comprehensive understanding of the economic landscape, inflation is carefully evaluated through the lens of consumer price changes measured annually, and foreign direct investment is measured as the net flow of digital financial inclusion expressed as (% of GDP).

## II. Review of Literature

In the literature and academic discourse, the effect of the financial system on economic growth, poverty alleviation, and income disparity has been the subject of significant investigation. Furthermore, the significance of financial development about CO2 emissions has garnered increased scholarly attention in recent years. Financial inclusion, a critical component of the financial system, remains a topic of ongoing scholarly debate. A substantial body of research has explored the ramifications of financial inclusion on poverty, capital accumulation, macroeconomic stability, financial efficiency, inequality, and economic growth



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(Ji et al., 2021; Kim et al., 2018; Cabeza-Garcıa et al., 2019; Le et al., 2019; Makina & Walle, 2019; Naqvi et al., 2021; Park & Mercado, 2015 Rojas-Suarez & Amado, 2014; Sahay et al., 2015; Salazar-Cantu et al., 2015; Umar et al., 2021a, 2021b). Van et al. (2021) in the context of developing markets, Kim et al. (2018) concerning OIC nations, Makina and Walle (2019) focusing on African states, and Hajilee et al. (2017) in the case of emerging economies have corroborated the positive effect of FI on economic growth. Nevertheless, the correlation between FI and environmental performance has not received substantial scholarly focus until recent years. Although financial inclusion has been theoretically acknowledged as hurting environmental performance, empirical evidence supporting this assertion remains limited, particularly in the context of B.R.I.C.S. nations. A select few researchers have examined the relationship between financial inclusion and CO2 emissions (Usman et al., 2021; Le et al., 2020). The expansion of accessibility to financial services and products presents a considerable threat to environmental sustainability because of heightened energy consumption. Additionally, Le et al. (2020) found no empirical support for the relationship between financial inclusion and CO2 emissions in Asian countries. Conversely, Usman et al. (2021) demonstrated the detrimental effect of FI on CO2 emissions among the top 15 emitting nations. Nonetheless, a significant limitation of their study lies in the utilization of an inadequate proxy for financial inclusion. For instance, Usman et al. (2021) employed financial development as a proxy for financial inclusion, a choice that warrants substantial critique.

The correlation between financial development (FD) and energy consumption has been found to exert a positive impact on greenhouse gas (GHG) emissions (Sarkodie and Owusu 2016). An analysis was conducted regarding the impact of urbanization, FD, trade, and energy consumption on greenhouse emissions across thirty-four distinct nations. The findings regarding causal relationships revealed a unidirectional causality linking CO2 emissions to FD (Khan et al. 2017). In addition, the influences of FD, economic growth, and energy consumption on (CO2) were meticulously examined. Utilizing the Vector Autoregression (VAR) model, the results obtained from 24 economies within the Middle East and North Africa region elucidated that both energy consumption and economic growth (EG) exhibit a weak association with environmental preservation (Charfeddine and Kahia, 2019). A study by Dong et al. (2018) asserted that the utilization of renewable and clean energy sources effectively reduces CO2 emissions within BRICS nations. Employing a novel statistical methodology, the MMQR approach, Rehman et al. (2021) determined that renewable energy displays a significant and inverse correlation with greenhouse emissions.

Plethora of empirical literature has demonstrated that trade, urbanization, economic complexity, EG, and energy consumption contribute to environmental degradation (Ahmad et al. 2021; Hashmi et al. 2020; Hashmi et al. 2021; Shahzad et al. 2021Ikram et al. 2021), while renewable energy serves to diminish CO2 emissions and ecological footprints (EGF) (Akram et al. 2020; Apergis et al. 2018; Apergis 2019; Apergis & Payne 2014a, 2014b, 2014c; Fareed et al. 2021; Wang and Dong 2019; Saidi and Omri 2020). The interplay of energy consumption, FD, and trade contributes to the mitigation of environmental deterioration; however, the findings derived from the augmented mean group model indicated that conventional usage of energy and economic progress are primarily responsible for environmental pollution (Usman et al. 2021).

In the context of India, there exists a paucity of literature that scrutinizes the direct correlation between FI and economic growth. Initial literature has focused on the theoretical elucidations of how FI is consequential for economic growth (Dev, 2006; Srinivasan, 2007; Kapoor, 2014; Dasgupta, 2009). These studies have posited that increased engagement of formal credit institutions, such as SHGs and microfinance entities within the informal sector, can engender financial system a more inclusive. Notably, several empirical investigations have developed an index to measure financial inclusion (Sarma, 2008; Chattopadhyay, 2011; Sarma and Pais, 2011). Gupte et al. (2012) computed the Financial Inclusion Index (FII) utilizing the methodology of Mandira Sarma (2008) for the fiscal year 2008–2009, incorporating various variables that are significant. Laha and Kuri (2014), Ambarkhane et al. (2016), and Sethy (2016), separately derived the index of financial inclusion index that is based on the supply-side and demand-side metrics of financial services. CRISIL (2013) measured the financial inclusion index (FII) across districts of India, revealing an improvement in FI from 2009 to 2011, with deposit penetration identified as a principal catalyst for this enhancement. However, Chakravarty and Pal (2013) proposed that an axiomatic framework represents a more robust methodology for assessing FI. Several studies have investigated the relationship between financial inclusion and economic growth. Eastwood and Kohli (1999) established that programs focused on branch expansion and targeted financing have stimulated investment, hence enhancing industrial production in small-scale firms. They argued that a robust financial system can reduce the spread of informal lending sources, sometimes marked by exploitative activities. Binswanger and Khandker (1995) observed that India's rural expansion effort has significantly reduced rural poverty while simultaneously increasing non-agricultural employment levels. Bell and Rousseau (2001) discovered that financial service providers have

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significantly enhanced investment and production growth in India. Mehrotra et al. (2009) asserted that improved access to banking services motivates individuals to deposit their wealth in formal financial institutions, thereby promoting substantial economic development via the multiplier effect. Ghosh (2011) noted the impact of foreign investment on state-level per capita GDP. Sharma (2016) determined that variables like the number of loan accounts, deposit accounts, and the population distribution of ATMs demonstrate a unidirectional causal link with economic development. Lenka and Sharma (2017) examined the enduring relationship between financial inclusion (FI) and economic growth, integrating both supply-side and demand-side factors, and concluded that FI positively influences long-term economic growth. Iqbal and Sami (2017) demonstrated that financial inclusion favourably impacts economic development when utilising indicators that include the number of bank branches and the ratio of credit deposits to GDP as proxies for financial inclusion.

## III. Data Source and Econometric Methodology

This analysis builds upon Khanday et al. (2023) and utilises annual time-series data from India spanning 2004 to 2023. The chosen era is mostly dictated by the limitations of data availability on financial inclusion. The information about GDP, CO2 emissions, ATMs, debit transactions, internet usage, industrial metrics, foreign direct investment (FDI), and inflation is sourced from the World Development Indicators (WDI) database maintained by the World Bank. The information about elements of digital financial inclusion, such as ATMs and debit transactions, has been sourced from the Financial Access Survey conducted by the IMF.

The majority of research on financial inclusion is on either the supply or demand side. Few studies examine both the demand and supply aspects of financial inclusion. We adhere to the study of Ozturk and Ullah (2022) to incorporate both supply and demand aspects of financial inclusion. We selected the quantity of ATMs from the demand perspective and the number of debit cards issued by the financial institution from the supply perspective. The amalgamation of these dimensions signifies DFI.

In accordance with the research conducted by Le et al. (2020) and Zaidi et al. (2021), we incorporated many control variables, including internet users, industrialisation, energy consumption, foreign direct investment, and inflation, into our model to mitigate potential omitted variable econometric bias. Internet users are quantified as a proportion of the population, whereas statistics on industrialisation is assessed as the value contributed by industry as a percentage of GDP, inclusive of construction. Foreign direct investment is measured as the net flow of FDI as a proportion of GDP, whereas inflation is represented by the yearly percentage change in consumer prices.

### *a) Model Specification*

Robust Least Squares Regression is utilised in the analysis to assess the relationship between the variables. Robust least square regression addresses the shortcomings of traditional non-parametric and parametric methods by minimising the influence of potential outliers from the dependent variable (utilising the M-estimator; Huber, 1973), the independent variables (employing the S-estimator; Rousseauw and Yohai, 1984), and from both (applying the MM-estimator; Yohai, 1987). Two functional relationships-economic growth and environmental quality have been used in this study. We selected GDP and CO2 as indicators of economic development and environmental quality. Consequently, the enumerated models are:

$$gdp_t = \omega_0 + \omega_1 ATMs_t + \omega_2 lnDebits_t + \omega_3 Int + \omega_4 Ind_t + \omega_5 fdi_t + \omega_6 Inf_t + \epsilon_t \quad (1)$$

$$lnCo2_t = \omega_0 + \omega_1 ATMs_t + \omega_2 lnDebits_t + \omega_3 Int + \omega_4 Ind_t + \omega_5 fdi_t + \omega_6 Inf_t + \epsilon_t \quad (2)$$

Where, gdp measures the GDP growth (annual percentage), ATMs and Debits represent the demand and supply side of financial inclusion, Ind represents Industry value added (% of GDP), fdi represents foreign direct investment (net inflows percentage of GDP), Inf represents inflation, consumer prices (annual percentage) and $e_t$ represents random error term, $\omega_0$ represents constant term and $\omega_1$ *to* $\omega_0$ are the coefficients of the following variables in the model.



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*Table 1:* Descriptive Statistics

| | lnCo2 | gdp | ATMs | lnDebit | Int | Ind | fdi | Inf | C |
|---|---|---|---|---|---|---|---|---|---|
| Mean | 14.417 | 6.368 | 13.690 | 5.916 | 17.832 | 28.127 | 1.798 | 6.572 | 1.000 |
| Median | 14.537 | 7.497 | 15.185 | 5.986 | 12.900 | 28.031 | 1.665 | 6.085 | 1.000 |
| Maximum | 14.715 | 9.690 | 24.960 | 6.798 | 46.320 | 31.137 | 3.621 | 11.989 | 1.000 |
| Minimum | 13.898 | -5.778 | 2.186 | 4.523 | 1.976 | 24.591 | 0.766 | 3.328 | 1.000 |
| Std. Dev. | 0.265 | 3.270 | 8.462 | 0.838 | 15.816 | 2.295 | 0.628 | 2.562 | 0.000 |
| Skewness | -0.738 | -2.728 | -0.151 | -0.491 | 0.918 | -0.058 | 1.055 | 0.642 | |
| Kurtosis | 2.154 | 10.717 | 1.372 | 1.815 | 2.396 | 1.557 | 4.878 | 2.308 | |
| Jarque-Bera | 2.414 | 74.437 | 2.284 | 1.974 | 3.114 | 1.745 | 6.652 | 1.774 | |
| Probability | 0.299 | 0.000 | 0.319 | 0.373 | 0.211 | 0.418 | 0.036 | 0.412 | |
| Sum | 288.344 | 127.3 | 273.80 | 118.317 | 356.64 | 562.5 | 35.96 | 131.4 | 20.00 |
| Sum Sq. Dev. | 1.332 | 203.1 | 1360.4 | 13.340 | 4752.4 | 100.1 | 7.485 | 124.70 | 0.000 |
| Observations | 20.00 | 20.00 | 20.00 | 20.00 | 2.00 | 20.00 | 20.00 | 20.00 | 20.00 |

*Source: Authors Calculation*

*b) Empirical Results*

*Table 2:* Correlation Matrix

| Variables | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
|---|---|---|---|---|---|---|---|
| (1) lnco2 | 1.000 | | | | | | |
| (2) ATMs | 0.938 | 1.000 | | | | | |
| (3) lnDebit | 0.980 | 0.968 | 1.000 | | | | |
| (4) Ind | -0.797 | -0.927 | -0.860 | 1.000 | | | |
| (5) Int | 0.710 | 0.837 | 0.808 | -0.847 | 1.000 | | |
| (6) fdi | -0.014 | -0.139 | -0.056 | 0.286 | -0.123 | 1.000 | |
| (7) Inf | -0.135 | -0.361 | -0.205 | 0.546 | -0.250 | 0.345 | 1.000 |

*Source: Authors Calculation*

Table 2 displays relationship estimates for the variables. The results demonstrate that GDP, as a dependent variable, has a positive relationship with all independent variables except Int and Inf. In the same way, lnco2 is positively related to all independent variables except Inf.

*Table 3:* Augmented Dicky Fuller (ADF) and Phillips-Perron (PP) unit root tests

| | ADF-test | | PP-test | |
|---|---|---|---|---|
| Variables | at Level | First Difference | at level | First Difference |
| gdp | -4.212 | -6.36 | -4.253 | -15.822 |
| ln2 | 2.994 | -1.457 | -0.404 | -3.681 |
| ATMs | -3.132 | -2.954 | -1.6772 | -2.963 |
| lnDebit | -0.0137 | -3.232 | -0.013 | -4.369 |
| Int | -0.0805 | -3.785 | -1.3668 | -2.062 |
| Ind | -2.426 | -1.247 | -2.839 | -3.8026 |
| fdi | -3.139 | -3.116 | -3.1085 | -5.0543 |
| Inf | -4.494 | -4.039 | -2.0159 | -4.0399 |

*Source: Authors Calculation*



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The results of the ADF and PP-unit root tests are displayed in Table 3. After becoming stationary at their first difference, the data reveal that gdp is non-stationary at the level. Every one of the other variables—lnCo2, ATMs, lnDebits, Int, Inf, fdi, and Inf—shows first difference stationary behaviour. We utilised the first difference of the corresponding variables to breakdown the non-stationary series into stationary ones, as the overall results suggest that the variables change over time.

To analyse the long-run estimates between gdp, ATMs, lnDebit, Ind, and fdi, the study estimated the Johansen cointegration test after analysing the unit root estimates. This test confirmed one cointegration equation between the variables. Therefore, the trace and eigenvalue tests limited the need to estimate Vector Autoregressive (VAR), which is presented in Table 4.

*Table 4:* VAR Estimates

| | gdp | ATMs | lnDebit | Int | fdi | Inf | Ind |
|---|---|---|---|---|---|---|---|
| gdp(-1) | 1.084256 | 0.006773 | 0.000507 | 1.376281 | 0.004680 | -0.009881 | 0.117894 |
| | (0.47349) | (0.10210) | (0.01416) | (0.69703) | (0.15754) | (0.24391) | (0.10287) |
| | [2.28993] | [1.63346] | [0.03578] | [ 1.97449] | [0.02971] | [-0.04051] | [1.14608] |
| gdp(-2) | 0.320316 | 0.407597 | 0.005266 | 0.081255 | 0.115619 | -0.141496 | 0.149378 |
| | (0.35673) | (0.07692) | (0.01067) | (0.52516) | (0.11869) | (0.18377) | (0.07750) |
| | [ 0.89791] | [5.29880] | [0.49376] | [0.15473] | [0.97410] | [-0.76998] | [ 1.92740] |
| ATMs(-1) | 0.337484 | 0.699737 | 0.072620 | 0.055299 | 0.200850 | -0.403336 | 0.205765 |
| | (1.01269) | (0.21837) | (0.03028) | (1.49081) | (0.33694) | (0.52167) | (0.22001) |
| | [-0.33325] | [ 3.20441] | [ 2.39844] | [-0.03709] | [ 0.59609] | [-0.77316] | [-0.93524] |
| ATMs(-2) | 0.835027 | 1.592692 | 0.041860 | 2.862247 | 0.225581 | -0.940415 | 0.090924 |
| | (1.69923) | (0.36641) | (0.05080) | (2.50147) | (0.56537) | (0.87533) | (0.36917) |
| | [ 0.49142] | [ 4.34681] | [ 0.82393] | [1.14423] | [ 0.39900] | [-1.07436] | [ 0.24629] |
| lnDebit (-1) | 0.781461 | 9.658448 | 0.157187 | 21.24660 | 0.337698 | 9.811987 | -2.481962 |
| | (16.5615) | (3.57115) | (0.49516) | (24.3805) | (5.51034) | (8.53136) | (3.59806) |
| | [0.04719] | [2.70458] | [0.31744] | [ 0.87146] | [0.06128] | [ 1.15011] | [-0.68981] |
| lnDebit (-2) | 11.31922 | 1.506014 | 0.370069 | 8.192909 | 2.757363 | -0.060114 | 0.171280 |
| | (11.9060) | (2.56728) | (0.35597) | (17.5270) | (3.96136) | (6.13316) | (2.58663) |
| | [0.95072] | [0.58662] | [ 1.03961] | [ 0.46744] | [0.69606] | [-0.00980] | [0.06622] |
| Int(-1) | 1.619653 | 0.123034 | 0.020482 | 1.991289 | 0.193689 | -0.050110 | 0.076793 |
| | (0.52992) | (0.11427) | (0.01584) | (0.78011) | (0.17632) | (0.27298) | (0.11513) |
| | [3.05640] | [1.07672] | [ 1.29273] | [ 2.55258] | [ 1.09853] | [-0.18357] | [0.66702] |
| Int(-2) | 1.467580 | 0.126209 | -0.020899 | 1.158633 | 0.162763 | 0.150876 | 0.075376 |
| | (0.49880) | (0.10756) | (0.01491) | (0.73429) | (0.16596) | (0.25695) | (0.10837) |
| | [ 2.94223] | [ 1.17343] | [-1.40136] | [1.57789] | [0.98073] | [ 0.58718] | [ 0.69557] |



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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| fdi(-1) | 0.829706 | 0.084274 | 0.072301 | 2.686245 | 0.147560 | 0.938355 | 0.056057 |
| | (1.53657) | (0.33133) | (0.04594) | (2.26202) | (0.51125) | (0.79154) | (0.33383) |
| | [0.53997] | [ 0.25435] | [ 1.57376] | [ 1.18754] | [0.28863] | [ 1.18548] | [ 0.16792] |
| fdi(-2) | 2.424259 | 0.566609 | 0.037289 | 3.347592 | 0.347327 | 0.166351 | 1.168693 |
| | (1.96083) | (0.42281) | (0.05863) | (2.88658) | (0.65241) | (1.01009) | (0.42600) |
| | [ 123634] | [1.34009] | [ 0.63605] | [1.15971] | [0.53238] | [ 0.16469] | [ 2.74340] |
| Inf(-1) | 1.487749 | 0.480692 | 0.009458 | 0.339405 | 0.049404 | 0.267816 | 0.056560 |
| | (0.76380) | (0.16470) | (0.02284) | (1.12441) | (0.25413) | (0.39346) | (0.16594) |
| | [ 1.94782] | [ 2.91861] | [0.41417] | [0.30185] | [0.19440] | [0.68067] | [0.34085] |
| Inf(-2) | 1.185960 | 0.654072 | 0.022844 | -1.844521 | -0.137880 | -0.246295 | 0.282968 |
| | (0.77482) | (0.16707) | (0.02317) | (1.14062) | (0.25780) | (0.39913) | (0.16833) |
| | [ 1.53064] | [ 3.91487] | [ 0.98612] | [-1.61712] | [-0.53484] | [-0.61708] | [ 1.68101] |
| Ind(-1) | 0.055796 | 1.001575 | 0.108324 | 0.722978 | 0.010050 | -0.652106 | 0.051931 |
| | (1.77908) | (0.38362) | (0.05319) | (2.61902) | (0.59194) | (0.91646) | (0.38651) |
| | [0.03136] | [2.61083] | [ 2.03648] | [0.27605] | [ 0.01698] | [-0.71155] | [0.13436] |
| Ind(-2) | 5.961030 | 1.635784 | 0.084695 | 0.259707 | 1.078101 | 0.720338 | -0.471563 |
| | (2.69861) | (0.58190) | (0.08068) | (3.97268) | (0.89788) | (1.39014) | (0.58629) |
| | [2.20893] | [ 2.81110] | [ 1.04971] | [ 0.06537] | [ 1.20071] | [ 0.51818] | [-0.80432] |
| C | 232.2851 | 30.58774 | 2.434603 | 114.5231 | 14.58298 | -34.98629 | 56.58289 |
| | (98.0977) | (21.1528) | (2.93297) | (144.412) | (32.6391) | (50.5334) | (21.3122) |
| | [ 2.36790] | [ 1.44604] | [0.83008] | [0.79303] | [0.44679] | [-0.69234] | [ 2.65495] |
| R-squared | 0.945007 | 0.999527 | 0.998931 | 0.994399 | 0.776042 | 0.973755 | 0.994685 |
| Adj. R-squared | 0.688373 | 0.997319 | 0.993941 | 0.968260 | -0.269093 | 0.851276 | 0.969883 |
| Sum-sq. resids | 10.87621 | 0.505704 | 0.009722 | 23.57025 | 1.204030 | 2.886136 | 0.513355 |
| S.E. equation | 1.904049 | 0.410570 | 0.056928 | 2.802989 | 0.633517 | 0.980839 | 0.413664 |
| F-statistic | 3.682319 | 452.7181 | 200.1914 | 38.04341 | 0.742528 | 7.950408 | 40.10438 |
| Log-likelihood | -21.00675 | 6.608692 | 42.17229 | -27.96741 | -1.198613 | -9.066814 | 6.473542 |
| Akaike AIC | 4.000750 | 0.932368 | -3.019143 | 4.774157 | 1.799846 | 2.674090 | 0.947384 |
| Schwarz SC | 4.742726 | 1.674344 | -2.277166 | 5.516134 | 2.541822 | 3.416067 | 1.689361 |
| Mean dependent | 6.195437 | 14.96280 | 6.069464 | 19.57088 | 1.906337 | 6.856637 | 27.98818 |
| S.D. dependent | 3.410836 | 7.929461 | 0.731345 | 15.73332 | 0.562356 | 2.543357 | 2.383641 |

*Source: Authors calculation*
*Note: Standard errors in ( ) & t-statistics in [ ]*



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The table presents the results of a Vector Autoregression (VAR) model analysing the relationships between various economic indicators, including gdp, ATMs, the logarithm of debit transactions lnDebit, interest rates Int, foreign direct investment fdi, inflation Inf, and industrial production Ind. Each variable's lagged values are included, showing how past values influence current outcomes. For instance, the coefficient for gdp(-1) is 1.084256, indicating a significant positive effect on current GDP, while ATMs(-1) has a coefficient of 0.337484, also showing a positive relationship. The statistical significance of these coefficients is assessed through t-statistics, with notable values such as 2.28993 for gdp(-1) and 3.20441 for ATMs(-1), suggesting strong relationships. The model's fit is indicated by an R-squared value of 0.945007 for the GDP equation, reflecting a strong explanatory power. Additionally, the sum of squared residuals for the GDP equation is 10.87621, which helps evaluate the model's accuracy. Overall, the table illustrates the dynamic interactions among these economic indicators over time, highlighting their lagged effects and significance in understanding economic behaviour.

*Table 5:* Robust Least Square estimates for the equation (1)

| gdp | Coeff. | St.Er. | t-value | p-value | [95% Conf | Interval] | Sig |
|---|---|---|---|---|---|---|---|
| ATMs | .63 | .077 | 2.28 | .04 | .032 | 1.229 | ** |
| lnDebit | 3.812 | .086 | 1.67 | .009 | -8.752 | 1.127 | |
| Ind | 1.192 | .096 | 1.71 | .001 | -.312 | 2.696 | |
| fdi | 1.62 | .055 | 2.15 | .051 | -3.25 | .011 | * |
| Inf | -.033 | .042 | -0.14 | .003 | -.556 | .49 | |
| Constant | 4.732 | 2.629 | 0.43 | .000 | 34.619 | 39.155 | |
| Mean of dependent var | | 7.007 | SD of dependent var | | | 1.631 | |
| R-squared | | 0.725 | Number of obs | | | 19 | |
| F-test | | 1.919 | Prob > F | | | 0.000 | |

*Source: Authors Calculation*
*Note: ** p<.05, * p<.1*

The table displays the outcomes of a robust regression model intended to elucidate the correlation between many independent variables and GDP. Each coefficient signifies the projected alteration in GDP resulting from a one-unit increase in the respective independent variable while maintaining all other variables constant. The correlation for ATMs is 0.63, showing that an increase of one ATM unit correlates with a 0.63 unit rise in GDP, signifying a positive effect on economic growth. The standard error quantifies the variability of the coefficient estimations. A reduced standard error signifies more accurate projections. The standard error for lnDebit is 0.086, indicating a very modest number that suggests the estimate's reliability; the t-value evaluates the importance of each coefficient. An elevated absolute t-value signifies a more substantial association. The t-value for FDI is 2.15, indicating that the correlation between FDI and GDP is statistically significant. The 95% confidence interval delineates a region in which we may assert with 95% certainty that the real coefficient resides. The confidence interval for ATMs spans from 0.032 to 1.229, suggesting that the real impact of ATMs on GDP is both positive and substantial. An R-squared score of 0.725 signifies that around 72.5% of the variability in GDP is explicable by the model's independent variables.

*Table 6:* Robust Least Square estimates for the equation (2)

| lnco2 | Coeff. | St.Er. | t-value | p-value | [95% Conf | Interval] | Sig |
|---|---|---|---|---|---|---|---|
| ATMs | 004 | .007 | 0.60 | .000 | .02 | .011 | |
| lnDebit | .411 | .062 | 6.64 | .000 | .278 | .544 | *** |
| Ind | .026 | .015 | 1.71 | .001 | -.007 | .059 | |
| fdi | .002 | .018 | 0.10 | .008 | -.037 | .041 | |
| Inf | -.007 | .006 | -1.19 | .254 | -.021 | .006 | |
| Constant | 11.344 | .222 | 21.73 | .000 | 10.224 | 12.464 | *** |
| Mean of dependent var | | 14.417 | SD of dependent var | | | 0.265 | |
| R-squared | | 0.980 | Number of obs | | | 20 | |
| F-test | | 135.273 | Prob > F | | | 0.000 | |

*Source: Authors Calculation*
*Note: *** p<.01, ** p<.05, * p<.*



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The table presents the results of a robust regression analysis for equation (2), detailing the coefficients, standard errors, t-values, p-values, and confidence intervals for various independent variables affecting the dependent variable. The coefficient for ATMs is 0.004, indicating a positive but weak relationship, with a statistically significant p-value of 0.000, suggesting that ATMs have a measurable impact on the outcome. The lnDebit variable shows a strong positive relationship with a coefficient of 0.411, a t-value of 6.64, and a p-value of 0.000, indicating high significance and reliability in its effect. In contrast, the lnd variable has a coefficient of 0.026, with a t-value of 1.71 and a p-value of 0.001, suggesting a positive but less certain effect. The fdi variable's coefficient is 0.002, with a t-value of 0.10 and a p-value of 0.008, indicating a weak positive relationship that may not be significant, as its confidence interval includes zero. The Inf variable shows a negative coefficient of -0.007, with a t-value of -1.19 and a p-value of 0.254, indicating no significant effect on the dependent variable. The constant term is 11.344, which is highly significant with a t-value of 21.73 and a p-value of 0.000. This indicates that there is a strong baseline value when all of the independent variables are zero. Overall, the model has a value of 0.980 for its R-squared, which indicates that it explains 98% of the variance in the dependent variable. Furthermore, the F-test confirms the model's overall significance with a p-value of 0.000, which highlights the model's robustness and reliability in explaining the relationships among the variables.

## IV. Conclusion and Policy Implications

The study concludes that digital financial inclusion (FI) significantly influences economic development and environmental sustainability in India, highlighting a complex relationship between these variables. It emphasises that while FI can drive economic growth by enhancing access to financial services, it may also pose challenges to environmental sustainability due to increased consumption patterns. Therefore, policymakers are urged to adopt a balanced approach that promotes economic growth through digital FI while implementing measures to mitigate environmental impacts. This includes investing in technology and infrastructure to expand access to financial services, particularly in underserved areas, and ensuring that financial inclusion initiatives align with sustainable development goals. Additionally, continuous monitoring and evaluation of these policies are essential to adapt strategies effectively and achieve desired outcomes in both economic and environmental domains.

In summary, the study concludes that FI is a critical factor in driving economic growth and achieving environmental sustainability, particularly in the context of India's unique challenges and opportunities. The insights provided can guide future research and inform policy decisions aimed at fostering a more inclusive and sustainable economy.

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# Credit Card Interest Rate Regulation in Brazil: Behavioral Biases Present in the Market and Possible Impacts

By Lessandro Werner Thomaz & Philipp Ehrl
*Getúlio Vargas Foundation*

*Resumo-* O presente estudo analisa as implicações econômicas e comportamentais associadas à regulação das taxas de juros no mercado de cartões de crédito no Brasil, com foco na recente regulamentação que estabeleceu limites para juros e encargos financeiros em operações de crédito rotativo e parcelado. A pesquisa contextualiza a importância dos cartões de crédito como meio de pagamento, destacando o impacto das altas taxas de juros e inadimplência no sistema financeiro. A análise abrange fatores estruturais, como o custo do crédito e os vieses comportamentais que influenciam as decisões dos consumidores e empresas, discutindo os possíveis efeitos da regulação, incluindo mudanças nas estratégias dos emissores, redução da oferta de crédito e o papel do parcelamento sem juros no consumo. O trabalho também propõe reflexões sobre educação financeira e incentivos ao uso consciente do crédito como ferramentas para uma inclusão financeira mais sustentável.

*Palavras Chave:* *cartão de crédito, juros, inadimplência, comportamento do consumidor, regulação econômica.*

*GJHSS-E Classification:* *LCC Code: HG1641-1643*




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# Credit Card Interest Rate Regulation in Brazil: Behavioral Biases Present in the Market and Possible Impacts

## Cartão de Crédito a Regulação dos Juros no Brasil: Os Vieses Comportamentais Presentes no Mercado e Possíveis Impactos

Lessandro Werner Thomaz [α] & Philipp Ehrl [σ]

*Resumo-* **O presente estudo analisa as implicações econômicas e comportamentais associadas à regulação das taxas de juros no mercado de cartões de crédito no Brasil, com foco na recente regulamentação que estabeleceu limites para juros e encargos financeiros em operações de crédito rotativo e parcelado. A pesquisa contextualiza a importância dos cartões de crédito como meio de pagamento, destacando o impacto das altas taxas de juros e inadimplência no sistema financeiro. A análise abrange fatores estruturais, como o custo do crédito e os vieses comportamentais que influenciam as decisões dos consumidores e empresas, discutindo os possíveis efeitos da regulação, incluindo mudanças nas estratégias dos emissores, redução da oferta de crédito e o papel do parcelamento sem juros no consumo. O trabalho também propõe reflexões sobre educação financeira e incentivos ao uso consciente do crédito como ferramentas para uma inclusão financeira mais sustentável.**

*Palavras Chave: cartão de crédito, juros, inadimplência, comportamento do consumidor, regulação econômica.*

## I. Introdução

O estabelecimento de limites aos juros é prática comum em linhas de crédito direcionadas, como habitação, rural ou operações com recursos subsidiados. No crédito comercial, entretanto, em que os recursos têm origem nas próprias captações das instituições financeiras e podem ser livremente alocados, a imposição regulatória pode gerar efeitos adversos, como a redução do apetite por concessão, a restrição do crédito e, em situações extremas, o encerramento de determinadas modalidades. Exemplo recente ocorreu em março de 2023, quando os principais bancos suspenderam a oferta do Crédito Consignado INSS após a imposição de teto de juros pelo poder público.

Esses desdobramentos decorrem da estrutura de custos de uma operação de crédito, composta essencialmente por despesas de captação, custos administrativos (geração, manutenção e cobrança de contratos) e risco de inadimplência. Ao se limitar a taxa de juros de determinada modalidade, restringe-se a capacidade de compensação das instituições: aumentos no custo de captação ou nas perdas por inadimplência deixam de ser repassados às novas contratações, comprimindo a margem do produto, que em casos extremos pode tornar-se deficitário.

A limitação de juros em operações com recursos livres foi introduzida pelo Banco Central em janeiro de 2020, quando as taxas do cheque especial foram fixadas em 8% ao mês. No caso do cartão de crédito, foco do presente estudo, a regulação assume contornos distintos, dado que o produto reúne múltiplas modalidades de crédito: compras à vista, crédito rotativo, crédito parcelado, compras parceladas sem juros, compras parceladas com juros, além de saques e pagamentos de contas na função crédito.

A Resolução CMN n.º 5.112/2023, editada a partir da Lei 14.690/2023, limitou os encargos financeiros a 100% do valor original da dívida, afetando especificamente as modalidades de crédito rotativo e parcelado, que são aquelas em que incidem juros remuneratórios. Essa regulação estabelece que "o total cobrado em cada caso a título de juros e encargos financeiros não poderá exceder o valor original da dívida". Assim, mesmo sem fixar uma taxa máxima de juros, a norma impõe limites práticos: a redução da taxa, a diminuição do prazo máximo de parcelamento ou a interrupção da cobrança de juros quando atingido o patamar de 100% do principal.

Os números agregados que serão mostrados na terceira seção desse trabalho mostram claramente que os cartões de crédito desempenham um papel crucial na economia brasileira, pois funcionam como uma ferramenta prática e amplamente acessível para

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facilitar o consumo. Em um país onde o crédito é um dos principais meios para viabilizar o acesso a bens e serviços, sendo que o cartão de crédito contribui para a inclusão financeira, permitindo que indivíduos sem poupança imediata realizem compras e investimentos pessoais. Essa forma de pagamento é especialmente relevante em momentos de inflação ou dificuldade econômica, quando o poder de compra das famílias pode ser comprometido, já que o parcelamento no cartão possibilita que gastos maiores sejam diluídos ao longo do tempo.

Por outro lado, o uso intensivo de cartões de crédito no Brasil também reflete os desafios estruturais da economia, como a alta taxa de juros. Os brasileiros, muitas vezes, recorrem ao crédito rotativo, uma das modalidades mais caras do mercado, o que pode gerar endividamento excessivo e limitar a capacidade de consumo futuro. Portanto, embora os cartões de crédito sejam uma peça-chave na dinamização da economia e na democratização do crédito, seu impacto depende de uma gestão responsável tanto por parte dos consumidores quanto das instituições financeiras e da regulação governamental.

Diante desse contexto, o presente estudo analisa as implicações econômicas e comportamentais da regulação das taxas de juros no mercado de cartões de crédito no Brasil, enfatizando os impactos sobre as operações de crédito rotativo e parcelado. A pesquisa destaca a relevância do cartão de crédito como meio de pagamento, evidenciando o peso das elevadas taxas de juros e da inadimplência para o sistema financeiro. Examina ainda fatores estruturais — como o custo do crédito e os vieses comportamentais que orientam decisões de consumidores e empresas — e discute potenciais efeitos da regulação, incluindo alterações nas estratégias dos emissores, redução da oferta de crédito e a centralidade do parcelamento sem juros no padrão de consumo. O trabalho também propõe reflexões sobre educação financeira e sobre incentivos ao uso consciente do crédito como instrumentos para uma inclusão financeira mais sustentável.

O artigo está organizado em seis seções, além desta introdução. A seção 2 apresenta a revisão de literatura; a seção 3 aborda a atuação da indústria; a seção 4 discute os impactos da regulação; a seção 5 analisa o comportamento de estabelecimentos e consumidores; e a seção 6 traz as considerações finais, seguidas das referências consultadas.

## II. Revisão de Literatura

A recente publicação da Resolução n.º 5.112/2023 ainda não gerou trabalhos específicos nas bases SCOPUS e Science Direct. De modo semelhante, a análise do Projeto de Lei n.º 2685/2022 não identificou estudos técnicos como subsídio, limitando-se a justificativas relacionadas ao teto de juros no cheque especial, à disparidade entre a taxa SELIC e as taxas anuais de cartão de crédito — que alcançam cerca de 300% a.a. — e à percepção de que a determinação do CMN, que restringiu a permanência no rotativo ao ciclo subsequente da fatura, não trouxe os resultados esperados.

Diante disso, a revisão de literatura voltou-se a trabalhos que tratam de concorrência entre bancos, spreads bancários e empréstimos sem destinação específica. Valente, Augusto e Murteira (2024) exploram como a eficiência da intermediação financeira afeta o crescimento econômico, enfatizando a medida mundial do spread bancário. Destacam que, em 2018, o spread médio no Brasil alcançou 32,21%, contra 5,34% mundial, e discutem fatores como o efeito de portfólio, a importância de distinguir categorias de crédito (rotativo, consignado, pessoal), a necessidade de trabalhar com taxas reais em vez de proxies contábeis e a influência de especificidades nacionais. A conclusão é que políticas eficazes exigem atenção à heterogeneidade das modalidades, evitando externalidades indesejadas.

Divino e Haraguchi (2023) analisam a transmissão da taxa básica de juros, concluindo que os bancos repassam aumentos de forma mais intensa do que reduções, gerando comportamento assimétrico e persistência em níveis elevados de algumas taxas. Além disso, identificam a prática de antecipar ajustes futuros da política monetária, o que reforça margens elevadas e sustenta o alto custo do crédito.

Ornelas, da Silva e Van Doornik (2022) investigam o papel do relacionamento bancário. Enquanto bancos públicos tendem a reduzir spreads à medida que acumulam informações, bancos privados adotam estratégia de "capturar e extrair rendas", mantendo taxas altas mesmo após longos relacionamentos. Essa prática relaciona-se ao poder de mercado, mensurado pelo índice de Lerner, e aos custos de troca de informações, que limitam a concorrência. O avanço do Open Finance, ao permitir o compartilhamento do histórico de relacionamento, pode reduzir tais barreiras e aumentar a competitividade do mercado.

No contexto internacional, Raveendranathan, Stefanidis e Sublet (2023) analisam os efeitos de tetos em linhas de crédito rotativo nos Estados Unidos. Os autores estimam ganhos de eficiência equivalentes a 1% da renda média anual (cerca de 25% do valor do acesso ao crédito), beneficiando sobretudo consumidores de baixa renda que já possuem cartão e credores estabelecidos. Entretanto, identificam um trade-off intergeracional: a regulação reduz a competição por novos clientes e pode dificultar o acesso de futuras gerações ao crédito.

Cabe notar, contudo, diferenças institucionais entre Brasil e Estados Unidos. No Brasil, o rotativo só

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ocorre após o fechamento da fatura, devendo o saldo ser quitado ou parcelado; já nos EUA, o saldo pode ser carregado indefinidamente, desde que se pague o mínimo, acumulando juros desde a compra.

De modo geral, a literatura aponta que o crédito no Brasil se caracteriza por custos elevados, explicados por fatores estruturais e institucionais: concentração bancária — os quatro maiores bancos (Banco do Brasil, CAIXA, Itaú e Bradesco) concentram 55,3% dos ativos totais (BACEN) —, política monetária historicamente restritiva, risco de crédito elevado, custos regulatórios e tributários, além de elevados índices de inadimplência. Também se destaca a preferência dos consumidores por linhas de fácil acesso, como o rotativo, que concentram justamente as taxas mais altas.

As propostas identificadas incluem uma política monetária menos restritiva (com cautela diante da inflação), reformas estruturais para reduzir custos operacionais, estímulo à concorrência bancária e iniciativas de educação financeira. Ainda assim, como alertam Raveendranathan, Stefanidis e Sublet (2023), tetos de juros podem introduzir barreiras de entrada, sobretudo para clientes de baixa renda sem histórico de crédito.

## III. Panorama do Mercado de Cartões de Crédito no Brasil

Esta seção descreve a evolução recente do mercado de cartões de crédito no Brasil, combinando dados do BACEN, IBGE, ABECS e CNC para discutir níveis de juros, uso do cartão, endividamento das famílias, a especificidade do parcelamento sem juros e a organização industrial do arranjo de pagamentos. O objetivo é oferecer um pano de fundo factual para a análise regulatória desenvolvida nas seções seguintes.

Na Figura 1 observam-se as taxas médias dos últimos cinco anos para o crédito rotativo e o parcelado. Os valores mínimos registrados foram de 11,97% (rotativo) e 6,72% (parcelado), ambos em jun/20, enquanto os máximos alcançaram 15,33% (rotativo, mai/23) e 9,6% (parcelado, abr/23). Nos meses mais recentes, nota-se tendência de queda na taxa do parcelado.

Ao comparar a taxa média do parcelamento com a de uma operação de crédito pessoal não consignado, de 5,47% a.m. em jun/24, observa-se diferença de 3,51 p.p. Esse resultado reforça o histórico de juros elevados nas operações vinculadas ao cartão de crédito. Segundo a ABECS[1], o faturamento por meio desse instrumento atingiu R$ 2,4 trilhões em 2023, o que representa crescimento nominal de 12,1% em relação a 2022.

No último dado divulgado pelo BACEN, em 2023 já existiam 206 milhões de cartões ativos (com pelo menos uma transação no último mês) em uma base total de 473 milhões de cartões. Comparado com o ano 2018, ambos figuras mais do que duplicaram. De acordo com o Censo 2022 (IBGE), a população brasileira soma 208,7 milhões de pessoas, das quais 107,4 milhões economicamente ativas. Isso significa quase dois cartões ativos por pessoa economicamente ativa e 4,4 cartões emitidos por habitante. O número crescente de cartões de crédito a estratégia de inclusão financeira e social por meio do Cartão de Crédito dos emissores, movimento que foi impulsionado pelo avanço dos processos digitais e pela pandemia da COVID-19, mas a indústria enfrentou dificuldade de avançar em medidas alternativas ao limite de taxas de juros do Cartão de Crédito, advindo do debate no legislativo.

[1] https://abecs.org.br/apresentacoes-e-estudos



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*Notes: elaborado pelos autores com dados BACEN – Séries Temporais (925477 e 25478).*

*Figura 1:* Taxas médias do crédito rotativo e parcelado

A Pesquisa de Endividamento e Inadimplência do Consumidor (PEIC/CNC) mostra que 28,8% das famílias estão inadimplentes, sendo que o cartão de crédito responde por 86% desse endividamento. Embora o acesso ao cartão represente inclusão financeira, ele também amplia o risco de sobre-endividamento, sobretudo quando não há quitação integral da fatura e o saldo migra para o rotativo — uma das modalidades mais caras do sistema.

A que se considerar que o aumento no uso das transações eletrônicas e em especial dos cartões de crédito tem um impacto direto no funcionamento do sistema financeiro e na arrecadação. As transações eletrônicas reduzem a circulação de dinheiro em espécie, contribuindo para a formalização da economia e dificultando práticas como a evasão fiscal. O setor bancário, por sua vez, beneficia-se das taxas cobradas sobre as operações e do alto volume de dados gerados pelo uso dos cartões, que podem ser utilizados para criar perfis de crédito e avaliar riscos de concessão de novos empréstimos. Esse ciclo reforça a conexão entre o consumo individual e o crescimento econômico em níveis mais amplos.

Outra característica única do mercado brasileiro é o parcelamento sem juros (PSJ), representando 51,9% das compras em 2023 (Tabela 1). Essa modalidade, hoje oferecida em até 12 vezes, sustenta o consumo, mas transfere custos a estabelecimentos e instituições financeiras, estimulando também o uso crescente da antecipação de recebíveis.

*Tabela 1:* Participação das compras parceladas por volume transacionado (%)

| Ano | Trimestre | 1 parc. | 2–3 parc. | 4–6 parc. | 7+ parc. |
|---|---|---|---|---|---|
| 2023 | I | 52,0 | 17,2 | 14,4 | 16,4 |
| | II | 51,8 | 17,9 | 14,8 | 15,5 |
| | III | 52,2 | 17,6 | 14,6 | 15,6 |
| | IV | 51,9 | 17,8 | 14,3 | 16,0 |

*Notas: Fonte: BACEN – Estatísticas de meios de pagamento.*

O funcionamento da indústria de meios de pagamento é ilustrado na Figura 2. Esta modelo baseia-se em quatro partes: consumidor, emissor, adquirente (credenciadora) e estabelecimento. O consumidor utiliza o cartão e paga ao emissor na data de vencimento (D); o emissor avalia o limite, assume o risco de crédito e liquida com a credenciadora depois de 27 dias (em D+27); a credenciadora habilita estabelecimentos e repassa valores em D+2; o estabelecimento recebe em D+30, podendo optar pela antecipação mediante taxa. As bandeiras (Elo, Visa e Master Card) atuam como Instituidoras do Arranjo de



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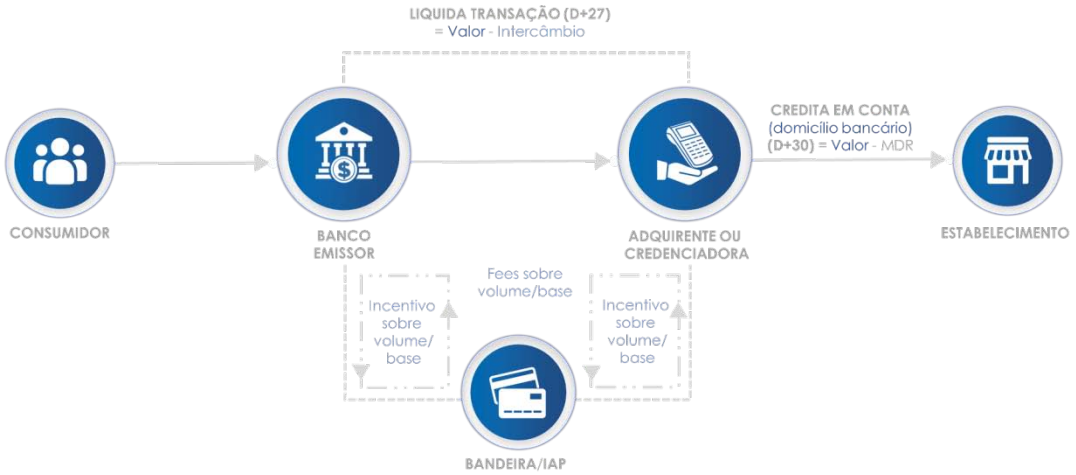
Pagamento (IAP), definindo regras e procedimentos. Os arranjos integram o Sistema de Pagamentos Brasileiro (SPB) e são supervisionados pelo BACEN.

Do ponto de vista de tarifação, tanto o banco emissor quanto o adqui-rente/credenciador pagam tarifas à Bandeira instituidora do arranjo pela utilização da infraestrutura, mas em contrapartida recebem, dentro do modelo de quatro partes, valores referentes às tarifas de intercâmbio (interchange) e ao Merchant Discount Rate (Taxa de Desconto do Comerciante) MDR. Entre o pagamento realizado pelo consumidor e o recebimento pelo estabelecimento em D+30, portanto, há deduções que financiam essa engrenagem, sendo parte das receitas destinadas também a programas de fidelidade e conveniências oferecidas ao consumidor, o que reforça a centralidade do cartão na relação com a instituição. Além disso, o emissor pode cobrar juros sobre o saldo devedor em caso de atraso, oferecendo ao cliente a opção de pagar apenas o mínimo e carregar o restante para o ciclo seguinte (crédito rotativo) ou parcelar o valor em condições específicas (crédito parcelado).




*Notas: Adaptado pelos autores. O esquema mostra consumidor, emissor, adquirente/credenciador e estabelecimento, com prazos de liquidação (D+27, D+2, D+30) e fluxos de tarifas. As bandeiras definem regras no âmbito do arranjo, sob regulação do BACEN.*

*Figura 2:* Modelo de quatro partes no arranjo de cartões de crédito

O mercado brasileiro apresenta ainda a particularidade do parcelamento sem juros, modalidade que se expandiu ao longo dos anos e hoje é frequentemente oferecida em até 12 prestações, sobretudo no varejo. Essa prática impulsiona o consumo e se consolidou como característica singular do sistema, mas transfere parte do custo para os estabelecimentos e para a própria indústria de pagamentos. Em paralelo, cresceu a operação de antecipação de recebíveis, na qual bancos e adquirentes cobram uma taxa adicional para liquidar vendas em D ou D+1, permitindo aos estabelecimentos recompor fluxo de caixa e capital de giro. Esse mecanismo tornou-se uma das principais fontes de receita das credenciadoras, reforçando o papel do cartão não apenas como meio de pagamento, mas também como instrumento de intermediação financeira.

Como mostra a Figura 3, o faturamento com cartões de crédito atingiu em 2023 R$ 2,4 trilhões, representando crescimento nominal de 12,1% e real de 6,96% em relação a 2022. Esse desempenho reflete não apenas os avanços em inovação e segurança implementados por toda a indústria, mas também a ampliação da oferta promovida pelos bancos digitais, que intensificaram a competição na emissão de cartões. Ainda assim, a estrutura de mercado mantém características assimétricas: o segmento de adquirentes e credenciadoras diversificou-se com a entrada de novos competidores, ao passo que o mercado de bandeiras permanece altamente concentrado em três grandes players — Visa, MasterCard e Elo, sendo esta última uma holding formada por Bradesco, Banco do Brasil e CAIXA.



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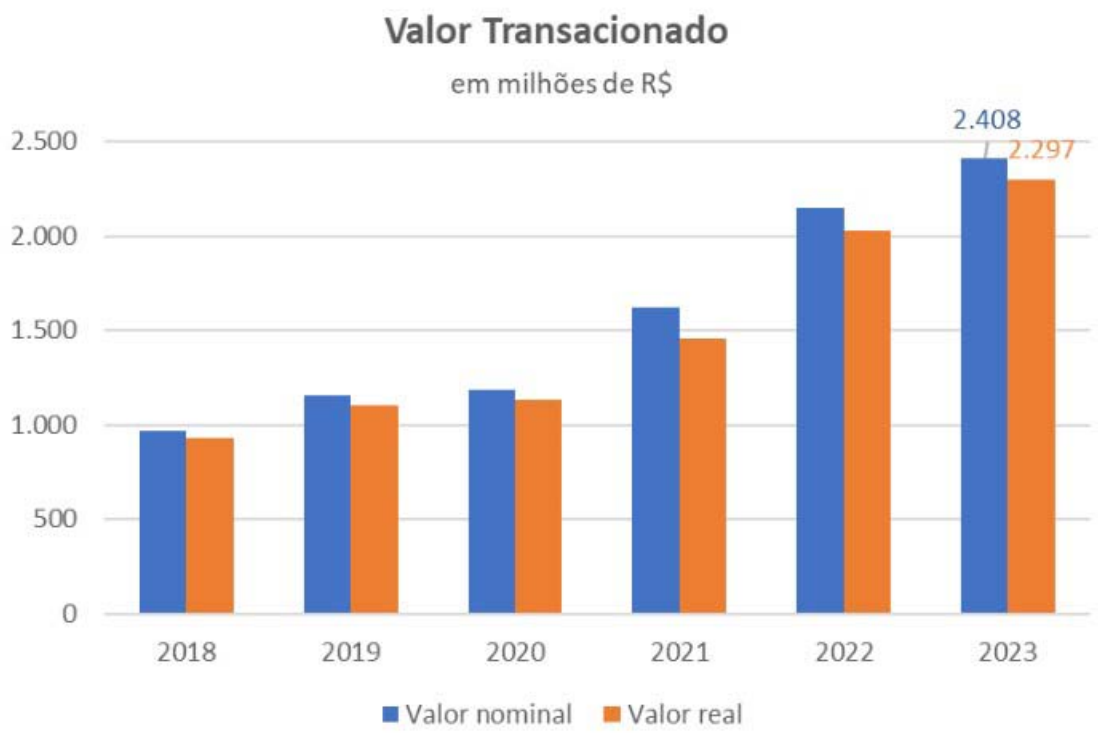


*Notas: Elaborado pelos autores com dados da ABECS.*

*Figura 3:* Valores transacionados em cartão de crédito no Brasil

## IV. Impactos da Regulamentação do Teto de Juros

Para compreender os efeitos da regulamentação é necessário esclarecer, em primeiro lugar, os conceitos utilizados no cálculo do teto de juros, lembrando o papel do emissor no arranjo de pagamento como responsável tanto pela atribuição do limite do cartão de crédito quanto pela liquidação da transação, mesmo no caso de inadimplência do cliente. O Art. 28 da Lei n.º 14.690/2023 estabelece que os emissores devem, de forma fundamentada e anual, submeter ao Conselho Monetário Nacional, por intermédio do Banco Central, limites para as taxas de juros e encargos financeiros no crédito rotativo e no parcelamento de saldo devedor. A regulamentação foi publicada em 21 de dezembro de 2023 por meio da Resolução n.º 5.112/2023, que alterou a Resolução n.º 4.549/2017.

A Resolução definiu os conceitos centrais: operações de crédito rotativo e de parcelamento de fatura; juros remuneratórios; encargos financeiros (multas, juros de mora, tarifas e comissões); e valor original da dívida (apuração do saldo sempre que for concedida nova operação de financiamento da fatura). O §1 do Art. 28 estabelece que "o total cobrado em cada caso a título de juros e encargos financeiros não poderá exceder o valor original da dívida". Como não há uma taxa máxima explícita, o limite pode ser respeitado reduzindo-se a taxa de juros, diminuindo-se o prazo máximo de parcelamento ou interrompendo a cobrança de juros após atingir 100% do valor original. Assim, a análise dos impactos deve considerar o efeito acumulado entre a cobrança do rotativo e a do parcelamento.

*Tabela 2:* Decomposição do spread do ICC (em % do spread)

| Discriminação | 2021 | 2022 | 2023 | Média |
|---|---|---|---|---|
| 1 – Inadimplência | 26,83 | 30,46 | 35,65 | 30,98 |
| 2 – Despesas administrativas | 29,90 | 25,48 | 23,97 | 26,45 |
| 3 – Tributos e FGC | 22,85 | 22,32 | 20,50 | 21,89 |
| 4 – Margem financeira do ICC | 20,42 | 21,74 | 19,89 | 20,68 |
| Spread do ICC (1 + 2 + 3 + 4) | 100,0 | 100,0 | 100,0 | 100,0 |

*Notas: Elaborado pelos autores com dados do BACEN – Relatório de Economia Bancária.*



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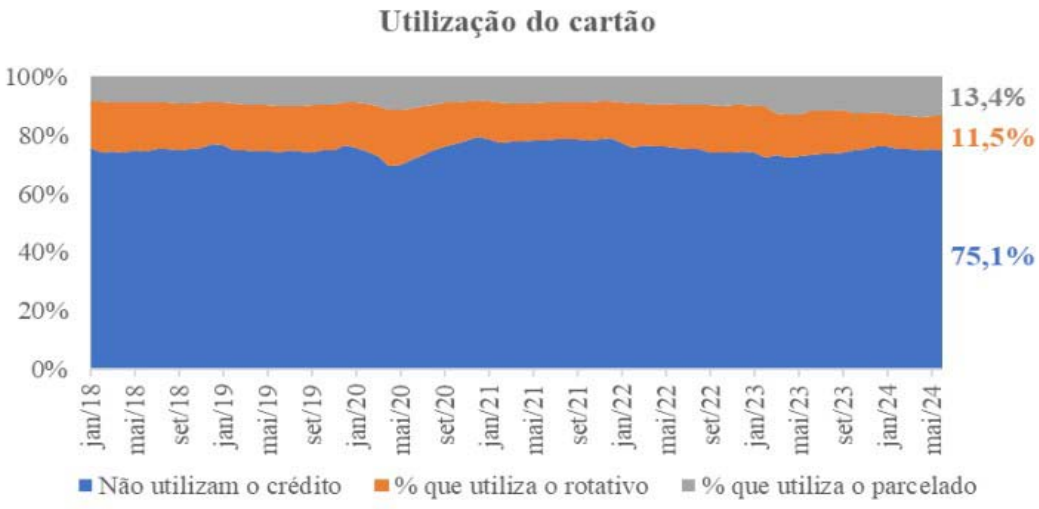
Um passo adicional é examinar os componentes que determinam as taxas cobradas, à luz do Relatório de Economia Bancária do BACEN, que decompõe o spread do Indicador de Custo do Crédito (ICC). Entre 2021 e 2023, a inadimplência respondeu em média por 30,98% do spread, seguida de despesas administrativas (26,45%), tributos e FGC (21,89%) e margem financeira (20,68%). Destaca-se o aumento da inadimplência, que passou de 26,83% em 2021 para 35,65% em 2023, reforçando seu peso na formação da taxa de juros.

Como mostra a Tabela 2, a inadimplência tornou-se o principal componente do spread, reforçando a importância de analisar não apenas o nível das taxas, mas também o comportamento dos clientes diante das opções de financiamento.

A Figura 4 evidencia que a maioria dos consumidores evita o crédito, mas a parcela que utiliza o rotativo apresenta inadimplência muito superior. Entre os 11,5% que recorrem ao rotativo, 54,46% tornam-se inadimplentes. Isso implica que menos da metade dos valores precisa gerar receita suficiente para cobrir as perdas, exigindo dos emissores mecanismos adicionais de compensação, como subsídio cruzado com outras receitas do produto, redução de limites para clientes mais arriscados, restrição de crédito ou encurtamento de prazos de parcelamento.

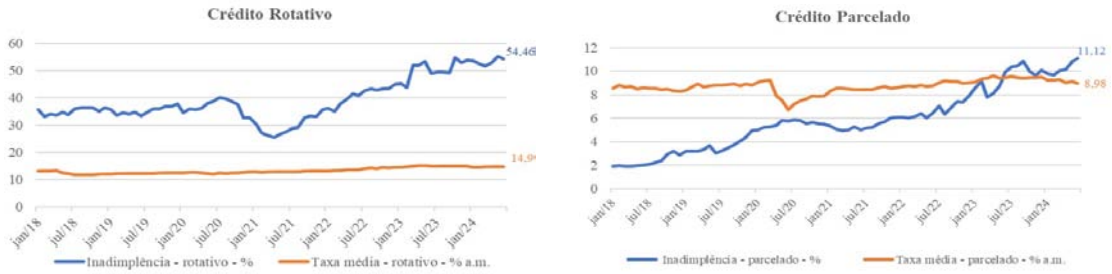
A Figura 5 compara diretamente as duas modalidades. O subpainel (a) mostra que a inadimplência no rotativo pode chegar a cinco vezes a observada no parcelado, ao passo que o subpainel (b) indica crescimento recente da inadimplência no parcelado, ainda que em níveis menores. Essa diferença estrutural explica por que o rotativo permanece a operação mais onerosa do sistema, mesmo com regras que limitam sua utilização a 85% do valor da fatura.

Após a instituição da regulação, observou-se movimento distinto entre as modalidades. A Figura 6 mostra que no rotativo, houve queda nas taxas médias nos dois primeiros meses, seguida de tendência de retorno. No parcelado, ao contrário, nota-se leve declínio contínuo ao longo dos meses. Ainda que a amostra cubra apenas seis meses de vigência, a evidência sugere uma redução artificial das taxas por força regulatória, o que demanda acompanhamento atento para avaliar se os efeitos se consolidam.




*Notas*: Elaborado pelos autores com dados BACEN.

*Figura 4:* Utilização do cartão de crédito com e sem incidência de juros




*Notas: Elaborado pelos autores com dados do BACEN.*

*Figura 5:* Taxa média e inadimplência por modalidade de crédito



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## V. Comportamento dos Estabelecimentos e Consumidores

Nas seções anteriores discutiu-se a formação da taxa de juros e seus componentes. Aqui, o foco recai sobre a forma como os arranjos de pagamento no cartão de crédito influenciam a inadimplência, considerando o comportamento do mercado e Figura 6: Evolução das taxas médias após a regulação dos consumidores.




*Notas: Elaborado pelos autores com dados do BACEN.*

*Figura 6:* Evolução das taxas médias após a regulação

A Tabela 3 resume a racionalidade econômica de consumidores e bancos frente às taxas elevadas de juros e à inadimplência. Do lado dos consumidores, recorrer ao crédito rotativo pode aliviar o fluxo de caixa no curto prazo, mas revela-se irracional a longo prazo diante do custo elevado. Há alternativas mais baratas, como empréstimos pessoais, mas a baixa educação financeira faz com que muitos não percebam o peso real dos juros. Do lado dos bancos, a cobrança de taxas elevadas pode ser justificada pelo risco de inadimplência e pela concentração de mercado. Ainda assim, taxas excessivas podem levar à perda de clientes ou ao aumento da inadimplência, gerando custos de longo prazo.

*Tabela 3:* Racionalidade da taxa de juros entre consumidores e bancos

| Consumidores | Bancos |
|---|---|
| *Pagar taxas altas:* pode ser racional no curto prazo para quem tem baixa poupança, mas irracional no longo prazo. Educação financeira limitada aumenta a propensão ao erro. | *Cobrar taxas altas:* pode ser racional frente ao risco e à baixa concorrência, mas reduzir taxas pode evitar inadimplência e fidelizar clientes. |
| *Inadimplência:* pode aliviar temporariamente o caixa, mas gera perdas futuras e restrições de crédito. | *Empurrar clientes à inadimplência:* pode gerar ganhos imediatos, mas aumenta perdas com dívidas incobráveis e deteriora o relacionamento. |

*Notas: Elaborado pelos autores.*

Exemplos simples ajudam a ilustrar esse dilema. Se analisarmos uma pessoa que tem despesas no cartão na ordem de R$ 1.000 (sendo R$ 300 de compras à vista e R$ 700 de compras parceladas sem juros) caso faça o uso do pagamento mínimo da fatura de R$ 150 (15%) terá o valor da próxima fatura de no mínimo R$ 1.650, considerando as compras parceladas o valor não pago da fatura anterior juros e IOF, isso sem considerar as novas compras realizadas no mês, o que pode comprometer rapidamente sua capacidade de pagamento.

Do ponto de vista dos estabelecimentos, o modelo de parcelamento sem juros (PSJ) é financiado pelo comerciante, que arca com o custo da antecipação de recebíveis. Simulações em sites de credenciadoras indicam que, em uma venda de R$1.000 parcelada em 12 vezes sem juros, o estabelecimento pode receber pouco mais de R$880 no dia seguinte, após taxas e descontos. Embora essa prática sustente volumes maiores de vendas, sobretudo em produtos de maior valor, ela transfere parte relevante do custo financeiro ao varejo.

Sob a ótica do consumidor, o PSJ também revela custos ocultos. Em pesquisa de preços de varejistas online, observou-se que o valor à vista via PIX foi, em média, 5,56% menor do que o preço parcelado no cartão, evidenciando a presença de juros implícitos. Assim, mesmo quando os consumidores acreditam



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contratar crédito gratuito, há um custo embutido que confirma a máxima econômica de que dinheiro no tempo tem valor. Essa assimetria de mercado reforça que o varejista concede o crédito, mas o risco é assumido pelo emissor, enquanto a receita financeira se concentra nas credenciadoras por meio da antecipação de recebíveis.

Essa dinâmica revela a importância da educação financeira. Segundo pesquisa do INSPER, apenas 35% dos brasileiros demonstram alfabetismo financeiro adequado, contra 55% em economias avançadas. Evidências comportamentais reforçam essa vulnerabilidade: estudos destacam vieses como ancoragem, efeito manada, status quo, aversão à perda, dor de pagamento e viés de presente (Lima, 2023). A "dor de pagamento" é especialmente relevante, pois mecanismos como pagamento por aproximação, recompensas e cashback tornam menos tangível a perda de recursos, ampliando o uso do cartão.

Experimentos do BACEN em parceria com a Plano CDE e a Fletcher School mostram que o desenho da fatura influencia as decisões de pagamento. Participantes expostos a faturas com leiaute simplificado e pré-preenchimento do valor integral compreenderam melhor os custos do cartão e pagaram percentuais maiores da fatura do que aqueles que receberam a fatura padrão. Isso sugere que mudanças institucionais relativamente simples podem melhorar a disciplina financeira dos consumidores.

Essas conclusões dialogam com a perspectiva de Richard Thaler, segundo a qual os consumidores mentalmente separam seus recursos em "balanços contábeis" distintos (Almeida, 2017). Essa contabilidade mental explica, por exemplo, por que muitos aceitam pagar juros no cartão superiores ao rendimento de sua poupança, ou por que parcelam bens a custos elevados em vez de comprá-los à vista. Essa percepção psicológica ajuda a entender o lema popular segundo o qual "se a parcela cabe no bolso, então pode comprar".

Em síntese, o comprometimento da capacidade de pagamento não decorre apenas de taxas de juros elevadas, mas também de assimetrias de mercado, da forma como o crédito é estruturado no Brasil e de vieses comportamentais que moldam decisões de consumo.

## VI. Considerações Finais

Os debates em torno das elevadas taxas de juros praticadas no Brasil, especialmente no crédito rotativo e parcelado de cartões, evidenciam a necessidade de políticas mais eficazes. Observou-se que, mesmo após a promulgação da Lei nº 14.690/2023 e da Resolução nº 5.112/2023, as taxas continuam em patamares historicamente altos—15,33% a.m. no rotativo e 9,60% a.m. no parcelado nos últimos cinco anos — com inadimplência de 54,46% e 11,12%, respectivamente. O relatório do BACEN mostra que a inadimplência respondeu por 35,65% do custo do crédito em 2023, um aumento de quase 9 p.p. em relação a 2021, reforçando seu peso central na formação das taxas.

Esses resultados sugerem que a inadimplência não decorre apenas dos juros elevados, mas também de práticas de mercado que exploram vieses comportamentais e induzem ao consumo excessivo. O uso intensivo de parcelamento sem juros e estratégias de marketing reduz a percepção de custo, levando consumidores a ultrapassar limites sustentáveis de endividamento. Assim, mesmo medidas regulatórias como a limitação de juros geram apenas efeitos transitórios.

Do lado da oferta, a regulação tende a levar bancos a reduzir limites, restringir crédito a clientes de maior risco e reforçar processos de renegociação para conter perdas. Contudo, isso ocorre em um ambiente em que grande parte da população é carente de alternativas de crédito acessível e de mecanismos de proteção financeira, o que penaliza inclusive bons pagadores.

Portanto, uma redução sustentável das taxas de juros exige abordagem mais abrangente. Além de medidas regulatórias, são necessários avanços em educação financeira, desenho de produtos que desestimulem o superendividamento e maior concorrência entre instituições financeiras. A incorporação de análises econométricas em estudos futuros poderá oferecer evidências mais robustas para orientar intervenções que fortaleçam a eficiência e a sustentabilidade do mercado de crédito.

Em síntese, as ações regulatórias recentes revelaram efeitos limitados. Para que o mercado de cartões de crédito contribua para uma inclusão financeira saudável, será necessário combinar disciplina regulatória, educação financeira e uma análise mais profunda dos mecanismos comportamentais que moldam o consumo no Brasil.

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# Human Recourses for Social Change: Promoting Women's Empowerment through Solidarity Economy Models in Afghanistan and Pakistan

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*Abstract-* Women's economic participation in fragile and conflict-affected contexts remains one of the most pressing development challenges of our time. In Afghanistan, the erosion of rights and restrictions on women's mobility since 2021 have drastically reduced access to employment and livelihoods, while in Pakistan, entrenched structural barriers continue to confine many women to informal or unpaid work. Against this backdrop, solidarity economy models cooperatives, mutual aid networks, community finance schemes, and social enterprises offer alternative pathways to income generation, collective protection, and social recognition. This article explores how such models can promote women's empowerment in Afghanistan and Pakistan when approached through the lens of human resources for social change.

Drawing on recent literature and reports (2024-2025), the study conceptualizes HR not as a narrow administrative function but as a strategic set of practices participatory governance, peer-to-peer training, leadership development, and collective accountability that can institutionalize inclusion and equity within solidarity-based organizations.

*Keywords: women's empowerment, human resources for social change, solidarity economy, cooperatives, community finance, gender and development, Afghanistan, Pakistan.*

*GJHSS-E Classification: LCC Code: HD60, HM1321*




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# Human Recourses for Social Change: Promoting Women's Empowerment through Solidarity Economy Models in Afghanistan and Pakistan

Jamila Asef [α], Hasan [σ] & Muhammad Azam [ρ]

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Drawing on recent literature and reports (2024-2025), the study conceptualizes HR not as a narrow administrative function but as a strategic set of practices participatory governance, peer-to-peer training, leadership development, and collective accountability that can institutionalize inclusion and equity within solidarity-based organizations. Comparative evidence shows that while Afghan women increasingly rely on community-led initiatives to sustain livelihoods under restrictive regimes, Pakistani women benefit from somewhat more enabling legal and institutional frameworks yet continue to face significant gender gaps. In both contexts, solidarity economy initiatives have enabled women to diversify income, build self-confidence, and gain decision-making power, though sustainability challenges persist due to limited financing, market access, and policy support.

By integrating insights from feminist political economy, organizational studies, and development practice, the article argues that HR for social change is central to scaling the transformative potential of solidarity economies. It concludes that embedding inclusive HR practices within community enterprises not only enhances women's economic agency but also fosters resilience, collective identity, and long-term social justice. These findings contribute to debates on alternative development models and provide actionable lessons for policymakers, practitioners, and scholars seeking to advance gender equity in fragile states.

*Keywords: women's empowerment, human resources for social change, solidarity economy, cooperatives, community finance, gender and development, Afghanistan, Pakistan.*

## I. Introduction

The last decade has seen growing global interest in alternative economic models that prioritize social justice, collective ownership, and community resilience. The solidarity economy an umbrella term that includes cooperatives, mutuals, community finance, producer networks and other forms of collective economic organization offer promising pathways to recover livelihoods, redistribute power, and bolster social protection where conventional markets and state support have failed.[1] For fragile and conflict-affected contexts such as Afghanistan and parts of Pakistan, where formal employment opportunities for women remain severely constrained and state institutions are often weak, solidarity economy models present not only an economic option but a social-political strategy for resisting exclusion and rebuilding community agency.

Afghanistan and Pakistan present both shared and divergent challenges for women's economic participation. In Afghanistan, the erosion of formal rights and restrictions on women's mobility and employment since 2021 have dramatically reduced women's access to public life and to formal labour markets, generating deep setbacks in their livelihoods and well-being. Consultations and large-scale assessments report that a large majority of Afghan women face constrained access to public spaces and income-generating opportunities, compounding household vulnerability and sharply increasing the risk of poverty.[2] In Pakistan, while legal and institutional environments are more permissive, entrenched gender gaps in labour force participation, pay, and access to productive assets persist; Pakistan's national and World Bank analyses document slow-moving progress and clear structural barriers that leave many women dependent on informal

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and unpaid work.[3] Together, these realities make it urgent to explore models that enable women to secure meaningful livelihoods outside or alongside constrained formal markets.

Traditional human resources (HR) practice focuses on recruitment, training, performance and compliance within firms and public agencies. When reframed through a "social change" lens, HR becomes a strategic lever for designing inclusive organizational forms, enabling participatory governance, and building collective capacities that advance gender justice. In solidarity economy initiatives, HR functions are less about top-down personnel management and more about facilitating cooperative governance, supporting peer-to-peer learning, mediating power relationships, and institutionalizing gender-equitable practices that endure despite political or economic shock.[4] This reconceptualization is especially relevant in Afghanistan and Pakistan where community-based organizations, women's cooperatives, and mutual-aid networks often substitute for absent or inaccessible formal services.

Existing evidence and illustrative models. Empirical and practitioner literature from the region points to multiple, modestly scaled examples where solidarity-based initiatives have generated tangible benefits for women. Micro-cooperatives, tailoring and handicraft cooperatives, community savings-and-loan circles, and social enterprise hybrids have helped women pool resources, access markets, and create safer workspaces often accompanied by non-financial supports such as literacy, legal rights education, and psychosocial services. International and local development organizations have supported the formation of women-led cooperatives in Afghan provinces and Pakistan's rural districts, reporting improvements in income diversification, social capital, and risk-sharing.[5] Moreover, prominent regional examples of solidarity finance such as Pakistan's Akhuwat model demonstrate how interest-free, community-based finance and social solidarity can scale inclusion while maintaining high repayment and social cohesion. These cases suggest important design principles for HR in solidarity organizations: participatory governance, community accountability, gender-sensitive capacity building, and integrated support services.

Despite practical interest and numerous pilots, there remains sparse consolidated academic and policy analysis that links HR practices directly to outcomes for women within solidarity economy organizations in Afghanistan and Pakistan, and articulates how such HR approaches can be adapted under severe socio-political constraints (for example, restrictions on women's mobility or limits on external funding). Most existing assessments document project outputs (e.g., numbers of cooperative members, income changes) but pay limited attention to internal governance practices, leadership pathways for women, conflict resolution mechanisms, and the ways HR-like functions are performed informally by community leaders.[6] This article therefore asks: What HR practices and organizational designs within solidarity economy models most effectively promote women's empowerment in Afghanistan and Pakistan? How do these practices navigate political constraints and cultural norms, and what lessons can be generalized for HR practitioners seeking social change in fragile contexts?

The analysis adopts a multi-dimensional understanding of women's empowerment that spans economic agency (income, access to finance and markets), social agency (mobility, voice, participation in decision-making), and psychological agency (self-efficacy, collective identity). Drawing on social movement, feminist political economy, and organizational studies literatures, the article treats solidarity economy organizations as hybrid social institutions where HR functions are enacted through both formal structures (bylaws, membership rules, leadership elections, training curricula) and informal practices (mentoring, kinship networks, moral economies). The conceptual framework positions HR for social change as comprising four interlocking domains: inclusive governance and leadership development;[7] capacity-building and skills for market and non-market activities;[8] protective social supports and risk-sharing mechanisms;[9] and linkages to markets, policy actors and solidarity finance.[10] This multi-domain lens enables

[3] Amaral, S., Sheth, S., Aggarwal, P., Guha, A., Safeer, O., & Manzur, S. (2024). *Women's economic empowerment in Pakistan: An evidence guided toolkit for more inclusive policies*. https://documents.worldbank.org/en/publication/documents-reports/documentdetail/099517505282516353

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analysis of both internal organizational processes and external enabling factors that determine whether solidarity economy efforts translate into durable empowerment.

This study contributes to scholarship and practice in three ways. First, it foregrounds HR as a purposeful set of practices for social transformation not merely administrative tasks thereby expanding what counts as workforce development in fragile settings. Second, it synthesizes recent empirical evidence (2024-2025) about women's economic conditions and programmatic responses in Afghanistan and Pakistan to identify transferrable HR design principles and pitfalls. Recent assessments by UN agencies and development partners underline both the scale of the problem and the resilience of local actors; this article mines those findings to propose practical, context-sensitive HR approaches that solidarity organizations can adopt.[11] Third, by comparing two neighboring contexts with different political constraints, the paper teases out adaptive strategies that can work when formal policy environments are hostile (as in Afghanistan) and when they are uneven but open (as in Pakistan). Such cross-contextual learning fills a pressing gap for practitioners designing interventions that must be robust under political uncertainty.

The next section reviews the political-economic landscapes in Afghanistan and Pakistan with attention to indicators that shape women's participation in economic life. Part three unpacks the solidarity economy its theoretical roots and practical manifestations in the region and identifies HR-related design elements that recur across successful initiatives. The fourth section analyzes challenges and risks, including elite capture, sustainability and the limits imposed by restrictive norms and policies. The final sections synthesize lessons for practitioners and policymakers, and propose an agenda for HR-led research and pilot interventions to scale solidarity approaches that center women's empowerment.

The urgency of strengthening women's livelihoods in Afghanistan and Pakistan cannot be overstated: setbacks in women's economic rights not only undermine individual well-being but also erode community resilience and national recovery prospects. Solidarity economy models when paired with intentional, gender-aware HR practices offer a promising route to rebuild inclusive local economies that protect women's rights, expand their agency, and sustain collective action in the face of political and economic shocks. This article begins from that premise and proceeds to examine how HR for social change can be designed, implemented, and institutionalized to make that promise real.

## II. Methodology

This study employs a qualitative, secondary-synthesis approach to examine how human resources (HR) practices within solidarity economy organizations contribute to women's empowerment in Afghanistan and Pakistan. Drawing on peer-reviewed journal articles, development agency reports, and institutional assessments published between 2024 and 2025, the analysis prioritizes high-quality, contextually relevant evidence from both formal and informal organizational settings. Key sources include UN and UNDP country assessments, World Bank reports, NGO case studies, and academic research that document women's economic participation, cooperative models, and solidarity finance initiatives.

To strengthen validity, the study triangulates quantitative indicators such as labor force participation, access to finance, and income generation with qualitative evidence on governance, leadership path-ways, and lived experiences of women participants. This combination allows for a nuanced understanding of both measurable outcomes and the mechanisms by which HR practices foster inclusion, agency, and social recognition.

The analytical framework is grounded in social movement theory, feminist political economy, and organizational studies, focusing on four interrelated HR domains: inclusive governance and leadership development, capacity-building and skills for market and non-market activities, protective social supports and risk-sharing mechanisms, and linkages to markets, policy actors, and solidarity finance. This framework enables systematic examination of internal organizational processes, external enabling factors, and the translation of HR practices into durable empower-ment outcomes, particularly under the socio-political constraints characterizing fragile and conflict-affected contexts.

### *a) Solidarity Economy in Fragile and Conflict-Affected Contexts*

In fragile and conflict-affected contexts, the solidarity economy serves not merely as a source of income but as a crucial mechanism of social protection, resilience, and locally grounded welfare. In settings where formal state welfare is weak and markets are unstable, practices such as women's handicraft cooperatives, savings-and-loan circles, and community-based enterprises have taken on additional importance: they provide safe social spaces, foster trust across fractured communities, and help to sustain cultural practices threatened by conflict or displacement.

https://pakistan.unwomen.org/sites/default/files/2024-06/pk-c972-national-report-on-the-status-of-women-s.pdf

[11] Javed, S., Quraishi, T., & Hakimi, N. (2025). The Systematic Oppression of Afghan Women and Girls Since the Taliban's Takeover in 2021. https://doi.org/10.59110/aplikatif.v4i1.555



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For example, in Pakistan conflict-affected regions, informal social protection via familial or tribal networks helps to buffer vulnerable households against harm, especially when formal welfare systems are unable to reach them. However, these informal networks are uneven and can at times reproduce patterns of domination or clientelism.[12] Such studies show that in places like Bajor, households rely on informal social protection, but these systems alone are inadequate to address gendered vulnerabilities in the long term.[13]

In neighbouring fragile settings, the importance of social capital and networks in resilience becomes even more evident. Research in 2024 on "Social Capital and Community Resilience in the wake of disasters, conflicts and displacements" highlights that strong social ties, local mutual aid, and participatory engagement in community processes significantly improve recovery after shocks.[14] Similarly, systematic reviews of what makes communities resilient emphasise the bridging role of solidarity economy forms, especially when formal governance is weak.[15]

Beyond Pakistan, in contexts like South Sudan, agribusiness cooperatives operating in fragile contexts have improved livelihood outcomes by strengthening value chains and enabling collective action among smallholder farmers. Such initiatives not only provide income but also stimulate local agency in supply, processing, and marketing under conditions of instability.[16] Parallelly, the global policy framing of SSE (Social and Solidarity Economy) is increasingly recognizing that cooperatives and SSE entities deliver inclusive, community-driven care solutions and gender-responsive collective governance (e.g. ILO-led initiatives 2025).[17]

In Afghanistan, the fiscal constraints caused by shrinking donor support combined with high security spending force trade-offs that affect social welfare. In this environment, solidarity economy practices emerge as adaptive strategies: local social entrepreneurship, communal savings, and women's groups become sites not only of income generation but of social repair and trust building.[18]

Across South Asia more broadly, solidarity economy initiatives are found to bridge formal and informal economies, especially for women. In urban Pakistan, for instance, women in the informal sector report that cooperative work and collective production provide more than economic benefits: they enhance voice, social respect, and safety when other institutions fail. Though empirical work remains limited, recent studies point to the potential of such models to strengthen women's agency across ethnic and class divides.[19]

While solidarity economy initiatives in fragile and conflict-affected contexts are not a panacea, they play critical roles: offering social protection, preserving cultural identity, and knitting together social cohesion in the aftermath or midst of violence. As formal welfare systems remain stretched or in collapse, such locally rooted, collectively run economic practices are central to strategies of resilience.

*b) Women's Empowerment and Alternative Economic Models*

Women's empowerment in fragile states is inherently multidimensional, spanning economic, social, political, psychological and relational domains. Empowerment cannot be reduced to income alone; instead, it encompasses enhanced decision-making power, mobility, recognition within households and communities, and shifts in social status and norms.[20] Empirical evidence from South Asia suggests that women's participation in cooperatives, savings or credit groups, community enterprises, or solidarity finance institutions offers both tangible benefits higher income, savings, better access to credit and intangible ones greater self-confidence, collective identity, better negotiation capacity in the household.[21]

In Afghanistan, even under restrictive regimes, studies show small-scale collective and enabling practices produce meaningful empowerment. For example, The Transformative Power of ICT in

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Empowering Women in Afghanistan (2024) finds that technology access helps women gain financial independence and social recognition despite mobility and legal constraints.[22] Barriers to healthcare utilization among married women in Afghanistan (2024) shows how asset ownership and decision autonomy correlate with greater use of health services, illustrating that control (not just income) matters.[23] Policy reports such as UN Women's Resolve of Afghan women in the face of erasure (2024) document persistence of women entrepreneurship, informal organizing, and community resilience even with shrinking formal supports.[24]

In Pakistan, solidarity finance models and cooperative/Islamic microfinance have delivered more pronounced outcomes. Microfinance's Business Breakthrough for Women Empowerment (Punjab, 2024) shows that microfinance participation improves women's wealth, reduces exposure to certain domestic vulnerabilities and boosts psychological well-being.[25] The 2025 case study Impact of Microfinance Services on Women Empowerment in Pakistan shows improvements not only in income but also in domestic decision-making and social independence among women borrowers. Studies on financial inclusion more broadly (Nexus between Women Empowerment and Financial Inclusion, 2024) show that inclusion via credit, savings, and access to financial services correlates with enhanced autonomy and status.[26] And the study of Islamic microfinance in South Punjab (Akhuwat clients) shows that aligning finance with religious-ethical norms can facilitate greater social acceptance, reduce stigma, and enhance women's voice in households and communities.[27]

To visually illustrate these differences and commonalities, Figure 1 presents a comparative framework of women's empowerment pathways through alternative economic models in Afghanistan and Pakistan.

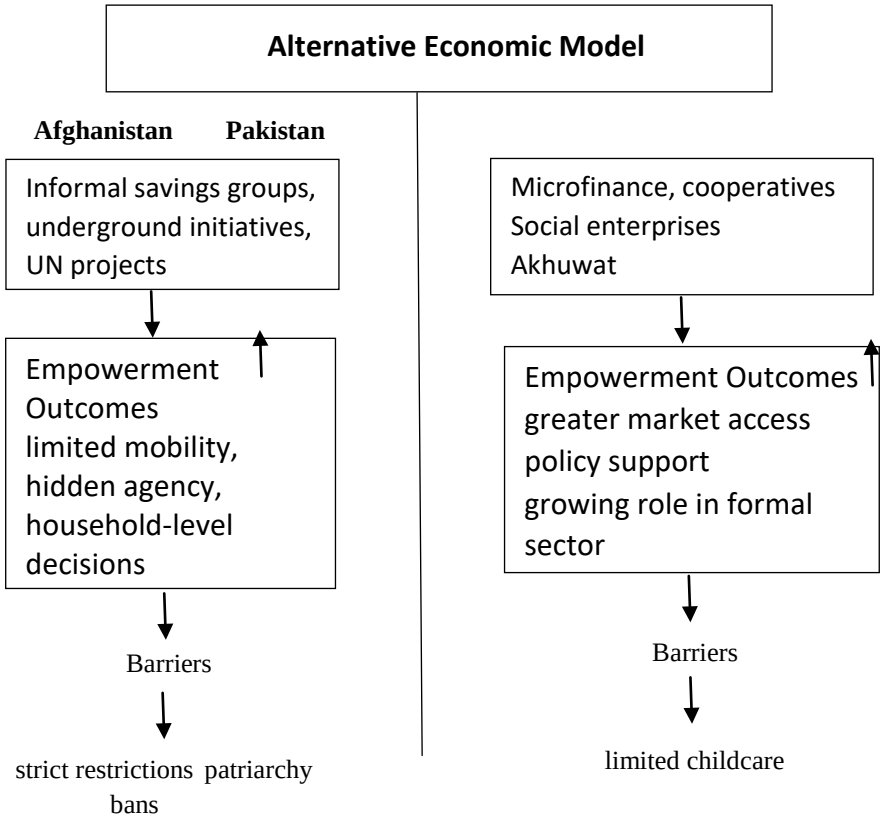


*Figure 1:* Alternative Economic Models and Women's Empowerment Pathways in Afghanistan and Pakistan.

[22] Abbas, S., & Jabeen, S. (2024). Women's Economic Empowerment through Agriculture: Analyzing Barriers and Solutions. https://doi.org/10.59107/edunity.v6i1.233

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These findings suggest that solidarity economy models microfinance, savings groups, cooperatives, ICT-enabled inclusion, interest-free or Islamic finance offer important pathways for empowerment where state or private sector employment is inaccessible.

## III. Human Resources as a Lever for Social Change

*a) From Administrative Function to Social Justice Mechanism*

Traditional human resources (HR) management has been framed as an administrative function: recruitment, training, evaluation, and compliance. Yet within solidarity economy organizations, HR becomes more than bureaucracy; it evolves into a lever for advancing inclusion, equity, and trust. Feminist HRM scholars highlight that in fragile contexts where formal gender equality mechanisms are absent HR functions often act as de facto social justice tools.[28] This redefinition positions HR as a societal rather than purely organizational mechanism.

*b) Participatory Governance as HR Practice*

One of the defining HR innovations in solidarity economy organizations is the shift from hierarchical control to participatory governance. Cooperative structures integrate collective decision-making, regular assemblies, and peer-driven evaluations into HR policies. Research from South Asian cooperatives shows that women's involvement in governance significantly increases their visibility and participation in organizational life. These practices ensure that HR functions are not imposed top-down but are negotiated inclusively, thereby democratizing organizational power.[29]

*c) Peer-to-Peer Learning and Rotational Leadership*

Solidarity economy HR also prioritizes horizontal learning models and rotational leadership. Instead of formalized, top-down training, members exchange skills in peer-to-peer environments. For women in fragile states, this provides recognition of experiential knowledge whether in agriculture, handicrafts, or informal trade and builds confidence in public participation. Rotational leadership systems allow women to occupy leadership roles regularly, breaking entrenched gender hierarchies while strengthening organizational resilience.[30]

*d) Social Norms and Community Accountability*

Unlike conventional HR systems, solidarity organizations often lack enforceable contracts. Instead, HR accountability rests on community trust, kinship ties, and moral obligations. This reliance on reputation and reciprocity functions as a form of informal HR governance. For example, trust-based lending in South Asian cooperatives creates accountability through reputational risks rather than legal enforcement.[31] While these mechanisms are culturally legitimate and resilient, they also risk reinforcing existing gendered expectations if not carefully balanced.

*e) Linking Individual Empowerment with Collective Outcomes*

The transformative dimension of HR lies in connecting personal empowerment with collective progress. Women who engage in solidarity HR practices such as recruitment boards, training committees, or conflict resolution councils gain not only technical skills but also negotiation power, mobility, and public recognition.[32] These outcomes transcend income alone, embedding empowerment across social and political domains.

*f) Challenges and Risks of Reproducing Inequality*

Despite their promise, solidarity HR practices are not automatically equitable. Gendered power imbalances sometimes persist, with men dominating leadership even under rotational rules.[33] Informal enforcement mechanisms can also place heavier obligations on women, particularly in patriarchal kinship structures.[34] Scholars stress the need for explicit gender-sensitive HR frameworks to prevent reproducing the exclusions of formal labor markets.[35]

When designed with intentional equity principles, HR within solidarity economy organizations acts as a transformative lever of social change. By prioritizing participatory governance, peer-to-peer learning, and community accountability, HR is reconceptualized from a control mechanism into an emancipatory practice. In fragile states like Afghanistan and conflict-affected regions of Pakistan, where women

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are excluded from formal labor markets, these HR innovations not only sustain livelihoods but also build resilience, cohesion, and social justice.

*g) Regional Evidence: Afghanistan and Pakistan*

Evidence from Afghanistan since 2021 highlights a sharp deterioration in women's access to formal employment, with restrictions on mobility and public presence limiting their options.[36] Women increasingly rely on informal, home-based cooperatives in tailoring, poultry farming, and food processing as economic lifelines and safe social environments.[37]

In contrast, women in Pakistan face fewer formal restrictions but continue to experience structural barriers, including wage gaps, lack of childcare, and disproportionate unpaid care responsibilities. Community-based solidarity finance initiatives, especially Akhuwat's interest-free loan system, have expanded women's credit access and enabled the growth of women-led enterprises.[38]

*Table 1:* Comparative Evidence on Women's Empowerment and Solidarity Economy Practices in Afghanistan and Pakistan

| Dimension | Afghanistan | Pakistan |
|---|---|---|
| Formal Employment Opportunities | Severe contraction since 2021; restrictions on women's mobility, education, and public presence have led to a dramatic decline in workforce participation.[39] | Relatively higher but still among the lowest in South Asia; women remain concentrated in informal and low-paid sectors, with persistent wage gaps.[40] |
| Dominant Livelihood Strategies | Informal, home-based cooperatives in tailoring, poultry farming, handicrafts, and food processing serve as survival strategies and safe social spaces.[41] | Women increasingly rely on microenterprises (tailoring shops, salons, handicrafts) supported by solidarity finance institutions such as Akhuwat.[42] |
| HR / Solidarity Practices | Emphasis on pooled savings, collective purchasing of raw materials, and rotational leadership within small cooperatives; HR functions operate informally through trust and kinship.[43] | Akhuwat's interest-free loans embed group training, skills-sharing, and peer accountability; HR-like practices include participatory governance and collective monitoring.[44] |
| Social and Cultural Barriers | Patriarchal norms reinforced by restrictive policies; limited visibility and recognition for women outside the home.[45] | Entrenched gender norms (care burden, mobility restrictions, lack of childcare) limit formal participation despite fewer legal prohibitions.[46] |
| Empowerment Outcomes | Maintenance of survival income, safe spaces, and minimal agency within restricted contexts; symbolic resistance through collective action.[47] | Expanded access to credit, modest increase in income, enhanced intra-household decision-making, and improved social recognition.[48] |
| Overall Trend (2024–2025) | Solidarity economy as a lifeline for survival and dignity in the absence of state or market support.[49] | Solidarity finance and community enterprises as complements to market participation, though structural inequalities persist.[50] |

[36] Impacts of the Taliban's ban on women's work and education - Afghanistan. https://reliefweb.int/report/afghanistan/impacts-talibans-ban-womens-work-and-education

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As shown in Table 1, Afghanistan reflects a survival-oriented solidarity economy under restrictive conditions, while in Pakistan such models operate as complementary strategies to enhance women's economic agency within broader but still unequal labor markets.

## IV. Conclusion

This article has examined the potential of solidarity economy models as vehicles for promoting women's empowerment in Afghanistan and Pakistan through the lens of human resources for social change. The review of recent literature (2024–2025) underscores that solidarity-based organizations whether in the form of cooperatives, savings-and-loan circles, or community enterprises are not merely economic arrangements but also social and political institutions that can challenge entrenched gender inequalities. In fragile contexts where formal markets are inaccessible and state protections are weak, these models provide women with critical platforms to generate income, share risks, and build collective agency.

The analysis highlights several key findings. First, solidarity economy initiatives in both Afghanistan and Pakistan create alternative pathways for women's participation in economic life, offering safe spaces and collective forms of protection where patriarchal restrictions and political instability would otherwise exclude them. Second, human resource practices within these organizations such as participatory governance, rotational leadership, peer-to-peer learning, and gender-sensitive training function as levers for empowerment. Rather than focusing only on administrative management, HR in solidarity contexts enables women to exercise leadership, develop capacities, and engage in decision-making processes that directly affect their lives. Finally, cross-country comparison reveals important differences: while Afghan initiatives must adapt to a highly restrictive environment where women's mobility and visibility are severely curtailed, Pakistani initiatives benefit from relatively more supportive institutional frameworks but continue to face structural gender inequalities, including wage gaps and limited childcare provisions.

Taken together, these insights suggest that HR for social change is not an abstract ideal but a practical necessity for sustaining solidarity economy initiatives. By embedding inclusive HR practices, these organizations can institutionalize gender equity and ensure that empowerment outcomes persist beyond short-term project cycles. This has significant implications for development practitioners and policymakers: supporting women's empowerment requires moving beyond income-based interventions toward systemic investments in governance, leadership, and collective capacity building.

At the same time, important challenges remain. Many solidarity initiatives operate at a small scale and face sustainability risks due to limited access to finance, market linkages, and legal recognition. Without broader institutional support, women-led cooperatives and enterprises may struggle to scale or survive under restrictive regimes. Future research should therefore focus on comparative, longitudinal analysis of HR practices within solidarity organizations, paying particular attention to how women navigate power dynamics, cultural norms, and policy barriers.

Solidarity economy models hold significant promise for advancing women's empowerment in Afghanistan and Pakistan, but their transformative potential depends on how intentionally they integrate HR practices that promote inclusion, accountability, and resilience. By centering human resources as tools for social change, policymakers, practitioners, and communities can reimagine development not as a top-down intervention but as a participatory, collective process led by women themselves.

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# Community Action for Climate Change and Sustainable Development: Some Lessons for Kerala and Tamil Nadu from Around the World

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*Abstract-* Climate change is markedly intensifying the challenges associated with urban heat, especially within rapidly growing Indian cities such as Kerala and Tamil Nadu. This study critically examines community action as a pivotal mechanism driving climate change mitigation and sustainable urban development. Leveraging an integrated analysis of both global and local case studies, it delves into the multifaceted impacts of rising urban heat. Particular focus is placed on health risks linked to elevated nocturnal temperatures, exacerbation of the urban heat island effect, and heightened vulnerability among marginalized populations. Employing a robust mixed-methods methodology encompassing literature review, case studies, and stakeholder interviews, the research identifies critical gaps in climate data accessibility, policy harmonization, and community inclusiveness. Findings substantiate the effectiveness of localized, community-driven initiatives in amplifying resilience and adaptive capacity. The study culminates with tangible recommendations emphasizing multi-sector collaboration, enhanced climate modelling, and inclusive frameworks necessary to safeguard vulnerable urban residents amid escalating climate threats.

*Keywords:* *community action, climate change adaptation, urban heat island, sustainable development, kerala, tamil nadu, urban resilience, green infrastructure, vulnerable populations, climate policy.*

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# Community Action for Climate Change and Sustainable Development: Some Lessons for Kerala and Tamil Nadu from Around the World

Dalia Ignatius

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## I. Introduction

The urban development model in India is not sustainable till it considers the local environment. Climate change increasingly threatens global ecosystems, human health, and economic stability, with urban areas emerging as critical hotspots of vulnerability due to intensified heat, pollution, and population density (World Resources Institute, 2023). Urban heat islands, defined as localized phenomena where urban areas exhibit higher temperatures than their rural surroundings, have intensified considerably due to rapid urbanization and proliferation of heat-absorbing artificial surfaces. This intensification has redefined urban heat from a mere comfort inconvenience into a critical public health and survival challenge. The compounded effects of greenhouse gas emissions alongside urban heat escalation uniquely threaten densely populated urban centers, with disproportionate impacts on socio-economically marginalized groups due to inadequate infrastructure and access to cooling resources. The urgency of addressing this phenomenon is consequently paramount to ensure sustainable urban development and climate resilience. (Indo-Asian News Service, 2024). The parallel rise of greenhouse gas emissions and urban heat has exacerbated these risks, particularly in rapidly expanding cities in India and across the global South, where marginalized populations face disproportionate risks due to inadequate housing, poor sanitation, and limited access to cooling infrastructure (Souverijns, et al., 2022); (World Resources Institute, 2023).

The stakes are high in Indian urban centers like Delhi, Mumbai, and cities in Kerala and Tamil Nadu. Nighttime temperatures which ideally should aid human physiological recovery through cooling have risen dramatically, with persistent hot nights above 25°C becoming commonplace and reaching unprecedented records, such as Delhi's overnight temperature of 35.2°C in 2023 (Indo-Asian News Service, 2024). Nighttime temperature rises pose profound risks to human health by disrupting the body's natural thermoregulation and sleep cycles essential for physiological recovery. Elevated nocturnal temperatures are empirically linked to increased incidences of cardiovascular, respiratory, and renal diseases, and contribute significantly to heat-related mortality. Vulnerable demographics including the elderly, laborers exposed to outdoor heat, and low-income households with limited cooling access are disproportionately susceptible. Without immediate policy interventions, climate projections suggest these conditions will become pervasive, intensifying social inequities and overburdening urban health and governance infrastructures. (Center for Climate and Energy Solutions, 2025). Climate models project that without significant intervention, such climatic stresses will become the new normal across Indian cities by the end of the century, compounding existing social inequities and straining urban governance systems (IPCC, 2022, as cited in (World Resources Institute, 2023).

Although climate change is a global challenge, localized action spearheaded by community engagement has emerged as an indispensable and

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pragmatic vector for effective climate adaptation and mitigation strategies. Community participation not only fosters contextually tailored solutions but also catalyses societal awareness and democratizes policymaking, ensuring greater inclusivity. Notably, Kerala's Extreme Poverty Eradication Programme exemplifies how decentralized, community-driven frameworks facilitated through organizations like the Kudumbashree network can generate transformative interventions addressing food security, health, housing, and livelihoods. (John, 2025) This grassroots empowerment model demonstrates scalability potential for broader climate resilience and sustainable development endeavours beyond state boundaries. Globally, urban centers demonstrate an inspiring array of climate resilience strategies that interweave nature-based solutions, infrastructural innovation, and participatory governance. Initiatives such as Medellin's "Green Corridors" employ extensive urban forestry to mitigate heat exposure, while Los Angeles innovatively coats road surfaces with reflective materials mitigating surface temperatures by up to 5°C. Cities like Paris and New York have developed "cool islands"—microclimates sustained through shaded green spaces and reflective rooftops—to alleviate heat risk and bolster public health. These cases underscore the critical importance of integrating environmental stewardship with urban policy to achieve equitable climate resilience. Nonetheless, they also highlight persistent challenges in ensuring resource allocation equity and substantive policy integration for vulnerable urban populations, particularly in lower-income contexts. (World Resources Institute, 2023); (Gerretsen, 2019)

Urban heat vulnerability research further reveals critical spatial heterogeneity at micro-scales. In South Africa, high-resolution simulations using the UrbClim model have identified that areas characterized by dense buildings, scant vegetation, and low socioeconomic status bear the brunt of heat exposure (Souverijns, et al., 2022). Such findings underscore the necessity for high-resolution climate data, which is currently limited in many Indian urban contexts. Local climate models of higher spatial granularity, combined with vulnerability and exposure data that intersect with demographic and infrastructural variables, enable precise targeting of adaptation measures. This approach fosters social equity and enhances the effectiveness of urban climate resilience policies (Souverijns, et al., 2022).

Kerala's Greenhouse Gas (GHG) Inventory Report emphasizes sectoral emission patterns providing foundations for targeted policy interventions. The Energy sector, dominated by fossil-fuel-dependent transport, remains the principal emitter, while waste management and agriculture contribute notably to emissions profiles (Directorate of Environment & Climate Change (DoECC), 2024). This report advocates for integrated mitigation strategies including transport electrification, forest conservation, and wastewater management as pillars of Kerala's low-carbon and climate-resilient development pathway aligned with India's Sustainable Development Goals (Directorate of Environment & Climate Change (DoECC), 2024). These institutional efforts affirm the critical role of coordinated governance and informed community involvement in progressing climate action. Despite promising initiatives, significant barriers persist in scaling community action for climate adaptation and sustainable development in Indian cities. A key limitation is the scarcity of actionable, accessible climate data for local governments and communities to design effective interventions (World Resources Institute, 2023). Political urgency and resource constraints often hamper integration of heat mitigation strategies into broader policy frameworks. Social inclusiveness remains a challenge, as marginalized populations frequently reside in informal settlements with limited voice in urban climate governance (John, 2025). Further, the multifaceted nature of climate risks demands multi-sectoral collaboration linking health, urban planning, social welfare, and environmental conservation efforts.

Communities coming together the world over demonstrate that active community participation can lead to greater change, more inclusivity and sustainable development. Thus if communities come together and take a pro-active role with regards to their environment, take responsibility for the waste generated and manage it in a decentralized manner will promote greater efficiency.

Freiburg in Breisgau, situated at the edge of Germany's Black Forest, exemplifies sustainable urban living through its pioneering integration of green infrastructure, energy, and civic culture. Distinguished as a European "solar city," Freiburg has implemented solar panels on both public and private buildings, supporting local grid renewable energy. The Vauban district, established on a repurposed military base, highlights ecological housing where "passive" and "plus-energy" homes minimize or exceed their energy requirements. Urban mobility is reimagined: cycling, walking, and trams powered by renewables dominate city travel, resulting in cleaner air and reduced vehicular congestion. Sustainability is embedded culturally, reinforced by citizen participation, robust organic markets, and widespread urban farming. Despite challenges such as rising housing costs and retrofitting older buildings, Freiburg's enduring commitment to climate neutrality aiming for full carbon neutrality by mid-century demonstrates the viability of cities harmonizing growth with green values and offers a replicable model for global urban sustainability. (TOI Lifestyle Desk, 2025)

This context mandates an investigation into how community-driven climate actions in Kerala and Tamil Nadu can leverage local knowledge, social networks, and institutional support to build resilience against climate-induced urban overheating and promote

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sustainable development. This study elucidates lessons from Indian and global cities, examining community engagement, policy synergy, vulnerability mapping, and governance innovations. Such comprehensive understanding informs scalable models that protect vulnerable populations and contribute to making cities livable in an era of intensifying climate change.

## II. Review of Literature

The report "Enhancing Sustainable Communities with Green Infrastructure" by the U.S. Environmental Protection Agency (EPA) offers a comprehensive guide for communities aiming to incorporate green infrastructure into sustainable development practices. Green infrastructure encompasses a range of methods such as rain gardens, permeable pavements, green roofs, and urban tree planting that mimic natural processes to manage stormwater onsite. These practices contrast traditional "gray" infrastructure, which relies on extensive underground sewer systems that channel runoff away from developed surfaces with limited regard for environmental or social benefits. The report positions green infrastructure as a multifaceted strategy that intertwines environmental, economic, public health, and social goals. It emphasizes that managing stormwater through local green solutions can help safeguard water quality, recharge groundwater, reduce municipal water consumption, and attenuate flood risks. Moreover, green infrastructure increases urban resilience to climate change impacts, such as heavier rainfall, heatwaves, and storm surges, by promoting natural systems capable of mitigating these effects. Economic benefits include reduced long-term operational costs, increased property values, job creation through green sector employment, and promotion of neighborhood revitalization and investment. Crucially, the EPA underscores the integration of green infrastructure as central to developing sustainable communities. Sustainable communities balance economic, social, and environmental priorities to ensure that development meets present needs without compromising future generations' well-being. The report links green infrastructure closely to smart growth principles, which advocate mixed land use, compact building design, walkable neighborhoods, and preservation of natural areas. The implementation of green infrastructure solutions supports these tenets by creating parks and community gardens, encouraging walking and cycling, and fostering robust stakeholder engagement in planning processes. The guide also provides a roadmap for communities to overcome barriers such as technical, regulatory, and financial to implementing green infrastructure. Successful planning involves broad community participation, vision and goal setting, asset assessment, leveraging existing public and private lands, incentivizing developers, coordinating with local government and agencies, securing funding, and establishing performance metrics for monitoring progress. Long-term operation and maintenance, including training for specialized green sector jobs, is noted as vital to sustainability. (U.S. Environmental Protection Agency., 2014)

The U.S. Environmental Protection Agency's (EPA) guide "Green Infrastructure in Parks" provides a comprehensive framework for integrating green infrastructure into park design, emphasizing collaboration between park agencies, stormwater managers, and community stakeholders. Green infrastructure refers to practices that manage stormwater at its source using natural systems, such as bioretention, permeable pavements, rain gardens, and restored wetlands, offering multifaceted benefits over conventional gray infrastructure. Green infrastructure can significantly enhance recreational value by creating amenities such as trails, wildlife habitats, and educational features while improving environmental quality and public health. Restored waterways and interactive features, such as wetlands and ponds, foster community engagement and environmental stewardship. Aesthetic improvements are achieved through landscapes with native flora, which support biodiversity, including pollinators and birds. The design of drainage and infiltration areas can further augment park aesthetics, create zones for meditation or wildlife observation, and minimize noise and informal pathways. Green infrastructure adoption in underserved communities addresses disparities in park access and quality, facilitating improved physical activity, mental well-being, and community interaction. These projects often leverage stormwater utility funds for improved drainage and reduced park maintenance, thereby decreasing erosion, standing water, mosquito breeding habitats, and supplemental irrigation requirements. Transitioning from high-maintenance turf to native vegetation lowers resource use and maintenance demands. Economically, parks equipped with green infrastructure may qualify for stormwater fee credits and attract additional funding for maintenance. Rainwater harvesting systems further offset potable water costs. Improved Park amenities have the potential to stimulate property investment and enhance neighborhood desirability. By employing permeable surfaces, soil amendments, and underground storage systems, green infrastructure mitigates nuisance flooding and enhances safe, accessible recreational facilities. Educational signage and demonstrations within parks raise public awareness about sustainable stormwater practices, aligning with municipal public education requirements and proliferating green workforce opportunities. The guide advocates for robust partnerships across government agencies, community organizations, and businesses. Case studies, such as the Indianapolis



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Cultural Trail and Philadelphia's Herron Park, exemplify collaborative models achieving recreational enhancement, stormwater management, and social equity. Funding can derive from diverse sources, including stormwater utilities, grants, transportation departments, business improvement districts, and water providers. The Implementation Framework process begins with stakeholder identification and engagement, followed by relationship-building, funding leverage, green infrastructure opportunity identification, and maintenance planning. Maintenance responsibilities are defined through memorandums of understanding (MOUs), with tasks allocated according to agency expertise. Maintenance supports green job creation and workforce development, targeting underemployed or youth demographics. The guide concludes with practical recommendations and a checklist for implementing green infrastructure actions, such as turf conversion, installation of rain barrels, permeable pavements, soil amendments, bioretention, educational signs, and green roofs. These actions collectively aim to enhance aesthetics, improve drainage, promote environmental education, share costs, and increase ecological diversity. (U.S. Environmental Protection Agency, 2017).

Cities around the globe are adopting innovative strategies to combat the detrimental effects of soaring temperatures due to climate change. As projections indicate that by 2050, the number of cities experiencing average summertime highs of 35°C will nearly triple, the urgency for adaptation becomes clear. Vulnerable populations, particularly the urban poor, bear the brunt of heat stress, often residing in inadequately ventilated and greenery-deficient environments, exacerbating their exposure and health risks. Several cities stand out for their adaptive responses. Medellin, Colombia, has effectively implemented the 'Green Corridors' project, transforming major roads and waterways into verdant spaces. This approach leverages urban vegetation to counteract the urban heat island effect, a phenomenon where dense cities experience higher temperatures than surrounding areas. Data indicate that these corridors have achieved surface temperature reductions of 2-3°C while simultaneously enhancing air quality and biodiversity. By prioritizing nature-based solutions over intensive air conditioning, Medellin sets a precedent for sustainable urban cooling. Los Angeles presents a different strategy, focusing on modifying city infrastructure. The municipality has coated roads with CoolSeal, a reflective white material that lowers absorption of solar rays. Empirical assessments confirm this intervention can keep roads up to 5.55°C cooler. Such innovations are pivotal as Los Angeles faces the prospect of over 22 days annually with temperatures exceeding 35°C by mid-century. Paris, confronted with deadly heatwaves such as the one in 2003, developed more than 900 'cool islands' comprising shaded parks, air-conditioned libraries, and pools. These spaces represent critical refuges for citizens during extreme heat events. Paris has also introduced a mobile application leveraging satellite data to help residents locate nearby cool spots, facilitating equitable access to temperature relief. New York has focused on building adaptation by painting rooftops white via the CoolRoofs initiative, covering more than 9.2 million square feet. Research demonstrates that white roofs can lower surface temperatures by up to 3°C and reduce cooling costs by 10-30 percent. This tactic aligns with New York's broader climate commitments, including the ambitious goal to decrease carbon emissions by 80 percent by 2050. In summary, the diverse adaptation methods deployed by cities spanning nature-based solutions, infrastructural coatings, urban refuges, and roof reflectivity highlight both the complexity of urban climate resilience and the innovative capacity of city governments in mitigating heat stress. Each approach not only addresses immediate thermal challenges but also offers co-benefits for public health, urban sustainability, and climate mitigation. (Gerretsen, 2019)

The study on "Urban heat in Johannesburg and Ekurhuleni, South Africa: A meter-scale assessment and vulnerability analysis" investigates urban heat stress in Johannesburg and Ekurhuleni, South Africa, regions increasingly vulnerable due to climate change and rapid urbanization. The authors employ the UrbClim numerical model, leveraging its capacity for fast, high-resolution simulations, to conduct comprehensive assessments of urban heat stress at a spatial granularity of 30 meters for the entire cities, and at meter-scale for selected neighborhoods. The model integrates detailed terrain information, enabling precise characterization of temperature variations across diverse urban landscapes. A central component of this research is the validation of UrbClim outputs through an extensive monitoring campaign, which uniquely benefits from substantial engagement with the local community. The findings reveal pronounced spatial heterogeneity in the intensity of the urban heat island effect: the highest levels of heat stress are systematically observed in zones with dense building structures, minimal vegetation cover, and lower socio-economic conditions. These spatial patterns strongly suggest that urban morphology and land use critically interact with demographic factors to shape microclimate vulnerability. Furthermore, the meter-scale simulations highlight the pivotal role of urban vegetation, especially shade-providing trees, in attenuating heat stress. This is evident in both current conditions and future climate projections, underscoring the potential of urban greening as a sustainable adaptation strategy. The study demonstrates that targeted increases in vegetation coverage can substantially buffer vulnerable populations against escalating heat risks associated with climate change. The authors advocate for the

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application of their approach in urban planning, emphasizing that high-resolution heat stress mapping is essential for designing climate-resilient cities. Their results offer actionable insights to policymakers and planners, facilitating the prioritization of interventions in the most impacted neighborhoods and promoting social equity in climate adaptation. This research contributes a methodological framework and empirical evidence for advancing urban heat vulnerability assessment, with broader implications for global cities facing similar challenges. (Souverijns, et al., 2022)

The article from the World Resources Institute discusses the intensifying threat of extreme heat in urban areas as global temperatures rise. Recent years have witnessed unprecedented heat waves, wildfires, and droughts, even at just 1.1°C above pre-industrial levels. Cities are particularly vulnerable due to both their population density and the urban heat island effect, which exacerbates heat by trapping warmth through infrastructure and reduced vegetation. These factors, combined with socioeconomic disparities, heighten risk for many urban residents, especially the poor. Intergovernmental Panel on Climate Change (IPCC) models predict that, by 2100, between 50 percent and 75 percent of the world's population will experience life-threatening heat and humidity (IPCC, 2022, as cited in World Resources Institute, 2023). The number of global urban residents exposed to at least eight days a year above 35°C will increase from 66 percent at 1.5°C warming to 85 percent at 3°C. Notably, the number of cities facing persistent extreme heat over 150 hot days per year, will rise from 67 at 1.5°C to 197 at 3°C, with more than half in India. These figures may underestimate impacts since the urban heat island effect is not included. The brunt of excessive heat will fall on resource-strapped cities and marginalized urban groups. Cities in South Asia, Sub-Saharan Africa, and Latin America exhibit the highest increases in extremely hot days, particularly in low- and lower-middle-income countries. These regions tend to lack fiscal and infrastructural capacity for effective adaptation. Within cities, the urban poor are most exposed not just due to location (slums), but because of inadequate shelter, poor air quality, and a lack of basic services. For example, temperatures in a Mumbai slum were found to be 6°C higher than neighboring areas. Adaptation remains an uphill battle, even for cities with proactive plans, such as Ahmedabad in India, which implemented South Asia's first Heat Action Plan. Despite progress, challenges persist: insufficient integration of heat strategies into broader policies, limited political urgency, and constrained resources to reach the most vulnerable. A critical barrier is the scarcity of accessible, actionable climate data at the city level. Next-generation local climate models must offer higher spatial resolution, relevant indicators for diverse departments, probabilistic information about risks, and integration of hazard, exposure, and vulnerability data. Ultimately, achieving livable cities hinges on limiting warming to 1.5°C. This demands not only ambitious mitigation at all levels of governance but also comprehensive adaptation, multi-level cooperation, and robust local data to protect those most at risk. (World Resources Institute, 2023)

The phenomenon of rising nighttime temperatures in India, attributed primarily to climate change induced by anthropogenic activities such as the combustion of fossil fuels, has led to considerable impacts on sleep quality and overall human health. Recent analyses by Climate Central and Climate Trends indicate that nighttime warming now exceeds daytime increases, with cities like Mumbai, Delhi, and others across states including Kerala, Karnataka, Maharashtra, Tamil Nadu, Punjab, Jammu and Kashmir, and Andhra Pradesh experiencing between 50 to 86 additional hot nights exceeding 25°C annually due to global warming between 2018 and 2023. The national capital, Delhi, set a record with a minimum overnight temperature of 35.2°C, the highest since 1969, exemplifying the trend of increasingly frequent episodes of extreme nighttime heat. This escalation in nighttime temperatures manifests most prominently in urban settings through the urban heat island effect, where built environments trap and re-emit heat, intensifying discomfort relative to surrounding rural areas. Physiological consequences include disrupted sleep owing to an impaired ability of the body to cool down at night, which is associated with increased risk of heat-related illnesses, exhaustion, and mortality. Vulnerable populations, notably the elderly and those lacking adequate cooling infrastructure, are disproportionately affected. Scientific consensus further suggests that unless substantial reductions in fossil fuel consumption ensue, many Indian cities will confront perennial hot nights above 25°C by century's end, compromising population health, cognitive function, and life expectancy. The persistent rise in nighttime minima highlights an urgent need for climate action, adaptation strategies, and urban policy interventions to mitigate exposures and protect the most at-risk communities. This situation underscores the broader links between climate change, urbanization, and public health, necessitating multisectoral responses for effective resilience building. (Indo-Asian News Service, 2024)

The Kerala GHG Inventory Report, prepared by the Directorate of Environment & Climate Change in collaboration with Vasudha Foundation, offers a comprehensive assessment of anthropogenic green-house gas (GHG) emissions in Kerala, serving as a foundation for targeted policy interventions under SAPCC 2.0 and the state's ambition to achieve carbon neutrality by 2050. Employing internationally recognized IPCC methodologies (Tier 1 and Tier 2), the report spans the period from 2005 to 2021 and covers emissions across the Energy, Industrial Processes and Product Use (IPPU), Agriculture, Land Use, Land-Use



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Change and Forestry (LULUCF), and Waste sectors: Key Findings and Sectoral Analysis: Overall Trends: In 2021, Kerala's total greenhouse gas (GHG) emissions were 21.86 million tonnes of CO2-equivalent (MtCO2e), reflecting a 6.8% decrease from 2005 levels. The state's per capita emissions stood at 0.33 tCO2e in 2021, significantly lower than the national average of 2.46 tCO2e in 2019, making Kerala the fifth lowest GHG-emitting state in India. Energy Sector Dominance: The Energy sector was responsible for 79% of the total emissions in 2021 (17.24 MtCO2e). Within this sector, the Transport sub-sector was the largest contributor, accounting for 49% of the emissions, with 91% of these emissions coming from road transport. The rapid increase in motor vehicles and dependence on fossil fuels highlight the urgent need for cleaner transportation options. The Residential sub-sector followed, primarily due to the use of LPG and kerosene. Waste Sector: The Waste sector was the second-largest emitter, contributing 8% of emissions (1.75 MtCO2e), with domestic wastewater being the main source. Although emissions from waste have slightly decreased due to improved solid waste management and the efforts of self-help groups (SHGs), further innovations and investments in wastewater infrastructure are still needed. Agriculture Sector: Agriculture was the third-largest emitter, accounting for 7% of emissions (1.56 MtCO2e), but its share has been decreasing (−23% since 2005), mainly due to a decline in livestock populations and reduced methane emissions. Enteric fermentation in livestock and rice cultivation are the main components, although the sector shows an adaptation-oriented character given Kerala's small landholding structure. Industrial (IPPU) Sector: Industrial emissions accounted for 6% of the total (1.32 MtCO2e), led by the chemical industry (ammonia, caprolactam, carbon black), followed by the mineral (cement, lime) and metal industries. A decline in IPPU emissions is evident, attributed to industry closures and reductions in production outputs. Land Use, Land-Use Change and Forestry (LULUCF): Kerala's extensive forest cover (54.68%) provides significant carbon sequestration, acting as a net sink with average annual removals of approximately 14.91 MtCO2e. Despite this, statewide net emissions have doubled in recent years due to energy sector emissions outpacing sequestration, partly due to declining carbon stock density. Methodological Rigor and Data Management: The estimates are based on the latest IPCC guidelines and are comparable to national GHG reporting standards, ensuring policy relevance. Stakeholder consultations and robust verification protocols support data integrity. However, persistent challenges include inconsistent land-use matrices and limited industrial activity data, highlighting the need for systematic state-level database management. Policy Implications and Pathways: The report identifies critical inferences for future action: Priority Decarbonization: Transport, especially road transport reliant on diesel, is central to state emissions. Electrification, modal shifts (inland waterways, e-buses), and cleaner fuels are emphasized for rapid decarbonization. Forest Conservation: Sustaining and improving forest quality is vital to maintain high sequestration potential. Wastewater and Solid Waste Innovation: Scaling up coverage and treatment technologies in both urban and rural contexts remains imperative. Agriculture: Given the sector's adaptation orientation, mitigation interventions must preserve productivity, aligning emission reduction with the needs of small and marginal farmers. The report calls for modelling emission pathways to bridge gaps between current and policy scenarios, aiding strategic resource allocation and risk assessments for the state's transition to net zero by 2050. Annual data updates, methodological refinements, and sector-specific metrics are recommended to enhance robustness and transparency. Kerala's GHG Inventory Report serves as an essential policy instrument for climate governance, presenting evidence-based pathways for emission reduction and resilience. It advocates clean transport, enhanced waste and wastewater management, industrial efficiency, and forest protection as pillars for Kerala's low-carbon future. (Directorate of Environment & Climate Change (DoECC), 2024)

The "Status Report on Coastal Area Management: An Indian Perspective, Regional Issues & Remedial Measures" published by the Central Water Commission (September 2024) provides a comprehensive assessment of the current challenges, strategies, and institutional frameworks related to coastal management in India. The report emphasizes the economic and ecological importance of India's coastline, which spans over 7,517 kilometers and supports a substantial share of the national population and economic activities such as ports, fisheries, tourism, and industry. India's coastline traverses nine states and four Union Territories, nurturing biodiverse ecosystems like mangroves, coral reefs, and seagrasses. However, rapid development and population pressure have rendered the fragile coastal environment susceptible to severe environmental degradation. Coastal erosion, impacting nearly one-third of the country's shoreline, is identified as a significant threat, influenced by both natural processes (waves, currents) and anthropogenic factors (infrastructure expansion, unsustainable land practices). Salinity ingress, another pressing issue, endangers freshwater resources, agriculture, and ecosystem integrity often with irreversible consequences. The report underscores the imperative of transitioning from fragmented, reactive management approaches to integrated, proactive frameworks. Collaborative governance and comprehensive management plans are advocated, bringing together stakeholders such as government agencies,

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research institutions, and local communities through platforms like the Coastal Protection and Development Advisory Committee (CPDAC) and through state-wise quarterly dialogues. These forums facilitate discussions on vulnerabilities, data sharing, protection measures, and sustainable funding mechanisms. Regionally, the report details geomorphological and socioeconomic characteristics of the coast, distinguishing the west coast's rocky features and rapid river flows from the east coast's deltaic and sediment-rich landscapes. State-wise accounts provide granular insights into erosion patterns, saline soil distribution, and the efficacy of existing measures including non-structural (vegetation, beach nourishment) and structural (sea walls, groynes) interventions. Notably, ongoing and proposed schemes for coastal protection and salinity mitigation are catalogued, with recommendations directed at data-driven decision-making, robust monitoring, capacity building, and funding. The report concludes by advocating unified coastal management that aligns stakeholder efforts across scales, integrating scientific research, technological advancements, and participatory decision-making. By strengthening institutional coordination, fostering innovation, and enhancing data collection frameworks (e.g., Coastal Management Information System), India can build resilience against environmental threats and promote sustainable growth in its coastal regions. (Central Water Commission, 2024)

The study by Gills et al. (2024) undertakes a comprehensive spatial assessment of climate change hazards along the Indian coastal districts, adopting the Climatic Impact-Driver (CID) framework introduced in the IPCC's Sixth Assessment Report. Indian coastal regions are uniquely vulnerable due to geographic positioning, population density, and infrastructure concentration. Five key physical hazards namely, sea level rise, floods, shoreline change, heatwaves, and cyclones were selected based on regional relevance, expert consultation, and empirical evidence. Hazard indices for each of these phenomena were constructed using threshold-based CID indices, enabling a comparative analysis at both district and state levels. Results demonstrate pronounced spatial variability; notably, West Bengal and Odisha exhibited the highest cyclone hazard indices, while Kerala registered extreme flood proneness. Andhra Pradesh appeared exceedingly susceptible to heatwave and overall multi-hazard exposure, as revealed by the composite index aggregating the severity across hazards. Gujarat and the Union Territories of Diu and Daman displayed the highest susceptibility to sea level rise, whereas shoreline change hazards were most severe in West Bengal. The study underscores that east coast states manifest a heightened proneness to climate change-induced hazards compared to the west coast, attributed to topographical diversity, regional climate patterns, and monsoonal variability. Compound and sequential climate events further amplify these risks, complicating hazard distinction and management. The district-level mapping facilitates targeted climate adaptation, risk mitigation, and strategic planning, though limitations persist regarding data completeness, spatial resolution, and micro-scale variability. Ultimately, the research advocates for improved spatial resolution, ground-truthing, and scenario updates to refine future hazard predictions and inform policy. (Gills, et al., 2024)

Groynes are prominent structures in coastal management designed to address the escalating challenges of coastal erosion caused by rising sea levels and intensifying storms. Constructed perpendicular to the shoreline, groynes primarily function by interrupting the longshore drift—a natural process in which waves move sediment along the coast. This intervention enables the retention of beach material on the updrift side, effectively widening and maintaining the beach, thus creating a natural barrier against the erosive energy of waves. Materials used in constructing groynes include timber, concrete, and especially rock armour, with the latter favoured for its durability and adaptability to high-energy marine environments. Rock armour consists of large, angular stones that efficiently absorb and dissipate wave energy, ensuring structural longevity and integration with the natural landscape. While timber groynes are traditional and concrete versions provide modern strength, rock armour offers a combination of resilience, sustainability, and environmental compatibility. Groynes are economically advantageous due to their longevity and minimal maintenance needs, making them a staple in protecting coastal infrastructure, residences, and ecosystems. However, their placement requires careful planning, as groynes can disrupt natural sediment flow and potentially accelerate erosion down-drift if not strategically managed. As such, groynes are most effective when integrated into a broader coastal defence strategy alongside sea walls and beach nourishment efforts. (Armstrongs Group, 2025)

Heat waves, defined as extended periods of excessively hot weather, have become increasingly frequent and intense worldwide due to climate change. According to the Center for Climate and Energy Solutions (C2ES), trends show that hot days are rising in both temperature and occurrence, while cold days are declining. Notably, the ratio of daily record highs to lows in the continental United States has shifted from parity in the 1950s to record highs occurring twice as often in recent years. The past decade and especially July 2023, marked by several record-setting hot days, exemplify this escalation in heat extremes.Climate projections, based on continued greenhouse gas emissions under scenarios such as RCP8.5, predict that daily high and low temperatures may rise by at least 5°F by mid-century and 10°F by late century. The National Climate



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Assessment estimates that most U.S. regions will experience 20–30 more days over 90°F annually by this timeframe. Moreover, when high temperatures coincide with elevated humidity, the dangers amplify; the frequency of days with a heat index above 100°F is expected to double, and those exceeding 105°F will triple compared to late 20th-century values. The urban heat island effect further amplifies risks through local absorption and slow release of heat, causing cities to remain notably warmer than rural surroundings, especially overnight. Extreme heat poses multifaceted threats. Human health is critically impacted heat waves are among the leading causes of weather-related fatalities in the U.S., responsible for over 600 deaths per year and ranking among the deadliest disasters. Heat stress results when the body's cooling mechanisms, primarily sweating, fail, especially in high humidity. Vulnerable groups include low-income households lacking cooling access, older adults, infants, outdoor workers, and individuals with chronic health conditions. Heat waves also affect air quality by increasing ground-level ozone and particulate pollution, with the respiratory risks disproportionately higher among those with asthma and other preexisting health issues. Agricultural impacts include reduced plant productivity due to excessive daytime temperatures and poor crop outcomes when nights are warm. Livestock experience various health issues, such as reduced milk yield or conception rates. Heat waves often contribute to drought and wildfires, further straining farm resources and raising the cost and risk of agricultural insurance. The energy sector also faces challenges. While cooling needs drive up electricity demand during summer heat waves, the capacity of transmission lines decreases, sometimes causing reliability issues, such as rolling blackouts. Warmer water bodies diminish power plant cooling efficiency, leading to possible shutdowns when environmental regulations limit the release of heated water. Building resilience to heat waves requires strategies such as identifying and supporting vulnerable populations, opening cooling centers, adopting workplace heat standards, installing cool roofs and pavements, increasing tree cover, and enhancing energy efficiency. Tools like the Climate Mapping for Resilience and Adaptation portal aid communities in assessing and planning for climate risks, including real-time mapping of heat, drought, wildfire, and other hazards. (Center for Climate and Energy Solutions, 2025)

Kerala's Extreme Poverty Eradication Programme (EPEP) represents a paradigm shift in social welfare delivery, targeting individuals and families that have eluded prior welfare initiatives. The scheme's implementation was marked by a rigorous enumeration process led by the Kerala Institute of Local Administration, deploying nearly four lakh enumerators to identify beneficiaries on four dimensions: food, health, income, and housing, in alignment with United Nations Sustainable Development Goals. Micro-plans were then prepared for each family, acknowledging the distinct severity and nature of deprivation experienced by different households. The local self-governance institutions, notably the Kudumbashree network, played a critical role in streamlining interventions that included housing construction or renovation, routine medical support, direct food provisioning, and livelihood facilitation. For instance, panchayat officials tailored support ranging from infrastructural improvements to chronic disease medication and livelihood opportunities such as setting up a tea stall for a beneficiary within the local administrative office. As of November 2025, Kerala stands poised to declare itself free from extreme poverty, having officially lifted 59,277 families, comprised of over 1,03,000 individuals, out of the gravest destitution. The scheme's differentiated approach ensured that even individuals living alone and chronically ill were included, and bespoke solutions were provided, from daily meal delivery to permanent housing allocation. While the decadal sustainability of this achievement remains under scrutiny, and criticisms persist concerning coverage inclusivity (notably among tribal and ASHA communities), EPEP's model underscores the efficacy of decentralized welfare mechanisms and rigorous beneficiary identification, situating Kerala as a progressive state in multidimensional poverty reduction. (John, 2025) This rigorous mapping and implementation drive succeeded owing to very active community participation, Kudumbashree unit support and a genuine collective effort towards achievement of welfare of the masses. This is the kind of model that needs to be implemented across India. Indias' community participation, awareness about government and holding people accountable should happen. Questioning should start with local authorities by holding them accountable and taking action in community welfare.

## III. Research Gap

Despite increasing acknowledgment of the urban heat crisis and the pivotal role of community action, notable knowledge gaps hinder the formulation of optimized mitigation strategies. Existing research frequently neglects the fine-scale spatial heterogeneity inherent in rapidly urbanizing Indian cities, thereby constraining the precision of intervention deployment. Additionally, the scarcity of accessible, high-resolution local climate and socio-demographic data impedes multi-dimensional vulnerability assessment, crucial for informed policy-making and community empowerment. Challenges such as variable political will, constrained financial resources, and insufficient interdisciplinary collaboration further limit the efficacy and inclusivity of climate adaptation efforts. Bridging these gaps through integrated quantitative-qualitative methodologies is

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essential to devise sustainable, equitable urban heat mitigation frameworks attentive to marginalized urban dwellers' needs.

## IV. Methodology

This research employs a rigorously designed mixed-methods approach, synthesizing quantitative urban climate datasets with qualitative insights derived from stakeholder engagement to holistically investigate the multifaceted dynamics of community action in climate resilience. Quantitative analyses utilize high-resolution spatial data modeling of temperature variability, greenhouse gas emissions, and land-use in Kerala and Tamil Nadu, aligning with advanced urban climate vulnerability frameworks. Concurrently, qualitative components consist of semi-structured interviews and participatory focus groups with community representatives, local government officers, and non-governmental organizations to elucidate lived experiences, governance challenges, and grassroots innovations. The integration of these complementary methods enhances analytical robustness and facilitates a comprehensive understanding that informs actionable policy recommendations.

Data triangulation enhances validity by cross-verifying climate data with lived experiences and policy frameworks. The study also reviews global best practices in urban climate adaptation, evaluating success factors in community-driven initiatives such as Medellin's Green Corridors and Ahmedabad's Heat Action Plan (Gerretsen, 2019); (World Resources Institute, 2023). The mixed-methods design allows for better insights into multi-sectoral collaboration needs, local data accessibility issues, and scalable community-driven solutions.

## V. Analysis

Community-driven initiatives have emerged as critical levers in confronting the escalating challenges posed by urban heat exacerbated by climate change. Indian cities, predominantly those in Kerala and Tamil Nadu, exhibit marked variances in heat exposure influenced by urban morphology and socio-economic factors, necessitating tailored community-centric interventions. Collaborative governance models, as seen in Kerala's Kudumbashree network, empower local populations, especially marginalized groups, to actively participate in resilience-building activities. (John, 2025) Complementary analysis of global best practices from Medellin's innovative green corridors to Ahmedabad's pioneering Heat Action Plan (Gerretsen, 2019) reveals that nature-based and infrastructural strategies combined with inclusive governance produce scalable, effective mitigation outcomes. However, continued barriers including fragmented policymaking, resource limitations, and inadequate community representation underscore the need for enhanced multi-sector collaboration and integrated data systems. To explore this complex issue comprehensively, this research adopts a mixed-methods approach, integrating quantitative analysis of urban heat exposure and greenhouse gas emission data with qualitative stakeholder interviews and case study reviews. High-resolution spatial climate data and emission inventories for Kerala and Tamil Nadu reveal spatial disparities in heat exposure linked to socio-economic and land-use factors (Souverijns, et al., 2022). In parallel, semi-structured interviews with community leaders, policy-makers, and civil society networks such as Kerala's Kudumbashree provide insights into barriers and catalysts for effective grassroots climate adaptation and sustainable development. (John, 2025)

Analysis of global best practices including Medellin's Green Corridors, Ahmedabad's Heat Action Plan, and infrastructural innovations in Los Angeles and Paris illuminates scalable strategies for urban heat mitigation through nature-based solutions, reflective coatings, and community-centered governance (Gerretsen, 2019; World Resources Institute, 2023). However, critical research gaps remain, including limited availability of actionable local climate data, insufficient integration of community voices into policymaking, and inadequate multi-sector coordination to reach marginalized urban groups effectively.

India's urban heat island mitigation strategies blend green infrastructure, innovative building designs, and water-based cooling systems. Green spaces, such as parks, green roofs, and urban forests, leverage shading and evapotranspiration to reduce ambient temperatures by up to 4°C, enhancing microclimate regulation and biodiversity (EPA as cited in Urban Design Lab, 2024). Cool roof technologies employing reflective materials reduce rooftop temperatures significantly, lowering indoor heat exposure and cooling energy demand (Urban Design Lab, 2024). Traditional architectural designs such as courtyards, jaali screens, and verandas that promote passive cooling and ventilation, merging cultural heritage with climate resilience. Restoration of urban water bodies and rainwater harvesting further contribute to natural cooling and stormwater management (Urban Design Lab, 2024).



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*Table 5.1:* Key Urban Heat Mitigation Strategies in Indian Cities

| Strategy | Description | Example Cities | Effectiveness |
|---|---|---|---|
| Green Infrastructure | Parks, green roofs, urban trees to reduce ambient temperature | Kerala, Tamil Nadu | Reduces surface temperature up to 4°C |
| Reflective Roofing | Use of reflective materials for roofs and pavements | Delhi, Mumbai | Lower rooftop temperatures by 2–5°C |
| Water-based Cooling | Restoring urban water bodies, rainwater harvesting | Bengaluru, Jaipur | Decreases local heat stress, supports stormwater management |

*Source: Compiled from (Mishra, 2024)*

This table summarizes the most prominent urban heat mitigation strategies implemented across Indian cities. Green infrastructure, including urban forests, parks, and green roofs, leverages natural processes to cool ambient temperatures effectively, with reports indicating reductions of up to 4°C in surface temperatures. (Mishra, 2024). Reflective roofing and pavement materials are also widely adopted to reflect solar radiation, lowering roof surface temperatures by as much as 5°C, notably in Mumbai and Delhi. Water-based interventions, such as urban water body restoration and rainwater harvesting, not only mitigate heat hotspots but also enhance stormwater resilience. Collectively, these measures form the backbone of India's multi-faceted urban heat adaptation efforts, blending nature-based and infrastructural solutions.

Policy frameworks at national and state levels encourage adoption of these measures through programs like the National Action Plan on Climate Change and state-specific green initiatives, while public-private partnerships facilitate the development of green infrastructure and smart technologies (Mishra, 2024). Technologies like IoT sensors and data analytics aid real-time heat monitoring and inform targeted adaptive interventions.

*Table 5.2*

| Community Initiative | Description | Key Outcomes | Challenges | Example | Source |
|---|---|---|---|---|---|
| Kudumbashree Network | Women-led community organizations in Kerala | Improved health, housing, livelihood | Limited inclusivity for tribal groups | Kerala EPEP | (John, 2025) |
| Urban Greening Campaigns | Local greening projects driven by resident groups | Surface temperature reduction, social cohesion | Funding constraints | Medellin's Green Corridors | (Gerretsen, 2019) |
| Awareness & Training Programs | School/workplace climate awareness seminars | Increased community participation | Political will, resource availability | Chennai's climate workshops | Authors' Synthesis |

This table illustrates successful community-driven efforts that bolster urban climate resilience. Kerala's Kudumbashree network exemplifies women-led initiatives that have significantly contributed to improving health, housing, and livelihoods, illustrating the potential of grassroots organizations in climate adaptation (John, 2025). Urban greening campaigns, such as Medellin's Green Corridors, have demonstrated substantial thermal and ecological benefits, fostering social cohesion and environmental sustainability. (Gerretsen, 2019). Awareness and training programs, deployed in urban schools and workplaces, have successfully increased community engagement and fostered behavioural change even though challenges such as funding constraints and political apathy persist. These community-cantered approaches are critical in scaling urban resilience, especially when integrated within inclusive governance models.

*The Vauban District Model: Vauban District, Freiburg, Germany.*

Vauban presents itself as a viable and real alternative to sub-urbanization of neighbourhoods and the loss of the sense of urbanism and citizenship in residential developments. Without a preconceived model of architectural typology or urbanism, Vauban is a bold experiment in the planning and design of housing for the future, and bringing back the qualities of the city into neighbourhood developments, yet at the same time seeking alternatives. (Schroepfer, 2008)

Vauban, a district in Freiburg, Germany, exemplifies an advanced model of sustainable urban development, integrating cutting-edge renewable energy, innovative architecture, and progressive urban planning. Central to Vauban's identity are "plus-energy homes", buildings that generate more renewable energy, primarily through rooftop solar photovoltaic (PV) panels, than they consume. Residents benefit from



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fiscal incentives, such as selling surplus energy to the municipality, leading to lower household electricity costs. Complementing this solar infrastructure is a highly efficient municipal cogeneration plant, relying on biomass and natural gas, which provides the district with both electricity and district heating through a 14 km insulated network, further reducing carbon emissions. The built environment in Vauban features passive homes and "passivhaus" standard buildings characterized by superlative insulation, airtight construction, triple-glazed windows, and maximized passive solar gain, all geared toward minimizing energy requirements. The urban landscape prioritizes pedestrians, cyclists, and public transit over private car ownership. Vauban's "filtered permeability" and "fused grid" plan designates narrow roads for cars, lacks conventional street parking, and imposes high fees for peripheral car parking, thus incentivizing most residents toward sustainable transport options like trams, cycling, or walking. Statistics reveal that over 70% of Vauban's inhabitants live without private vehicles, benefiting from a dense network of cycling and pedestrian paths, and ready access to public transit. (Green City Times, 2022); (Casadevante, Morán, & Ramos, 2010); (TOI Lifestyle Desk, 2025)

Vauban's history as a repurposed military base, converted through citizen-led participatory planning (Forum Vauban), enabled the creation of a nearly car-free, socially integrative, low-energy urban district. The developmental ethos prioritized high ecological standards, combining energy-efficient construction, co-housing initiatives, and a reduced-traffic model. The ecological traffic concept, community engagement, robust public transport, and infrastructure for active mobility have resulted in a replicable showcase for zero-emission living at the urban scale, a setting where the environmental footprint of transportation and housing is minimized without sacrificing urban vibrancy or inclusivity. (Green City Times, 2022); (TOI Lifestyle Desk, 2025)

*Application of the Vauban Model to Kerala and Tamil Nadu:*

Implementing the Vauban model in South Indian contexts like Kerala and Tamil Nadu necessitates adaptability toward local climate, social structures, and economic realities, yet the central tenets of sustainable urban development remain highly relevant. Both states, with their high urbanization rates, acute ecological sensitivity, and aspirations for climate resilience, present fertile grounds for Vauban-inspired planning. Adopting plus-energy or passive building principles is feasible in the region's diverse climates through innovations such as context-sensitive insulation, advanced ventilation, and locally manufactured solar PV technologies, thereby reducing residential and commercial energy demand while generating employment in green construction. Integration of municipal-scale cogeneration or biomass plants, leveraging local agricultural or forestry residues, offers a clean, decentralized approach to energy and heating/cooling loads.

Urban planning in Kerala and Tamil Nadu can draw from Vauban's "filtered permeability" by designing neighborhoods with connected yet pedestrian- and cyclist-focused streets, ample green spaces, and easy access to public transport, which aligns with traditional Indian settlement patterns. Policy-driven reduction of private car usage, introduction of car-free zones, congestion pricing, and robust investment in trams or electric buses can catalyze a modal shift, addressing challenges like road congestion and urban air pollution. Housing cooperatives and community-driven participatory planning, reminiscent of Vauban's Forum, resonate with Kerala's strong local governance and Tamil Nadu's legacy of social reforms, enabling equitable development and community buy-in. Institutional support for solar power (both rooftop and communal), building efficiency codes, and incentives for sustainable lifestyles could be mainstreamed through state policies and pilot projects.

In short, the Vauban template offers Tamil Nadu and Kerala a pathway to reimagine urban growth: fostering energy-positive neighborhoods, socially inclusive urbanity, low-carbon mobility, and participatory governance. Its translation, however, must be sensitive to local needs a careful blending of high-tech and vernacular, strong state intervention, and vibrant grassroots participation to ensure environmental, social, and economic sustainability in the South Indian urban context.

Findings highlight that community involvement is indispensable for successful heat mitigation. Awareness campaigns, participatory planning, and stakeholder collaboration improve engagement and accountability. However, funding constraints and governance fragmentation pose challenges, emphasizing the need for coordinated, inclusive approaches that prioritize vulnerable neighborhoods.

## VI. Suggestions

Tamil Nadu's adoption of Kerala's community-driven models, exemplified by the Extreme Poverty Eradication Programme, offers promising prospects for scalable social and environmental resilience. Targeted pilot programs focused on training youth cohorts in sustainable urban management can harness demographic dividends while addressing socio-economic vulnerabilities. Moreover, embedding agriculture consultants equipped with climate-smart expertise in vulnerable regions can enhance smallholder adaptive capacity and foster agro-entrepreneurship. Strengthening sanitation and decentralized waste management systems through persistent community



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engagement and incentivized segregation initiatives will significantly enhance urban environmental quality. Strategic expansion of high-resolution climate monitoring, coupled with socio-economic vulnerability indexing, will potentiate precision interventions. Encouraging widespread community-led greening projects, integrating vernacular architectural principles for passive cooling, and leveraging smart city technologies will synergistically bolster adaptive capacity across urban settings. To combat climate change Agriculture consultants could be employed in identified weak regions. Small time Agri-entrepreneurship startups could be financially supported as well as roped in to give trainings to small scale farmers who are struggling, or even any person with the interest to learn. This has again been and being implemented in Kerala.

Sanitation and waste management is another area of concern, community participation and willingness to change will come from awareness. Constant nudging to segregate waste at the point of origin (household) must be implemented. Households must have pick up points to give their glass waste, plastic waste, old clothes etc in addition to the sanitation workers. Segregated waste must be taken at a price to provide incentive for segregation.

1. Expand high-resolution local climate monitoring and integrate socio-economic vulnerability indices to guide targeted interventions.
2. Promote community-led greening projects, leveraging local knowledge and labor, funded through public-private partnerships and climate finance mechanisms.
3. Incorporate traditional architectural elements in new urban development codes to enhance passive cooling.
4. Scale up smart city technologies for heat mapping, early warning systems, and public information dissemination.
5. Foster multi-sector collaboration between urban planners, health departments, civil society, and residents to create holistic urban heat action plans.
6. Introduce incentives for adoption of cool roof materials and water-sensitive urban design in affordable housing projects.

## VII. Conclusion

The intensification of urban heat by climate change imposes profound and multifaceted risks to human health, social equity, and sustainable development trajectories within Indian cities and globally. Kerala and Tamil Nadu serve as illustrative exemplars where rising night temperatures disproportionately endanger vulnerable populations, heightening the urgency for strategic mitigation. This research elucidates the indispensable role of community engagement, supported by rigorous climate data integration and innovative technological solutions, in cultivating climate-resilient, liveable urban environments. Nature-based interventions such as urban greening and water body restoration, complemented by reflective infrastructure and advanced monitoring systems, offer pragmatic pathways to alleviate urban heat stress. Crucially, embedding community voices in urban planning and fostering multi-sector collaboration are pivotal to ensure inclusiveness and efficacy. This multidimensional approach aligns with India's and global climate commitments, transforming escalating challenges into opportunities for equitable and resilient urban futures.

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# Do Remittances From International Migrants Improve Access to Healthcare for Households in Cameroon?

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*Abstract-* The purpose of this article is to highlight the role played by remittances from international migrants in access to healthcare for Cameroonian households. It uses the instrumental variables approach to address the endogeneity problem associated with the migrant remittances variable. Using data from the fourth Cameroonian household survey (ECAM 4), the results obtained with the instrumental variables method (IV-2SLS) converge with those obtained using the generalised method of moments (GMM) and highlight the dual role played by remittances in access to healthcare. On the one hand, they show that households receiving these transfers change their choice of healthcare facilities in favour of private healthcare units. On the other hand, these results more generally show that remittances enable households to meet their basic needs and thus change their position according to Engel's law (1857). Thus, public authorities should improve the incentive framework for these transfers, not only to combat monetary poverty but also to improve life expectancy and reduce mortality rates.

*Keywords:* *remittances, access to care, health.*

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# Do Remittances from International Migrants Improve Access to Healthcare for Households in Cameroon?

## Les Transferts de Fonds des Migrants Internationaux Améliorent-Ils L'accès Aux Soins de Santé de Ménages au Cameroun?

Duclo Bouwawe [α], Jacques Tchakouadeu Tsatchoua [σ] & Georges Dieudonné Mbondo [ρ]

*Résumé-* Le présent article a pour objectif de mettre en évidence le rôle joué par les transferts de fonds des migrants internationaux dans l'accès aux soins des ménages camerounais. Il mobilise l'approche des variables instrumentales pour traiter le problème d'endogénéité lié à la variable transferts de fonds des migrants. En utilisant les données de la quatrième enquête camerounaise auprès des ménages (ECAM 4), les résultats obtenus avec la méthode des doubles moindres carrés (IV- 2SLS) convergent avec ceux atteints par la méthode des moments généralisés (GMM) et mettent en évidence le double rôle joué par les tranaferts de fonds dans l'accès aux soins de santé. D'une part, ils montrent que les ménages bénéficiaires de ces transferts modifient leur choix des établissements sanitaires au profit des unités de soins privées. D'autre part, ces résultats font valoir plus généralement que, les transferts de fonds permettent aux ménages de satisfaire leur besoin de prémière nécéssité et donc, de modifier leur position selon la loi d'Engel (1857). Ainsi, la puissance publique devrait-elle améliorer le cadre incitatif de ces tranferts, non seulement pour lutter contre la pauvreté monétaire mais aussi améliorer l'espérance de vie et de réduire le taux de mortalité.

*Motsclés: transferts de fonds, accès aux soins, santé.*

*Abstract-* The purpose of this article is to highlight the role played by remittances from international migrants in access to healthcare for Cameroonian households. It uses the instrumental variables approach to address the endogeneity problem associated with the migrant remittances variable. Using data from the fourth Cameroonian household survey (ECAM 4), the results obtained with the instrumental variables method (IV-2SLS) converge with those obtained using the generalised method of moments (GMM) and highlight the dual role played by remittances in access to healthcare. On the one hand, they show that households receiving these transfers change their choice of healthcare facilities in favour of private healthcare units. On the other hand, these results more generally show that remittances enable households to meet their basic needs and thus change their position according to Engel's law (1857). Thus, public authorities should improve the incentive framework for these transfers, not only to combat monetary poverty but also to improve life expectancy and reduce mortality rates.

*Keywords: remittances, access to care, health.*

## Introduction

Faciliter l'accès aux soins de santé reste un défi majeur pour les pays en développement. En effet, malgré quelques efforts consentis ces dernières décennies, le problème d'accessibilité aux soins de santé est loin d'être résolu. Selon l'OMS (2019), la moitié de la population mondiale n'a pas accès aux services de santé essentiel. Selon la même source, des millions de femmes accouchent sans l'aide d'une personne qualifiée et des millions de personnes souffrent et meurent sans recevoir de traitement dans les centres de santé. Outre le problème épineux de la prestation de soins de qualité s'ajoutent des difficultés liées au financement des systèmes de santé (Ridde et al., 2011; Ridde, 2012). Tout ceci ayant un impact désastreux sur la population notamment les plus pauvres qui n'arrivent pas à bénéficier de soins de qualité.

Au Cameroun, l'accès dans les établissements sanitaires est soumis à des contraintes majeures qui influent négativement la santé des ménages. En effet, les coûts relatifs aux soins de santé sont souvent difficiles à assumer en ce qui concerne non seulement les consultations, la mobilité et l'hospitalisation mais aussi l'accès aux médicaments. Ce qui fait que certaines de ces ménages optent pour les plantes médicinales et le recours au pratique d'automédication[1] (OMS, 2020). Aussi, les travaux de Nkoma (2015) constatent que 80% de la population camerounaise

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[1] L'automédication est l'utilisation, hors prescription médicale, par des personnes pour elles-mêmes ou pour leurs proches et de leur propre initiative, des médicaments considérés comme tels et ayant reçu l'AMM (l'autorisation de mise sous le marché), avec la possibilité d'assistance et de conseils de la part des pharmaciens (Pouillard, 2001).



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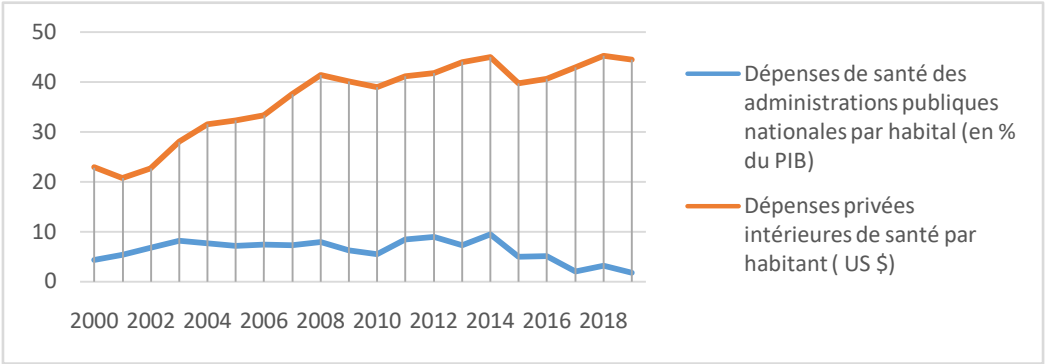
revêt un profil de consommation pauvre. Cela entraîne une faible capacité de recours aux soins de qualité, laissant ainsi transparaître que la décision de consulter un médecin dès l'apparition de la maladie est largement tributaire des moyens financiers disponibles.

Pourtant, le Cameroun consacre paradoxalement une part importante de son budget aux dépenses en soins de santé. En principe, ces dépenses doivent être assumées à 51% en moyenne par les administrations publiques, à 35% par les individus sous forme de dépenses directes et par d'autres entités telles que les régimes d'assurance-maladie facultative, les régimes prévus par les employeurs et les organisations non gouvernementales et les partenaires (Mawuema et Okey, 2020). Or, ce sont les ménages camerounais eux-mêmes qui assument la plus grande partie de ce fardeau financier comme l'indique la figure 1.




*Source: Auteurs à partir des données de la Banque mondiale (2021).*

*Figure 1:* Evolution des dépenses de santé au Cameroun (2000-2019)

Par ailleurs, pour améliorer l'accès dans les établissements sanitaires, la littérature récente suggère la migration des membres de la famille et les envois de fonds des migrants comme facteurs importants affectant l'accès aux soins de santé (Cevallos et Chi, 2012 ; Ambrosiuse et Cuecuecha, 2013 ; Nabeel, 2021).

En 2019, la somme des envois de fonds des pays riches vers les pays à revenus faibles et intermédiaires a atteint 550 milliards de dollars. Ce chiffre pourrait faire du transfert d'argent l'une des principales sources de financement extérieur des pays en développement. La part orientée vers le continent africain est estimée à 48 milliards de dollars (Mawuema et Okey, 2020). L'étude des transferts des fonds des migrants est donc cruciale pour comprendre la situation sociale en Afrique subsaharienne (Cha'ngom et Tamokwe, 2018), et particulièrement au Cameroun, du fait de sa grande dépendance aux remises de fonds. En effet, au Cameroun, les transferts des fonds des migrants ont connu une progression considérable au cours des dernières décennies comme l'indique la figure 2.

D'après, le rapport[2] sur le panorama des transferts de fonds dans les pays de la commission économique des Etats de l'Afrique centrale (CEEAC), le Cameroun, avec 345 millions d'euros, soit 201 milliards de francs CFA, est le second pays de la CEEAC à avoir bénéficié des transferts de fonds des migrants africains derrière la République démocratique du Congo (RDC) en 2018. Selon le rapport de la Banque des Etats d'Afrique Centrale (BEAC, 2020), ces transferts sont passés de 40,5 milliards de F CFA en 2005 à 103,4 Milliards de F CFA en 2011 pour atteindre 184,5 Milliard de F CFA en 2018. Bien plus, comme l'indique la même figure, les envois de fonds vont graduellement croître et atteindre leur pic à 356 millions de dollars en 2019 (0,91 % du PIB) pour connaître ensuite, une baisse de l'ordre de 334 millions de dollars en 2020 (0,82% du PIB) certainement causée par la pandémie de la Covid-19.

[2] Rapport publié en 2018 par le secrétariat en charge du groupe des Etats d'Afrique, des Caraïbes et du Pacifique (ACP) et la Commission Européenne.



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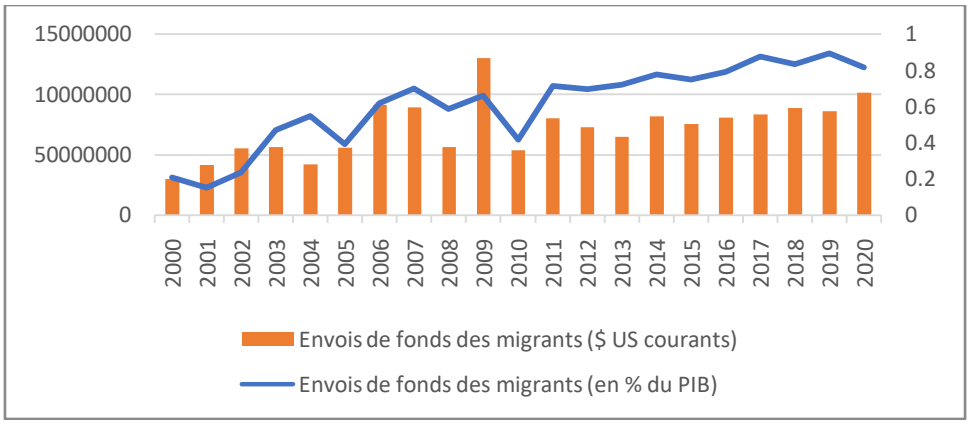


*Source: Auteurs à partir des données de la Banque mondiale (2021).*

*Figure 2:* Evolution des envois de fonds des migrants au Cameroun sur la période 2000-2020

A ce qui précède, les études sur le rôle des transferts de fonds de migrants se sont intéressées à la mesure du budget du ménage. Si ces mesures sont importantes, l'orientation des ménages dans les choix des structures sanitaires demeure un problème social important car, il permet de comprendre que les ménages récipiendaires de fonds de migrants changent de classe sociale. En conséquence, ces ménages s'orientent vers les structures sanitaires privées où la prise en charge parait beaucoup plus intéressante que les structures sanitaires publiques où cette même prise en charge reste problématique. L'étude de ces orientations a un effet sur les politiques publiques qui, désormais doivent considérer les effets des transferts de fonds des migrants sur la structure des inégalités en matière d'accès aux soins de santé.

L'objectif de ce papier est de mettre en évidence le rôle joué par les transferts de fonds des migrants internationaux dans l'accès aux soins des ménages camerounais. Cette étude présente un triple intérêt. Premièrement, elle permet de repositionner la santé au centre des politiques de développement. La santé étant la condition sinéqua none de l'individu à participer activement au marché du travail. Deuxièmement, elle permet également de comprendre comment se fonde la décision pour un ménage de choisir une unité de soins par rapport à une autre en fonction des transferts de fonds. Troisièmement, elle permet aux autorités publiques d'élaborer une politique active du financement en matière de santé.

La suite de l'article est organisée de la manière suivante. Dans la deuxième partie, nous exposons une revue de la littérature; dans la troisième, la méthodologie ; la quatrième partie présente les résultats et enfin, la dernière partie conclut.

## I. Revue de la Littérature

De nombreux travaux ont étudié l'impact du phénomène de la migration – transferts de fonds sur la santé et particulièrement sur l'accès aux soins des ménages. Certains d'entre eux ont analysé l'impact de ce phénomène sur les déterminants de la demande de santé, et d'autres uniquement sur les dépenses en soins de santé (Rosenstock-Strecher, et Becker, 1988)[3]. Chaque chercheur se base sur des tests et des hypothèses spécifiques différentes, et sur un échantillon d'une région donnée qui se caractérise par la structure économique spécifique. Tous ces éléments peuvent expliquer les différences des résultats obtenus par ces nombreux travaux. Dans ce qui suit, nous proposons de rappeler une brève littérature tant théorique qu'empirique expliquant la relation transferts de fonds-accès aux soins de santé des ménages.

Du point de vue théorique, les unités sanitaires offrent un ensemble de prestations qui constituent un panier de biens pour lequel le consommateur tire une certaine utilité. Les soins de santé sont un bien qui inclue de plus en plus le goût (ou préférence) car, tout individu qui demande les soins de santé se comporte comme un consommateur pour n'importe quel autre bien. En conséquence, les choix des individus en matière de consommation dépendent de leur préférence qui sont par essence subjectifs, des contraintes financières auxquelles ils sont soumis. A cela, les recherches d'Andersen et Newman (1973) ont affirmé que l'accessibilité et la disponibilité des services de santé constituent un élément crucial, déterminant de l'utilisation des services de santé. Ainsi, la décision du ménage de choisir un prestataire de soins de santé ou d'utiliser les services de soins dépend non seulement de la qualité des services offerts mais aussi de la disponibilité physique du fournisseur de services dans sa région d'origine. Les travaux de Kim et al. (2012) ont montré l'importance de la qualité perçue par les individus sur l'utilisation des services de santé. Ainsi, avec une perception accrue des services de santé, la

[3] Ces auteurs ont proposé un modèle théorique pour tenter expliquer l'accès aux soins de santé en se concentrant sur l'attitude et les croyances de l'individu, et sur leur état de santé.



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probabilité d'utilisation de ces services augmente, et vice versa.

En outre, l'élément essentiel qui impacte fortement la décision du ménage à recourir aux unités de soins de santé est le coût du traitement car, les dépenses de santé élevées rendent les individus moins susceptibles d'utiliser ces services. Ce qui les pousse à chercher ailleurs d'autres alternatives comme l'automédication (Andersen et Newman, 1973). Ainsi, dans le contexte de pays en développement où la pauvreté monétaire constitue un obstacle majeur à l'accès aux soins, la littérature a identifié divers mécanismes parmi lesquels les transferts de fonds des migrants. La migration peut avoir un effet positif sur la santé des ménages récipiendaires si les envois de fonds des migrants contribuent à l'assouplir les contraintes budgétaires et à investir dans la santé des ménages. Cela a été le cas du Mexique, où les envois de fonds contribuent de manière significative à la réduction du taux de mortalité chez les enfants de moins de cinq ans et sont également associés aux nouveau-nés pesant au-dessus de la moyenne dans les familles récipiendaires des envois de fonds (Duryea et al., 2005). L'étude fait valoir que les transferts de fonds des migrants constituent une source de financement cruciale pour l'accès aux soins de santé dans les établissements sanitaires formels.

La réduction des inégalités d'accès aux soins de santé grâce aux transferts de fonds des migrants est retrouvée dans les travaux de Atake (2018) au Togo, preuve que la migration contribue grandement à l'amélioration de la naissance à l'hôpital, l'aide aux accouchements qualifiés, soins prénataux et postnataux notamment dans les centres sanitaires de pédiatrie. Ces conclusions sont conformes à celles des études antérieures dans les pays en développement, qui ont montrées que la migration, par le biais des transferts de fonds, améliore l'accès à la santé des enfants, la santé maternelle et l'utilisation des soins de santé de qualité et réduit par conséquent le taux de mortalité infantile.

Par ailleurs, l'augmentation des dépenses en services de santé des ménages migrants peut en effet, améliorer l'accès aux services de santé du secteur privé pour tous les membres de la communauté. Car, c'est en réponse à cette demande accrue que les prestataires de services s'installent dans les communautés. Dans une étude sur les conséquences de la migration au Kerala en Inde, Zachariah et al. (2000) constatent que la réception de transferts de fonds est associée à une plus grande utilisation des installations hospitalières pour traiter les maladies, et à une multiplication par trois du recours aux hôpitaux privés pour les accouchements.

De même, Lindstrom et Munoz-Franco (2006) utilisent les données de l'enquête guatémaltèque de 1995 sur la santé des familles (EGSF) menée dans quatre régions rurales du Guatemala pour étudier comment l'expérience de la migration et les liens sociaux avec les migrants influencent la probabilité d'utiliser les services formels de soins de santé maternelle. Ils constatent que l'expérience de la migration urbaine et le fait d'avoir les parents à l'étranger sont associés à une plus grande probabilité de recours aux soins prénataux formels, après avoir pris en compte les caractéristiques du milieu et les ressources favorables. L'expérience de la migration à tous les niveaux est également fortement associée à l'assistance formelle à l'accouchement dans les zones rurales du Guatemala.

Les transferts de fonds affectent ainsi la santé des membres des ménages des migrants, en assouplissant les contraintes de liquidité qui, autrement, restreindraient l'accès aux soins de santé (Amuedo-Dorantes et Pozo, 2009). Ces résultats suggèrent alors que l'on peut améliorer sensiblement les services de santé maternelle et infantile notamment en mettant en œuvre des politiques assurant l'utilisation efficiente des fonds transférés par les migrants tout comme le modèle des pays africains subsahariens, tels que le Mali et la République démocratique du Congo (RDC), où les transferts des migrants contribuent énormément à la construction d'infrastructures sanitaires (hôpitaux et cliniques), ce qui permet d'améliorer à la fois la santé des familles des migrants et des non-migrants dans les pays d'origine. Cet impact positif sur l'accès aux soins de santé des ménages est pourtant nuancé dans les travaux de Terrelonge (2014). Ce qui prouve que la relation entre les transferts des fonds des migrants sur le bien être des ménages reste ambigu et nécessite encore des études de cas pour éclairer la littérature.

Malgré la littérature relativement abondante, au cours de ces dernières décennies, plusieurs travaux ont étudié l'impact des transferts de fonds sur le développement économique au Cameroun. La littérature comprend l'évaluation de cet impact sur l'investissement en éducation et logement (Méka'a, 2015), sur les conditions de vies de ménages d'origine (Nouetagni et Hamadou, 2015), sur le capital humain (Amassangka et al., 2020), sur les résultats scolaires (Fambeu, 2021). Néanmoins, au Cameroun, les liens possibles entre les transferts de fonds et l'accès aux soins dans les établissements sanitaires sont rarement explorés par la littérature. De plus, aucune de ces études n'ont intégré la notion de préférence des ménages récipiendaires en matière de choix des unités de soins de santé.

## II. Méthodologie

*a) Sources de données*

Les données utilisées dans la présente étude proviennent de la quatrième enquête camerounaise auprès des ménages (ECAM 4) réalisée en 2014 par l'Institut National de la Statistique (INS). Cette enquête, menée auprès d'un échantillon de représentatif

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d'environ 17430 ménages, fournit des informations sur la migration, les transferts de fonds des migrants, le patrimoine et les autres caractéristiques socio-économiques du ménage. ECAM 4 étant, comme la précédente enquête (ECAM 3), une enquête à objectifs multiples, son questionnaire est articulé autour d'un certain nombre de module correspondant aux domaines d'investigation en fonction des objectifs retenus. Les différentes sections abordées touchent, entre autres, les domaines ci-après : l'éducation, l'emploi et les revenus, les travaux domestiques et le travail des enfants, le standing et les équipements des ménages, le patrimoine, l'environnement du ménage, la mobilité résidentielle et les migrations[4], l'accessibilité aux infrastructures de base, l'agriculture et les activités du monde rural, la gouvernance et la corruption, le tourisme interne, les dépenses et la consommation finale des ménages, la santé des membres du ménage[5].

Toutefois, il convient de souligner que cette enquête n'a pas spécialement été conçue pour l'étude de la migration. En effet, elle a collecté des informations sur celles-ci et les transferts de fonds. Malheureusement, cette enquête n'a fourni aucune information sur les revenus obtenus par les migrants dans leur localité d'accueil. Dans cette enquête, les données sur les transferts de fonds des migrants ont été collectées grâce à une série de question[6] adressées aux ménages concernant leur situation par rapport aux fonds qu'ils reçoivent.

Afin d'évaluer l'effet des transferts des fonds des migrants sur l'accès aux soins de santé des ménages, il est important de bien identifier les indicateurs qui capturent ces variables. Pour capter l'accès aux soins de santé, nous utilisons l'information liée aux types d'établissement sanitaire. Cette information, recueillies sur la base d'une série de question[7], nous permet de construire la variable dépendante qui représente le comportement du ménage malade (demande conditionnelle). Ainsi, lorsqu'un ménage est malade, il a le choix de se rendre dans un établissement sanitaire. Nous distinguons trois niveaux du secteur de la santé conformément à l'organigramme de 2002 du Ministère de la santé publique au Cameroun. Dans cette étude, l'unité de soins fait référence à un établissement de santé (ou service de soins). Ainsi, nous définissons une unité de soins comme une entité regroupant des activités de soins de santé (soins médicaux ou soins infirmiers). C'est dans cette acceptation de l'unité de soins de santé, plus global mais au contenu problématique bien circonscrit, que nous emploierons indistinctement les termes unité de soins, établissement de santé ou encore prestataires de soins dans le cadre de cette étude.

De ce fait et conformément à l'Organisation Mondiale de la Santé (OMS, 2020), nous définissons l'accès (aux services de santé) comme la capacité, réelle ou perçue, d'accéder aux services de santé ou aux établissements de santé (emplacement, délais, et facilité d'accès). Concernant les migrations, nous définissons un ménage migrant comme étant celui dont au moins un membre est installé dans une autre localité depuis 2001 et qui n'est pas revenu. Ainsi, la variable d'intérêt est mesurée par un indicateur binaire prenant la valeur 1 si le ménage a reçu de l'argent du migrant au cours des douze derniers moins et 0 sinon. Les autres variables explicatives sont liées au lieu de résidence du ménage, aux caractéristiques du ménage et aux caractéristiques liées à la santé. Ainsi, le tableau présentant le recodage de ces variables selon leur modalité est présenté en annexe. Le tableau 1 ci-dessous présente plus en détail les variables utilisées, ainsi que les statistiques descriptives.

[4] Confer section 07: Migration et mobilité résidentielle (questionnaires Q24 et Q25 d'ECAM 4).
[5] Confer section 02 : Santé des membres du ménages (questionnaires Q7, Q8 et Q9 d'ECAM 4).
[6] Les questions suivantes ont ainsi été posées : i) Au cours des douze derniers mois le migrant a-t-il/elle envoyé de l'argent ou des biens à votre ménage? ii) Si oui, à combien estimez - vous la valeur de l'ensemble des biens et/ou le montant total d'argent qu'il/elle a envoyé à votre ménage au cours des 12 derniers mois ?
[7] Les questions suivantes ont aussi été posé : i) Dans quel secteur a-t-il/elle été consulté(e) ? ii) quel était le principal motif de ce choix ? iii) dans quel type de structure de soins a-t-il/elle été consulté(e)?



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*Tableau 1:* Statistiques descriptives

| Variables | Observations | Mean | Std. Dev. | Min | Max |
|---|---|---|---|---|---|
| Unités de soins | | | | | |
| Publique | 17.437 | 0.1893566 | 0.3918028 | 0 | 1 |
| Privée | 17.437 | 0.7482509 | 0.4340303 | 0 | 1 |
| Automédication | 17.437 | 0.0623925 | 0.241874 | 0 | 1 |
| Transfert de Migrants | 17.437 | 0.509884 | 2.306441 | 1 | 23.02585 |
| Cout consultation | 17.437 | 1.317102 | 2.70409 | 0 | 11.0021 |
| Satisfaction des prestations offertes | 17.437 | 0.6815002 | 0.4659079 | 0 | 1 |
| Satisfait | 17.437 | 0.1149214 | 0.3189363 | 0 | 1 |
| Insatisfait | | | | | |
| Sexe du chef de Ménage | | | | | |
| Masculin | 17.437 | 0.8257254 | 0.3793563 | 0 | 1 |
| Féminin | 17.437 | 0.1742746 | 0.3793563 | 0 | 1 |
| Niveau de vie | | | | | |
| Pauvre | 17.437 | 0.4973047 | 0.5000071 | 0 | 1 |
| Riche | 17.437 | 0.5026953 | 0.5000071 | 0 | 1 |
| Age chef ménage | 17.437 | 27. 37539 | 23.43131 | 0 | 99 |
| Catégorie socio professionnelle | | | | | |
| Cadre | 17.437 | 0.0658906 | 0.2480979 | 0 | 1 |
| Employé | 17.437 | 0.5459915 | 0.4978946 | 0 | 1 |
| Auto emploi | 17.437 | 0.3881179 | 0.4873356 | 0 | 1 |
| Taille chef de Ménage | 17.437 | 3.281684 | 2.985699 | 1 | 43 |
| Milieu de résidence | | | | | |
| Urbain | 17.437 | 0.7121229 | 0.4527865 | 0 | 1 |
| Rural | 17.437 | 0.2878771 | 0.4527865 | 0 | 1 |
| Revenu du Ménage | | | | | |
| Stable | 17.437 | 0.0575181 | 0.2328365 | 0 | 1 |
| Instable | 17.437 | 0.9424819 | 0.2328365 | 0 | 1 |
| Statut matrimonial | | | | | |
| Marié | 17.437 | 0.4058378 | 0.4910675 | 0 | 1 |
| Célibataire | 17.437 | 0.5941622 | 0.4910675 | 0 | 1 |
| Niveau d'instruction | | | | | |
| Non scolarisé | 17.437 | 0.1553504 | 0.3622488 | 0 | 1 |
| Primaire | 17.437 | 0.5639982 | 0.4959015 | 0 | 1 |
| Secondaire | 17.437 | 0.2286386 | 0.419968 | 0 | 1 |

*Source: Auteurs*

L'observation du tableau 1 révèle qu'en matière d'accès aux soins de santé, 74,8% des ménages optent pour les unités de soins privée, contre 18,9% des ménages bénéficiaires qui choisissent de se soigner dans les unités de soins publiques. Seulement 6% des ménages récipiendaires de fonds s'auto-médicamentent. Ainsi, les ménages récipiendaires de fonds utilisent plus des services de soins privés que les autres services. De manière générale, 68% de ces ménages se déclarent satisfaits des soins reçus contre 11% insatisfaits et 20% indifférents.

*b) Stratégie d'estimation*

Pour mettre en évidence le rôle des transferts de fonds dans l'accès aux soins de santé, la présente étude a élaboré une spécification économétrique où la variable dépendante est une variable discrète à trois modalités.

- 1 si l'individu se soigne les unités de soins publiques
- 2 si l'individu fréquente les unités de santé privées
- 3 si l'individu pratique l'automédication

Ainsi, au moyen d'une approche des variables instrumentales, nous analysons la probabilité de se soigner dans un établissement sanitaire public, privé ou la pratique d'automédication. Ce type de spécification permet d'expliquer la probabilité pour un individu malade de se trouver dans une situation par rapport à une autre, conditionnellement aux variables explicatives. En conséquence, le modèle empirique s'inspire des travaux de Nabeel (2021) et se présente comme suit:

$$as_{ij} = \alpha_0 + \beta_i trans_i + \sigma_i X_{ij} + e_{ij}$$



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où $as_{ij}$ représente le choix de soins de santé du ménage $i$ utilisant $j$ le type d'établissement de santé. $trans_i$, le montant des transferts de fonds reçus par le ménage, $X_{ij}$ est le vecteur de caractéristiques du ménages. Ces facteurs peuvent influencer le comportement du décideur qui choisit entre les services de santé publics, privés ou l'automédication. $e_{ij}$ représente le terme d'erreur, qui peut inclure des attributs non observables pouvant affecter la variable de résultat.

La présente étude a fait recours à des regressions avec variables instrumentales en raison du fait que les estimations obtenues par l'utilisation des moindres carrés ordinaire (MCO) sont susceptibles d'être correlées avec le terme d'erreur. Ainsi, la méthode des moindres carrés en deux étapes (2-SLS) et la méthode des moments généralisés (GMM) seront utilisées pour régresser les indicateurs de mesure de l'accès aux soins de santé avec les transferts de fonds des migrants internationaux et les variables socio-économiques et démographiques des ménages. Ainsi, le recours à ces variables instrumentales se justifient notamment par le fait que la littérature établie de manière formelle un biais d'endogénéité lié à la corrélation entre les transferts de fonds des migrants et le terme d'erreur (McKenzie et Sasin, 2007 ; Bouoiyour et Miftah, 2014). En conséquence, une régression par les MCO donnerait des résultats biaisés. De ce fait, il convient de corriger le problème d'endogénéité lié à la variable explicative (transferts de fonds de migrants internationaux). Plusieurs études ont conclu à la nécessité de prendre en compte l'endogénéité des transferts des migrants (Bouoiyour et al., 2016; Fambeu, 2021). En réalité, l'introduction des transferts financiers des migrants comme variable explicative, pourrait entraîner un biais potentiel d'endogénéité.

Elle peut être corrélée avec le terme d'erreur de notre équation d'intérêt, dans la mesure où des variables omises dans cette équation peuvent expliquer le comportement de transfert des migrants camerounais. Aussi, il est possible que certaines caractéristiques non observées du ménage du ménage qui affecte simultanément le choix des soins de santé et les transferts de fonds soit omise, par exemple: le rôle de l'émigrant dans la prise de décision en matière de soins de santé et le coût des soins de santé privés. Par ailleurs, les envois de fonds peuvent avoir comme motif le financement des soins de santé des ménages. Or, notre équation de base explique l'accès aux unités de soins de santé, entre autres, par les transferts de fonds des migrants. Ces problèmes rendent difficile l'établissement de la causalité et biaisent le cadre typique des régressions sous forme réduite. Dans notre cas, les problèmes à prendre en compte sont notamment : la causalité inverse (par exemple, le choix d'un prestataire de soins de santé privés peut induire un besoin de ressources financières plus importantes, augmentant ainsi l'afflux de transferts de fonds). Ainsi, pour réduire la probabilité d'un biais potentiel causé par l'endogénéité de la variable de traitement (transferts de fonds des migrants), nous utilisons la technique de la variable instrumentale, où les transferts de fonds reçu sont instrumentés par les variables liées au ménages.

## III. Résultats

Avant de passer à l'analyse des résultats, il est nécessaire de clarifier la validité économétrique du modèle, des tests de validité des instruments et d'endogénéité. Du fait de l'absence de certaines variables dans la base, les caractéristiques liées aux ménages sont utilisées comme instruments pouvant identifier notre modèle. Ces caractéristiques sont le sexe, l'âge et le niveau d'éducation etc. Le test de sur-indentification de Sargan permet de confirmer la validité de nos instruments. Étant donné nos P-value > 5%, on accepte l'hypothèse nulle de validité des instruments. Le test d'endogénéité de Hausman montre que le modèle ne souffre d'aucun biais d'endogénéité et permet ainsi de valider l'endogénéité de la variable d'intérêt (transfert des fonds de migrants) par la méthode des variables instrumentates.

Le tableau 2 présente les paramètres estimés du modèle à l'aide de l'approche des variables instrumentales opposant les trois situations suivantes: unité de soins publique, unité de soins privée et automédication. Les résultats montrent que globalement, les transferts de fonds des migrants ont des effets variés sur l'accès aux soins dans les unités de santé. Pris individuellement, les transferts des fonds ont des effets négatifs chez les ménages se soignant dans les établissements publics alors qu'ils ont un effet positif dans les autres unités de soins.

En effet, suivant la méthode (IV-2SLS), une augmentation de 1% du montant des transferts de fonds entraîne une hausse de 66,1% et de 92,3% la chance pour les ménages bénéficiaires de recourir aux unités de soins privées et à la pratique de l'automédication, respectivement.

Ceci peut s'expliquer par le fait que les ménages camerounais ont davantage besoins de moyens financiers pour recourir aux soins dans les unités privées. Dans ces unités de soins où le coût de consultation parfois élevé a un effet négatif (-6,68e-05) sur le choix de ces dernières alors que la prise en charge des patients et les services sont de meilleurs qualités. En conséquence, les transferts de fonds des migrants réduisent donc ces contraintes bugetaires des ménages bénéficiaires leur permettant de choisir ces unités de soins en raison de leur commodité. Ce résultat est cohérent avec celui de la variable satisfaction qui montre que les ménages qui font recourt à ces unités de soins privées (0,261) sont satisfaits par rapport à



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ceux des unités publiques (-0,007). Les résultats corroborent ceux de Nabeel (2021) et Zachariah et al. (2000) qui montrent que les ménages qui reçoivent les fonds sont plus susceptibles d'être hospitalisés dans les unités de soins privées au Pakistan et en Inde, respectivement.

Concernant la pratique de l'automédication, ceci pourrait s'expliquer par le fait qu'une part importante des ménages bénéficiaires des transferts se trouvent non seulement dans une situation de précarité, mais aussi dans les zones géographiques où les unités de soins formelles (publique et privée) ne sont toujours opérationnelles et donc ils sont contraints de recourir à cette pratique. Aussi, les montants des transferts peuvent être insuffisants pour satisfaire leur besoin de première nécessité et ils préfèrent donc l'automédication afin de rationnaliser leur dépense. Ceci est semblable aux études de Mora-Rivera et al (2024) qui montrent que ces résultats sont liés aux disparités socio-économiques structurelles qui caractérisent les pays en développement et dépendent également de la perception de ce revenu supplémentaire comme permanent ou transitoire.

Dans les unités de soins publiques, les résultats montrent qu'une augmentation de 1 point de pourcentage du montant de transferts entraîne une diminution de 158,4 points de pourcentage la chance de recourir aux unités de soins publiques. L'explication pourrait venir du fait que dans les unités de santé publiques, les coûts de consultations et de prise en charge subventionés par l'Etat font de ces centres, de unités de préférence des ménages pauvres[8] qui vivent dans des conditions éloignées du confort social[9]. Dans ces unités, à l'exception de quelques grandes structures hospitalières, une file d'attente longue, l'absence et le retard manifeste de certains professionnels de santé découragent les ménages bénficiaires de transferts de fonds qui optent plutôt pour les unités de soins privées.

Les caractéristiques individuelles sont également des déterminants de choix des unités de soins au Cameroun. La probabilité de renoncer aux unités de soins publiques dinimue de 10,1 points de pourcentage chez les hommes comparativement aux femmes. En revanche, cette probabilité augmente de 8,67 et 1,04 points de pourcentage chez les hommes comparativement aux femmes de solliciter les unités de soins privées et la pratique de l'automédication, respectivement. Ce résultat pourrait s'expliquer par le fait que généralement, contrairement aux femmes qui sont très attentives à leur sensation corporelle et à celle de leur famille, les hommes sont moins. Ces derniers qui ne jouent pas souvent le rôle de soignant principal ne perçoivent pas mieux les risques liés à l'usage des médicaments hors prescription médicale (automédication). Ce résultat est en accord avec ceux des travaux de Ndonou et Fomba (2024).

En outre, la probabilité d'accès aux unités de soins publiques augmente de 0,18 point de pourcentage avec l'âge du chef de ménage tandisque cette probabilité dans les unités de soins privées et l'automédication diminue de 0,14 et 0,04 point de pourcentage, respectivement. Ces résultats confirment l'idée selon laquelle l'âge s'accompagne de l'expérience et les personnes âgées sont généralement plus conscientes des résultats potentiels des différents unités de santé (Hughes et al., 2001). Un autre résultat important est celui du niveau d'instruction. Les montrent que le niveau d'instruction a un effet varié suivant les différents unités de soins. En effet, la probabilité d'accès aux soins dans les unités publiques plutôt que de recourir aux autres prestataires diminue de 0,73 point de pourcentage lorsque le chef de ménage a au plus le niveau primaire et augmente de 1,16 point de pourcentage lorsque celui-ci a au moins le niveau secondaire. Par contre, dans les unités de soins privées et la pratique de l'automédication, l'éducation a un effet négatif et positif quelque soit le niveau d'instruction, respectivement. Ceci est cohérent aux résultats des travaux antérieurs qui attestent que l'éducation améliore niveau de connaîssance. Ce qui confer la capacité de s'informer et de comprendre les enjeux liés aux risques sanitaires, rendant les individus plus enclins à recourir aux meilleurs prestataires de soins (Raynaud, 2008; Gurmu et Tesfu, 2012; Ndonou et Fomba, 2024).

[8] Confert les travaux de Owoundi (2013) pour qui, au Cameroun, 51% de la population vit avec moins de deux dollars par jour, tandis que la propension moyenne de la consommation médicale totale des ménages est élevée.

[9] L'indice de développement humain du Cameroun a régressé. En effet, cet indice est passé de 0,52 en 2020 contre 0,56 un an plutôt, soit en baisse de 0,04 point. Le Cameroun occupe ainsi le 156e rang mondial sur 189 pays du classement du PNUD (Banque Mondiale, 2021).

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*Tableau 2:* Résultats de l'estimation de l'effet des transferts de fonds internationaux sur l'accès aux soins dans les unités de santé (Méthodes des variables instrumentales)

| Variables | Publique | | Privé | | Automédication | |
|---|---|---|---|---|---|---|
| | IV-2SLS | GMM | IV-2SLS | GMM | IV-2SLS | GMM |
| Transfert de Migrants | -1.584*** (1.087) | -1.541*** (1.013) | 0.661 (0.817) | 0.871 (0.920) | 0.923 (0.657) | 1.069 (0658) |
| Coût Consultation | 7.17e-05*** (2.48e-06) | 7.14e-05*** (1.38e-05) | -6.68e-05*** (3.30e-6) | -6.74e-05*** (1.32e-05) | -3.67e-06*** (1.99e-06) | -3.58e-06*** (1.60e-06) |
| Satisfait | -0.00771** (0.0117) | 0.00197** (0.0131) | 0.261* (0.0156) | 0.0268* (0.0145) | -0.0254*** (0.00943) | -0232*** (0.00940) |
| Homme | -0.101*** (0.0133) | -0.0983*** (0.0159) | 0.0867* (0.0178) | 0.0872* (0.0171) | 0.0104* (0.0107) | 0.0169* (0.0105) |
| Agecm | 0.00185*** (0.000835) | 0.00164** (0.000940) | -0.00143*** (0.00111) | -0.00147*** (0.00104) | -0.000423*** (0.000671) | -0.000555*** (0.000674) |
| Cadre | -0.00547*** (0.0197) | -0.00256*** (0.0225) | 0.00368*** (0.0262) | 0.00289*** (0.0245) | -0.00915 (0.0158) | -0.0119 (0.0155) |
| Employé | 0.0321** (0.0165) | 0.0356* (0.0187) | -0.0279*** (0.0220) | -0.0272*** (0.0204) | 0.00412* (0.0133) | 0.00208 (0.0131) |
| Taillem | 0.00651 (0.00192) | 0.00626* (0.00220) | -0.00628 (0.00256) | -0.00633** (0.00240) | -0.000237 (0.00155) | -0.000460 (0.00160) |
| Urbain | -0.0163 *** (0.0145) | -0.0124*** (0.0166) | 0.0394** (0.0193) | 0.0398** (0.0182) | -0.0230** (0.0117) | -0.0201*** (0.0117) |
| Revenu stable | 0.00310** (0.0136) | 0.00180** (0.00180) | -0.0214*** (0.0181) | -0.0219*** (0.0173) | -0.0183*** (0.0109) | 0.0184* (0.0103) |
| Niveau de vie du ménage (Pauvre) | 0.101*** (0.0312) | 0.0937*** (0.352) | -0.0792* (0.0416) | -0.0807* (0.0387) | 0.0221* (0.0251) | 0.0273* (0.0251) |
| Non scolarisé | -0.0630*** (0.251) | -0.0592*** (0.0287) | -0.0167*** (0.0334) | -0.0161*** (0.0313) | 0.0798* (0.0202) | 0.0821* (0.0191) |
| Primaire | -0.00730** (0.0270) | -0.00176*** (0.0307) | -0.0487*** (0.0389) | -0.0479*** (0.0334) | 0.0560** (0.0217) | 0.0593* (0.0205) |
| Secondaire | 0.0116* (0.0148) | 0.0115* (0.0184) | -0.0389*** (0.0197) | -0.0391** (0.0191) | 0.0273* (0.0119) | 0.0270* (0.00877) |
| Constant | -1.072*** (1.631) | -1.492*** (1.836) | 3.833 (2.172) | 3.748 (2.022) | -1.762*** (1.312) | -2.053*** (1.314) |
| Wald Chi2(18) | 3734.73 | 1468.07 | 2977.40 | 2436.02 | 552.46 | 403.85 |
| R-squared | 0.6790 | 0.7211 | 0.6223 | 0.8119 | 0.5612 | 0.7122 |
| Prob > chi2 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 | 0.0000 |
| Sargan P-value | 0.6112 | 0.6507 | 0.7092 | 0.5732 | 0.5823 | 0.5402 |
| Observations | 17.437 | | 17.437 | | 17.437 | |
| Standard errors in parentheses | *** p<0.01, ** p<0.05, * p<0.1 | | | | | |

*Source: Auteurs*

L'analyse des résultats sous le prisme du niveau de vie des ménages montre que la probabilité d'accès aux unités de soins publiques et à l'automédication augmente de 10,1 et 2,21 points de



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pourcentage respectivement lorsque le ménage se situe dans la classe des ménages pauvres. Par contre dans les unités de soins privées, cette probabilité diminue 7,92 points de pourcentage. Ce résultat est conforme aux recherches qui montrent que les individus des ménages pauvres aux contraintes financières d'accès aux unités de soins formelles privées. Ceci dû à une insuffisance des capacités financières à couvrir les frais de services médicaux et une absence de couverture d'assurrance santé. Les résultats vont dans le même sens des travaux de Shafie et al (2018) et Awojobi (2019).

Ce tableau révèle également qu'au Cameroun, il existe une disparité géographique en matière d'accès aux soins dans les unités sanitaires. En effet, la probabilité de recourir aux unités de soins publiques et à la pratique de l'automédication diminue respectivement de 1,63 et 2,3 points de pourcentage en milieu urbain comparativement au milieu rural. En revanche, cette probabilité augmente l'accès dans les unités de soins privées de 3,94 points de pourcentage en zone urbaine comparativement en zone rurale. Ceci pourrait s'expliquer par le fait qu'en milieu urbain, il existe une diversité d'établissement en matière d'offre santé privée, parmi lesquelles les unités de soins privées formelles et informelles. D'une part, les structures sanitaires privées formelles offrent des commodités en termes de prise charge rapide, des équipements, infrastrucures adéquats ce qui pourraient favoriser l'attractivité vers ces unités sanitaires. D'autre part, les unités de soins informelles qui sont pratiquées dans les structures clandestines où les personnels de santé publics en service et même ceux en retraite mettent leur compétence contre rémunération aux populations. Ces populations déjà pauvres font recourt à ces unités parfois à crédit avant de régler les factures plus tard. Ce résultat corrobore ceux de Duchesne (1998) qui montrent qu'en Tanzanie, les individus habitant le milieu urbain accèdent plus aux formations hospitalières privées que ceux habitant le milieu rural.

La catégorie socioprofessionnelle est également un déterminant de choix d'accès aux soins de santé. En effet, le fait d'être cadre diminue de 0,54 et augmente par contre de 0,36 point de pourcentage la probabilité d'accès aux unités de soins publiques et privées, respectivement. En revanche, le fait d'être employé augmente de 3,21 points de pourcentage la probabilité de recourir aux unités de soins publiques et diminue de 2,79 points de pourcentage la probabilité de recourir aux unités de soins privées. Ces résultats pourraient s'expliquer par le fait que d'une part, les cadres sont des individus d'une classe sociale aisée ou riche et disposant de personnels de santé privés. De ce fait, ils préfèrent se faire consulter soit à domicile soit dans les hôpitaux privés de référence. D'autre part, les employés sont des individus ayant des revenus relativement stables et donc sont couverts par un régime d'assurance maladie dans les hôpitaux publics puis que ces revenus sont généralement faibles pour solliciter les unités de soins privées dont les services sont très coûteux. Ce résultat est cohérent avec celui de la variable revenu stable qui montre que les individus disposant de ce type de revenu ont une préférence pour les unités de soins publiques plutôt que celles de soins privées et la pratique de l'automédication.

## IV. Conclusion

L'objectif du présent papier a été de mettre en évidence le rôle joué par les transferts de fonds des migrants internationaux dans l'accès aux soins des ménages camerounais. En utilisant la méthode des variables instrumentales et les données d'ECAM 4, nous trouvons que les ménages qui reçoivent des fonds des migrants internationaux sont plus susceptibles de solliciter le secteur de santé privé et la pratique de l'automédication. Cette préférence de ces secteurs par rapport à celui du public par les ménages laisse penser que les transferts de fonds sont l'un des déterminants importants qui influencent le choix des prestataires de soins au Cameroun. Du point de vue d'implications de politique en matière de santé, la puissance publique devrait intégrer les camerounais de la diaspora dans les politiques de développement notamment dans le financement de la santé. Ainsi, ces fonds pourront servir dans la construction d'infrastructures sanitaires en particulier dans les zones rurales afin de réduire les disparités géographiques en matière d'offre de soins.

Bien que cette étude fournit des effets statistiquement significatifs des transferts de fonds sur l'accès au soins de santé, elle n'offre qu'une vision partielle du problème abordé, invétablement entachée de limites principalement liées au type de données utilisées dans l'analyse. Premièrement, compte des objectifs d'ECAM 4, il est possible que l'ensemble des transferts de fonds déclarés par les sources officielles ne soit pas pris compte. Ceci souligne la nécessité d'enquêtes plus précises sur les revenus provenant des transferts de fonds. Deuxièmement, il serait souhaitable de disposer des données longittudinales permettant de suivre les mêmes ménages à différents moments et de stratifier les transferts de fonds en tranche de revenus. Ceci permettrait de tirer des conclusions plus complètes sur la dynamique entre les flux de transferts de fonds et leurs effets sur l'accès de soins de santé. Troisièmement et enfin, il serait souhaitable de tenir compte des différentes composantes de l'automédication à savoir s'automédicamenter à la pharmacie, vente de rue et plantes médecinales. Ceci dans l'optique de s'interroger sur les perspectives de développement de l'automédication dans le contexte camerounais où la demande dépend très largement de facteurs économiques et culturels. Ces limites ne remettent aucunement en cause la pertinence de nos



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résultats mais souligner la nécessité de leur prise en compte pour des recherches ultérieures.

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## Annexe

*Tableau 1:* Récapitulatif des variables selon leur modalité

| Variables | Modalités |
|---|---|
| Réception des transferts de fonds | 1 si le ménage a reçu un transfert de fonds des migrants et 0 sinon. |
| *Unité de soins de santé* | |
| Unité de soins publique | 1 si le ménage a reçu des soins venant du publique 0 si non |
| Unité de soins privée | 1 si le ménage a reçu des soins venant du privé 0 si non |
| Automédication | 1 si le ménage s'automédicamente 0 si non |
| *Niveau d'éducation du chef de ménage* | |
| Non scolarisé | 1 si le chef de ménage n'a pas été scolarisé 0 si non. |
| Primaire | 1 si le chef de ménage a un niveau primaire 0 si non |
| Secondaire | 1 si le chef de ménage a un niveau secondaire 0 si non |
| Supérieur | 1 si le chef de ménage a un niveau Supérieur 0 si non |
| *Situation des revenus* | |
| Stable | 1 si le ménage a des revenus stable 0 si non |
| Instable | 1 si le ménage a des revenus stable 0 si non |
| *Catégorie socio professionnelle* | |
| Cadre | 1 si le chef de ménage est un cadre 0 si non. |
| Employé | 1 si le chef de ménage est un employé 0 si non. |
| Auto emploi | 1 si le chef de ménage s'auto emploi 0 si non. |
| *Niveau de vie* | |
| Pauvre | 1 si un ménage pauvre a reçu un transfert de fond 0 si non. |
| Riche | 1 si un ménage riche a reçu un transfert de fond 0 si non. |
| *Satisfaction des prestations offertes* | |
| Satisfait | 1 si un ménage est satisfait des soins reçus 0 si non. |
| Insatisfait | 1 si un ménage est insatisfait des soins reçus 0 si non. |
| *Sexe du chef de Ménage* | |
| Masculin | 1 si le chef de ménage est de sexe masculin 0 si non. |
| Féminin | 1 si le chef de ménage est de sexe féminin 0 si non. |
| Age du chef du ménage | Age du chef de ménage |
| *Milieu de résidence* | |
| Urbain | 1 si le ménage réside en milieu urbain 0 si non. |
| Rural | 1 si le ménage réside en milieu rural 0 si non. |



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| | |
|---|---|
| *Revenu du Ménage* | |
| Stable | 1 si le ménage a des revenus stables 0 si non. |
| Instable | 1 si le ménage a des revenus instables 0 si non. |
| *Statut matrimonial* | |
| Marié | 1 si le chef du ménage est marié 0 si non. |
| Célibataire | 1 si le chef du ménage est célibataire 0 si non. |
| Taille du ménage | Taille du ménage |
| Coût de consultation | Coût de consultation |

*Source: Auteurs*



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# Global Journals Guidelines Handbook 2025

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# Memberships

## Fellows/Associates of Social Science Research Council

### FSSRC/ASSRC Memberships



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- Author name in font size of 11 in one column.
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- Main text: font size 10 with two justified columns.
- Two columns with equal column width of 3.38 and spacing of 0.2.
- First character must be three lines drop-capped.
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- Large images must be in one column.
- The names of first main headings (Heading 1) must be in Roman font, capital letters, and font size of 10.
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h) All data must have been gathered with attention to numerical detail in the planning stage.

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A major lynchpin of research work for the writing of research papers is the keyword search, which one will employ to find both library and internet resources. Up to eleven keywords or very brief phrases have to be given to help data retrieval, mining, and indexing.

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It may take the discovery of only one important paper to steer in the right keyword direction because, in most databases, the keywords under which a research paper is abstracted are listed with the paper.

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***3. Ask your guides:*** If you are having any difficulty with your research, then do not hesitate to share your difficulty with your guide (if you have one). They will surely help you out and resolve your doubts. If you can't clarify what exactly you require for your work, then ask your supervisor to help you with an alternative. He or she might also provide you with a list of essential readings.

***4. Use of computer is recommended:*** As you are doing research in the field of homan social science then this point is quite obvious. Use right software: Always use good quality software packages. If you are not capable of judging good software, then you can lose the quality of your paper unknowingly. There are various programs available to help you which you can get through the internet.

***5. Use the internet for help:*** An excellent start for your paper is using Google. It is a wondrous search engine, where you can have your doubts resolved. You may also read some answers for the frequent question of how to write your research paper or find a model research paper. You can download books from the internet. If you have all the required books, place importance on reading, selecting, and analyzing the specified information. Then sketch out your research paper. Use big pictures: You may use encyclopedias like Wikipedia to get pictures with the best resolution. At Global Journals, you should strictly follow here.



***6. Bookmarks are useful:*** When you read any book or magazine, you generally use bookmarks, right? It is a good habit which helps to not lose your continuity. You should always use bookmarks while searching on the internet also, which will make your search easier.

***7. Revise what you wrote:*** When you write anything, always read it, summarize it, and then finalize it.

***8. Make every effort:*** Make every effort to mention what you are going to write in your paper. That means always have a good start. Try to mention everything in the introduction—what is the need for a particular research paper. Polish your work with good writing skills and always give an evaluator what he wants. Make backups: When you are going to do any important thing like making a research paper, you should always have backup copies of it either on your computer or on paper. This protects you from losing any portion of your important data.

***9. Produce good diagrams of your own:*** Always try to include good charts or diagrams in your paper to improve quality. Using several unnecessary diagrams will degrade the quality of your paper by creating a hodgepodge. So always try to include diagrams which were made by you to improve the readability of your paper. Use of direct quotes: When you do research relevant to literature, history, or current affairs, then use of quotes becomes essential, but if the study is relevant to science, use of quotes is not preferable.

***10. Use proper verb tense:*** Use proper verb tenses in your paper. Use past tense to present those events that have happened. Use present tense to indicate events that are going on. Use future tense to indicate events that will happen in the future. Use of wrong tenses will confuse the evaluator. Avoid sentences that are incomplete.

***11. Pick a good study spot:*** Always try to pick a spot for your research which is quiet. Not every spot is good for studying.

***12. Know what you know:*** Always try to know what you know by making objectives, otherwise you will be confused and unable to achieve your target.

***13. Use good grammar:*** Always use good grammar and words that will have a positive impact on the evaluator; use of good vocabulary does not mean using tough words which the evaluator has to find in a dictionary. Do not fragment sentences. Eliminate one-word sentences. Do not ever use a big word when a smaller one would suffice.

Verbs have to be in agreement with their subjects. In a research paper, do not start sentences with conjunctions or finish them with prepositions. When writing formally, it is advisable to never split an infinitive because someone will (wrongly) complain. Avoid clichés like a disease. Always shun irritating alliteration. Use language which is simple and straightforward. Put together a neat summary.

***14. Arrangement of information:*** Each section of the main body should start with an opening sentence, and there should be a changeover at the end of the section. Give only valid and powerful arguments for your topic. You may also maintain your arguments with records.

***15. Never start at the last minute:*** Always allow enough time for research work. Leaving everything to the last minute will degrade your paper and spoil your work.

***16. Multitasking in research is not good:*** Doing several things at the same time is a bad habit in the case of research activity. Research is an area where everything has a particular time slot. Divide your research work into parts, and do a particular part in a particular time slot.

***17. Never copy others' work:*** Never copy others' work and give it your name because if the evaluator has seen it anywhere, you will be in trouble. Take proper rest and food: No matter how many hours you spend on your research activity, if you are not taking care of your health, then all your efforts will have been in vain. For quality research, take proper rest and food.

***18. Go to seminars:*** Attend seminars if the topic is relevant to your research area. Utilize all your resources.
Refresh your mind after intervals: Try to give your mind a rest by listening to soft music or sleeping in intervals. This will also improve your memory. Acquire colleagues: Always try to acquire colleagues. No matter how sharp you are, if you acquire colleagues, they can give you ideas which will be helpful to your research.

***19. Think technically:*** Always think technically. If anything happens, search for its reasons, benefits, and demerits. Think and then print: When you go to print your paper, check that tables are not split, headings are not detached from their descriptions, and page sequence is maintained.

***20. Adding unnecessary information:*** Do not add unnecessary information like "I have used MS Excel to draw graphs." Irrelevant and inappropriate material is superfluous. Foreign terminology and phrases are not apropos. One should never take a broad view. Analogy is like feathers on a snake. Use words properly, regardless of how others use them. Remove quotations. Puns are for kids, not grunt readers. Never oversimplify: When adding material to your research paper, never go for oversimplification; this will definitely irritate the evaluator. Be specific. Never use rhythmic redundancies. Contractions shouldn't be used in a research paper. Comparisons are as terrible as clichés. Give up ampersands, abbreviations, and so on. Remove commas that are not necessary. Parenthetical words should be between brackets or commas. Understatement is always the best way to put forward earth-shaking thoughts. Give a detailed literary review.

***21. Report concluded results:*** Use concluded results. From raw data, filter the results, and then conclude your studies based on measurements and observations taken. An appropriate number of decimal places should be used. Parenthetical remarks are prohibited here. Proofread carefully at the final stage. At the end, give an outline to your arguments. Spot perspectives of further study of the subject. Justify your conclusion at the bottom sufficiently, which will probably include examples.

***22. Upon conclusion:*** Once you have concluded your research, the next most important step is to present your findings. Presentation is extremely important as it is the definite medium though which your research is going to be in print for the rest of the crowd. Care should be taken to categorize your thoughts well and present them in a logical and neat manner. A good quality research paper format is essential because it serves to highlight your research paper and bring to light all necessary aspects of your research.

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## Informal Guidelines of Research Paper Writing

***Key points to remember:***

- Submit all work in its final form.
- Write your paper in the form which is presented in the guidelines using the template.
- Please note the criteria peer reviewers will use for grading the final paper.

**Final points:**

One purpose of organizing a research paper is to let people interpret your efforts selectively. The journal requires the following sections, submitted in the order listed, with each section starting on a new page:

*The introduction:* This will be compiled from reference matter and reflect the design processes or outline of basis that directed you to make a study. As you carry out the process of study, the method and process section will be constructed like that. The results segment will show related statistics in nearly sequential order and direct reviewers to similar intellectual paths throughout the data that you gathered to carry out your study.

**The discussion section:**

This will provide understanding of the data and projections as to the implications of the results. The use of good quality references throughout the paper will give the effort trustworthiness by representing an alertness to prior workings.

Writing a research paper is not an easy job, no matter how trouble-free the actual research or concept. Practice, excellent preparation, and controlled record-keeping are the only means to make straightforward progression.

**General style:**

Specific editorial column necessities for compliance of a manuscript will always take over from directions in these general guidelines.

**To make a paper clear:** Adhere to recommended page limits.



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*Mistakes to avoid:*

- Insertion of a title at the foot of a page with subsequent text on the next page.
- Separating a table, chart, or figure—confine each to a single page.
- Submitting a manuscript with pages out of sequence.
- In every section of your document, use standard writing style, including articles ("a" and "the").
- Keep paying attention to the topic of the paper.
- Use paragraphs to split each significant point (excluding the abstract).
- Align the primary line of each section.
- Present your points in sound order.
- Use present tense to report well-accepted matters.
- Use past tense to describe specific results.
- Do not use familiar wording; don't address the reviewer directly. Don't use slang or superlatives.
- Avoid use of extra pictures—include only those figures essential to presenting results.

**Title page:**

Choose a revealing title. It should be short and include the name(s) and address(es) of all authors. It should not have acronyms or abbreviations or exceed two printed lines.

**Abstract:** This summary should be two hundred words or less. It should clearly and briefly explain the key findings reported in the manuscript and must have precise statistics. It should not have acronyms or abbreviations. It should be logical in itself. Do not cite references at this point.

An abstract is a brief, distinct paragraph summary of finished work or work in development. In a minute or less, a reviewer can be taught the foundation behind the study, common approaches to the problem, relevant results, and significant conclusions or new questions.

Write your summary when your paper is completed because how can you write the summary of anything which is not yet written? Wealth of terminology is very essential in abstract. Use comprehensive sentences, and do not sacrifice readability for brevity; you can maintain it succinctly by phrasing sentences so that they provide more than a lone rationale. The author can at this moment go straight to shortening the outcome. Sum up the study with the subsequent elements in any summary. Try to limit the initial two items to no more than one line each.

*Reason for writing the article—theory, overall issue, purpose.*

- Fundamental goal.
- To-the-point depiction of the research.
- Consequences, including definite statistics—if the consequences are quantitative in nature, account for this; results of any numerical analysis should be reported. Significant conclusions or questions that emerge from the research.

**Approach:**

- Single section and succinct.
- An outline of the job done is always written in past tense.
- Concentrate on shortening results—limit background information to a verdict or two.
- Exact spelling, clarity of sentences and phrases, and appropriate reporting of quantities (proper units, important statistics) are just as significant in an abstract as they are anywhere else.

**Introduction:**

The introduction should "introduce" the manuscript. The reviewer should be presented with sufficient background information to be capable of comprehending and calculating the purpose of your study without having to refer to other works. The basis for the study should be offered. Give the most important references, but avoid making a comprehensive appraisal of the topic. Describe the problem visibly. If the problem is not acknowledged in a logical, reasonable way, the reviewer will give no attention to your results. Speak in common terms about techniques used to explain the problem, if needed, but do not present any particulars about the protocols here.

*The following approach can create a valuable beginning:*

- Explain the value (significance) of the study.
- Defend the model—why did you employ this particular system or method? What is its compensation? Remark upon its appropriateness from an abstract point of view as well as pointing out sensible reasons for using it.
- Present a justification. State your particular theory(-ies) or aim(s), and describe the logic that led you to choose them.
- Briefly explain the study's tentative purpose and how it meets the declared objectives.

**Approach:**

Use past tense except for when referring to recognized facts. After all, the manuscript will be submitted after the entire job is done. Sort out your thoughts; manufacture one key point for every section. If you make the four points listed above, you will need at least four paragraphs. Present surrounding information only when it is necessary to support a situation. The reviewer does not desire to read everything you know about a topic. Shape the theory specifically—do not take a broad view.

As always, give awareness to spelling, simplicity, and correctness of sentences and phrases.

**Procedures (methods and materials):**

This part is supposed to be the easiest to carve if you have good skills. A soundly written procedures segment allows a capable scientist to replicate your results. Present precise information about your supplies. The suppliers and clarity of reagents can be helpful bits of information. Present methods in sequential order, but linked methodologies can be grouped as a segment. Be concise when relating the protocols. Attempt to give the least amount of information that would permit another capable scientist to replicate your outcome, but be cautious that vital information is integrated. The use of subheadings is suggested and ought to be synchronized with the results section.

When a technique is used that has been well-described in another section, mention the specific item describing the way, but draw the basic principle while stating the situation. The purpose is to show all particular resources and broad procedures so that another person may use some or all of the methods in one more study or referee the scientific value of your work. It is not to be a step-by-step report of the whole thing you did, nor is a methods section a set of orders.

**Materials:**

*Materials may be reported in part of a section or else they may be recognized along with your measures.*

**Methods:**

- Report the method and not the particulars of each process that engaged the same methodology.
- Describe the method entirely.
- To be succinct, present methods under headings dedicated to specific dealings or groups of measures.
- Simplify—detail how procedures were completed, not how they were performed on a particular day.
- If well-known procedures were used, account for the procedure by name, possibly with a reference, and that's all.

**Approach:**

It is embarrassing to use vigorous voice when documenting methods without using first person, which would focus the reviewer's interest on the researcher rather than the job. As a result, when writing up the methods, most authors use third person passive voice.

Use standard style in this and every other part of the paper—avoid familiar lists, and use full sentences.

**What to keep away from:**

- Resources and methods are not a set of information.
- Skip all descriptive information and surroundings—save it for the argument.
- Leave out information that is immaterial to a third party.



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**Results:**

The principle of a results segment is to present and demonstrate your conclusion. Create this part as entirely objective details of the outcome, and save all understanding for the discussion.

The page length of this segment is set by the sum and types of data to be reported. Use statistics and tables, if suitable, to present consequences most efficiently.

You must clearly differentiate material which would usually be incorporated in a study editorial from any unprocessed data or additional appendix matter that would not be available. In fact, such matters should not be submitted at all except if requested by the instructor.

**Content:**

- Sum up your conclusions in text and demonstrate them, if suitable, with figures and tables.
- In the manuscript, explain each of your consequences, and point the reader to remarks that are most appropriate.
- Present a background, such as by describing the question that was addressed by creation of an exacting study.
- Explain results of control experiments and give remarks that are not accessible in a prescribed figure or table, if appropriate.
- Examine your data, then prepare the analyzed (transformed) data in the form of a figure (graph), table, or manuscript.

**What to stay away from:**

- Do not discuss or infer your outcome, report surrounding information, or try to explain anything.
- Do not include raw data or intermediate calculations in a research manuscript.
- Do not present similar data more than once.
- A manuscript should complement any figures or tables, not duplicate information.
- Never confuse figures with tables—there is a difference.

**Approach:**

As always, use past tense when you submit your results, and put the whole thing in a reasonable order.

Put figures and tables, appropriately numbered, in order at the end of the report.

If you desire, you may place your figures and tables properly within the text of your results section.

**Figures and tables:**

If you put figures and tables at the end of some details, make certain that they are visibly distinguished from any attached appendix materials, such as raw facts. Whatever the position, each table must be titled, numbered one after the other, and include a heading. All figures and tables must be divided from the text.

**Discussion:**

The discussion is expected to be the trickiest segment to write. A lot of papers submitted to the journal are discarded based on problems with the discussion. There is no rule for how long an argument should be.

Position your understanding of the outcome visibly to lead the reviewer through your conclusions, and then finish the paper with a summing up of the implications of the study. The purpose here is to offer an understanding of your results and support all of your conclusions, using facts from your research and generally accepted information, if suitable. The implication of results should be fully described.

Infer your data in the conversation in suitable depth. This means that when you clarify an observable fact, you must explain mechanisms that may account for the observation. If your results vary from your prospect, make clear why that may have happened. If your results agree, then explain the theory that the proof supported. It is never suitable to just state that the data approved the prospect, and let it drop at that. Make a decision as to whether each premise is supported or discarded or if you cannot make a conclusion with assurance. Do not just dismiss a study or part of a study as "uncertain."





Research papers are not acknowledged if the work is imperfect. Draw what conclusions you can based upon the results that you have, and take care of the study as a finished work.

- You may propose future guidelines, such as how an experiment might be personalized to accomplish a new idea.
- Give details of all of your remarks as much as possible, focusing on mechanisms.
- Make a decision as to whether the tentative design sufficiently addressed the theory and whether or not it was correctly restricted. Try to present substitute explanations if they are sensible alternatives.
- One piece of research will not counter an overall question, so maintain the large picture in mind. Where do you go next? The best studies unlock new avenues of study. What questions remain?
- Recommendations for detailed papers will offer supplementary suggestions.

**Approach:**

When you refer to information, differentiate data generated by your own studies from other available information. Present work done by specific persons (including you) in past tense.

Describe generally acknowledged facts and main beliefs in present tense.

## The Administration Rules

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*Please read the following rules and regulations carefully before submitting your research paper to Global Journals Inc. to avoid rejection*.

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| Topics | Grades | | |
|---|---|---|---|
| | **A-B** | **C-D** | **E-F** |
| ***Abstract*** | Clear and concise with appropriate content, Correct format. 200 words or below | Unclear summary and no specific data, Incorrect form<br><br>Above 200 words | No specific data with ambiguous information<br><br>Above 250 words |
| ***Introduction*** | Containing all background details with clear goal and appropriate details, flow specification, no grammar and spelling mistake, well organized sentence and paragraph, reference cited | Unclear and confusing data, appropriate format, grammar and spelling errors with unorganized matter | Out of place depth and content, hazy format |
| ***Methods and Procedures*** | Clear and to the point with well arranged paragraph, precision and accuracy of facts and figures, well organized subheads | Difficult to comprehend with embarrassed text, too much explanation but completed | Incorrect and unorganized structure with hazy meaning |
| ***Result*** | Well organized, Clear and specific, Correct units with precision, correct data, well structuring of paragraph, no grammar and spelling mistake | Complete and embarrassed text, difficult to comprehend | Irregular format with wrong facts and figures |
| ***Discussion*** | Well organized, meaningful specification, sound conclusion, logical and concise explanation, highly structured paragraph reference cited | Wordy, unclear conclusion, spurious | Conclusion is not cited, unorganized, difficult to comprehend |
| ***References*** | Complete and correct format, well organized | Beside the point, Incomplete | Wrong format and structuring |

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