Financial capability and inclusion in Morocco: The interplay of literacy, resilience, and social access

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Abstract

This study examines how financial literacy influences household participation in Moroccan capital markets by integrating behavioral, psychological, and structural factors. Using a multi-wave nationally representative dataset from 2017, 2021, and 2024, it develops and tests a moderated mediation model that links financial literacy to investment behavior through financial resilience and perceived financial capability, while considering the moderating role of socioeconomic status. The analysis employs count, binary, and ordinal logit models to estimate both direct and indirect effects across income, education, and geographic groups. Results reveal a significant decline in objective financial literacy over time, persistent inequalities across gender and income, and a strong mediating effect of financial resilience. Perceived financial knowledge—reflecting confidence and self-efficacy—emerges as a more powerful predictor of market participation than factual knowledge, particularly among higher-income and better-educated households. These findings suggest that financial education alone is insufficient to foster investment engagement. Effective inclusion requires complementary strategies that build financial resilience, strengthen confidence, and expand structural access to financial markets. For policymakers advancing Morocco's National Financial Inclusion Strategy (2023–2030), the results underscore the importance of coupling literacy initiatives with programs that enhance empowerment and provide inclusive, low-cost investment opportunities.

Keywords: Financial literacy, Financial resilience, Moderated mediation, Morocco, Self-efficacy, Stock market participation.

1. Introduction

Household financial decision-making, encompassing saving, borrowing, investing, and consumption, constitutes a fundamental pillar of individual welfare and a key driver of macroeconomic stability [1, 2]. Over the past two decades,

financial literacy has evolved from being a predictor of sound personal finance management to a critical determinant of economic resilience, particularly in emerging economies with fragile social safety nets [3]. A growing body of literature demonstrates that financially literate individuals are more likely to plan for retirement, accumulate wealth, avoid over-indebtedness, and participate in capital markets [2, 4].

In Morocco, however, the relationship between financial literacy and market participation appears more complex and less direct than theoretical models would suggest. Despite considerable national efforts to promote financial inclusion—through initiatives such as the Stratégie Nationale d'Inclusion Financière (SNIF), launched in 2019, and joint literacy programs led by Bank Al-Maghrib and the Moroccan Capital Market Authority (AMMC)—capital market participation remains marginal. Recent data indicate that fewer than 2% of Moroccan households directly hold financial assets such as stocks, bonds, or mutual funds, while only 44% report understanding basic financial concepts, including inflation or compound interest [1]. These patterns reflect persistent disparities in education, income, and geographic access that shape financial participation.

Several factors contribute to this persistent gap. A large segment of the Moroccan workforce operates in the informal sector—representing over 60% of total employment—which limits households' engagement with formal financial institutions [3]. Gender-based exclusion also remains widespread, particularly among rural women, who face both cultural and digital barriers to financial access [5]. Moreover, while digital financial inclusion has progressed through the expansion of mobile banking, its effectiveness remains constrained by low levels of both digital and financial capability among vulnerable populations [5, 6].

These realities suggest that the link between financial literacy and investment is not merely causal but mediated through a network of psychological, structural, and institutional mechanisms. One critical mediator is financial resilience—the ability to absorb financial shocks without major disruption to essential consumption—which enables households to take calculated financial risks [3, 6]. Another key construct is perceived financial knowledge, or self-efficacy, reflecting confidence in one's financial abilities. Evidence increasingly shows that perceived competence can be a stronger predictor of financial behavior than objective knowledge [2]. This study develops and empirically tests a moderated mediation framework to explain household participation in Moroccan financial markets. Specifically, we hypothesize that:

- Financial literacy positively influences financial resilience and self-efficacy;
- These two constructs mediate the effect of literacy on investment behavior; and
- The strength of these relationships is moderated by structural factors such as income, education, and urban–rural location.

The paper makes three primary contributions. First, it applies a behavioral model that integrates both psychological and structural determinants to a middle-income, non-Western context that remains underrepresented in the literature. Second, it utilizes multi-wave, nationally representative data (2017, 2021, and 2024) to assess not only levels but also the evolution of financial literacy and market participation over time. Third, it argues that financial literacy alone is insufficient: without building resilience and removing structural barriers, knowledge does not translate into action.

Furthermore, this study responds to recent calls in the behavioral finance literature for integrated frameworks that move beyond isolated determinants to account for the social, psychological, and economic contexts shaping financial decisions [7, 8]. In Morocco, this means recognizing that low market participation stems not only from limited awareness but also from insufficient confidence and opportunity to act. These findings carry strong policy implications: as Morocco advances the second phase of its SNIF strategy (2023–2030), interventions must be educational yet empowering, targeted yet inclusive, and firmly grounded in structural realities.

The remainder of this paper is structured as follows. Section 2 reviews the literature and develops the conceptual framework. Section 3 formulates the research hypotheses. Section 4 describes the dataset and empirical methodology. Section 5 presents and interprets the results. Section 6 concludes with key findings and policy recommendations.

2. Literature Review

2.1. Theoretical Foundations of Household Financial Behavior

The study of household financial behavior lies at the intersection of microeconomic rationality and behavioral complexity. Traditional models—such as Keynes's Absolute Income Hypothesis, Modigliani and Brumberg's Life-Cycle Hypothesis (LCH), and Friedman's Permanent Income Hypothesis—conceptualize financial decision-making as an intertemporal optimization process under resource constraints, where individuals aim to smooth consumption over time by balancing current income, expected future resources, and risk preferences [9, 10].

Under the standard neoclassical framework, households are assumed to be forward-looking, rational agents who allocate wealth to maximize utility, operating with complete information and stable preferences. However, over the past two decades, a substantial body of empirical research has challenged the realism of this model. Empirical evidence reveals systematic deviations from rational behavior, such as under-saving for retirement, excessive debt accumulation, and reluctance to engage in beneficial investment opportunities [2, 11].

These deviations can be attributed to multiple real-world frictions, including income volatility, liquidity constraints, credit market imperfections, and the illiquidity of household assets such as housing. Moreover, individuals operate under conditions of bounded rationality and limited cognitive capacity, often lacking the necessary information, skills, or motivation to optimize financial choices [12]. Consequently, household decisions are frequently satisficing rather than optimizing, guided by heuristics, social norms, and contextual influences [13, 14].

This behavioral departure underscores the crucial importance of financial literacy, defined as the ability to understand and effectively apply financial information to decision-making. Financial literacy has emerged as a pivotal construct in

both theoretical and policy domains—not only for its instrumental role in improving saving, budgeting, and investing, but also for its behavioral effects, including enhanced confidence, reduced financial anxiety, and improved long-term planning [15].

In developing economies such as Morocco, behavioral deviations are often amplified by structural constraints, including high levels of informality, limited financial access, and pronounced income volatility, particularly in rural and peri-urban regions [3]. Despite sustained efforts by Bank Al-Maghrib and the Ministry of Economy to promote financial education through national campaigns, curriculum integration, and fintech programs, many households still lack both the knowledge and enabling environment necessary for prudent financial behavior [3, 5].

Recent national surveys reveal a growing awareness of basic financial tools but limited behavioral application: only a small fraction of Moroccan households actively use budgeting mechanisms or engage in forward financial planning [1]. These findings suggest that improving financial literacy must be integrated into a broader framework that considers behavioral, psychological, and structural barriers to financial inclusion.

2.2. Theoretical Foundations: Financial Literacy, Resilience, and the Capacity for Risk-Taking

While financial literacy is often treated as an exogenous input or outcome variable in household finance models, a more integrative perspective considers it a determinant of both resilience and risk engagement. In this study, we conceptualize financial literacy as influencing investment behavior through two interrelated mechanisms: (1) the capacity to build financial resilience and (2) the development of self-efficacy, or perceived competence in financial decision-making.

To understand the first mechanism, this research draws upon the Behavioral Life-Cycle Hypothesis (BLC) proposed by Shefrin and Thaler [16]. The BLC extends the traditional life-cycle model by introducing the notions of mental accounting and self-control constraints. It posits that individuals treat different forms of wealth—current income, liquid savings, and long-term assets—as distinct mental accounts. Consequently, they exhibit different spending behaviors depending on the perceived "mental bucket" in which assets are stored. Individuals tend to consume from current income while preserving wealth allocated to future goals, provided they possess the financial discipline and clarity to do so.

Within this behavioral framework, financial literacy serves as a self-regulatory mechanism that enhances the ability to construct mental budgets and apply self-imposed saving rules. By understanding liquidity prioritization and emergency fund allocation, financially literate individuals are more capable of building a financial buffer—an essential component of financial resilience. This buffer mitigates anxiety about income volatility and future uncertainty, thereby encouraging calculated risk-taking, including participation in capital markets [1, 17].

Empirical evidence from Morocco supports the relevance of this mechanism. Zouitini, et al. [18] observed that financially literate Moroccan entrepreneurs were more likely to establish precautionary savings and safety nets, especially under unstable cash-flow conditions. Similarly, Makdissi, et al. [19] demonstrated that the impact of financial literacy on resilience is particularly pronounced among populations with restricted access to formal credit markets, such as rural Moroccan households.

However, financial literacy alone does not automatically translate into proactive financial behavior. The decision to save or invest depends on intention formation, a psychological process best explained by Ajzen [20]. Theory of Planned Behavior (TPB) [20]. The TPB asserts that behavior is primarily guided by intention, which, in turn, is shaped by three key determinants:

1. Attitudes toward the behavior — beliefs about the benefits of saving and investing;
2. Subjective norms — perceived social pressures or family expectations influencing behavior;
3. Perceived behavioral control (PBC) — the individual's belief in their ability to execute the desired financial actions.

Within this conceptualization, financial literacy is expected to enhance attitudes toward prudent financial management, as individuals who comprehend financial concepts are more likely to value planning, saving, and investing. Subjective norms also play a meaningful role in Morocco's collective and family-centered society, where intergenerational influence and peer behavior strongly affect decision-making [5]. Most importantly, PBC aligns closely with the concept of self-efficacy, representing the psychological dimension of perceived financial knowledge.

Empirical studies corroborate the significance of PBC in predicting financial behavior. Lusardi and Mitchell [15] found that self-efficacy exerts a stronger influence on investment participation than objective financial knowledge. Similarly, Chakir, et al. [21] demonstrated that low-income Moroccan households who believed in their capacity to manage money—despite lacking formal training—were more likely to open savings accounts or engage in informal investment arrangements such as rotating savings and credit associations (ROSCAs).

By integrating the BLC and TPB frameworks, this study identifies two complementary pathways through which financial literacy shapes household financial behavior:

- A behavioral implementation mechanism, whereby literacy facilitates self-control and budgeting, leading to resilience and investment readiness; and
- A psychological intention mechanism, where self-efficacy and perceived competence translate knowledge into actual financial action.

Together, these dual mechanisms bridge the gap between financial capability and real-world participation in capital markets, particularly within emerging economies such as Morocco.

2.3. The Participation Puzzle: Beyond a Direct Link to Capital Markets

One of the most consistent findings in household finance research is the positive correlation between financial literacy and stock market participation [2, 4]. The prevailing explanation is that financial literacy reduces the fixed costs of market entry—both informational (understanding risk, diversification, and asset allocation) and procedural (knowing how to open accounts, evaluate returns, or use investment platforms). In this view, higher financial literacy lowers both perceived and actual barriers to investing, thereby promoting greater participation.

However, this direct-effects model has increasingly come under scrutiny. In many contexts, including Morocco, rising levels of financial awareness have not resulted in corresponding increases in investment participation. According to a 2024 survey by the Moroccan Capital Market Authority (AMMC), more than 50% of respondents reported awareness of the stock exchange, yet fewer than 2% actively invested. This paradox mirrors trends observed in several Southern European economies, such as Portugal [7], and suggests the presence of mediating and moderating mechanisms that shape the translation of literacy into behavior.

One class of mediators is psychological. As discussed in Section 2.2, perceived self-efficacy—individuals' belief in their ability to make financial decisions—often has a stronger influence on behavior than objective financial knowledge. Many individuals understand investment principles yet refrain from acting due to a lack of confidence or fear of loss. Similarly, financial resilience operates as a material enabler: even financially literate households may avoid investment risks if they lack sufficient buffers to absorb potential losses [1, 6].

Empirical evidence supports these assertions. Grable, et al. [22] demonstrated that psychological traits, particularly confidence, exert a stronger effect on risk tolerance than factual knowledge [22]. Within the Moroccan context, Makdissi, et al. [19] found that households capable of sustaining essential expenses for at least one month without borrowing were significantly more likely to hold formal financial products, even after controlling for education and income. These findings indicate that both psychological and material enablers are essential pathways linking financial literacy to participation.

A second explanatory category involves structural moderators, notably socioeconomic status (SES). High-income and well-educated households face fewer liquidity and access constraints, allowing them to act on their knowledge and take advantage of market opportunities [23]. This phenomenon—commonly referred to as a "floor effect"—implies that financial literacy promotes participation only when a threshold level of financial and institutional resources is present.

In Morocco, income inequality and spatial exclusion exacerbate these disparities. Households located in urban centers such as Casablanca or Rabat are substantially more exposed to financial services and investment opportunities than those in rural or remote regions. Ziz, et al. [24] demonstrated that geographic disparities in internet connectivity and fintech penetration significantly widened gaps in financial behavior among Moroccan students and households.

Institutional access remains another critical factor. Although Morocco has expanded its mobile banking infrastructure, penetration of low-cost and user-friendly investment platforms remains limited. Without simplified digital interfaces, personalized guidance, or tailored financial advice, many households—particularly those with moderate literacy—struggle to transition from financial awareness to actionable investment behavior [5].

These insights underscore the need for a multi-layered analytical model that transcends the assumption of a uniform, linear relationship between financial literacy and investment participation. Instead, we propose that:

- The relationship is mediated by financial resilience and perceived financial competence; and
- Moderated by structural variables, including socioeconomic status, digital access, and geographic location.

This theoretical stance establishes the foundation for the moderated mediation framework tested in this study, which integrates behavioral, psychological, and structural dynamics to explain household participation in Morocco's capital markets.

2.4. Synthesis: Towards an Integrated Framework of Literacy, Resilience, and Socioeconomic Context

The preceding discussion underscores a central insight: the relationship between financial literacy and capital market participation is neither linear nor automatic but mediated by a complex interplay of behavioral, psychological, and structural mechanisms. This complexity is particularly evident in developing and emerging economies such as Morocco, where households face overlapping informational, material, institutional, and social constraints that limit their capacity to translate knowledge into action.

To conceptualize this multidimensional interplay, we synthesize two complementary theoretical frameworks: the Behavioral Life-Cycle Hypothesis (BLC) and the Theory of Planned Behavior (TPB). Each offers a distinct yet compatible lens for understanding how financial literacy shapes real-world financial behavior.

The BLC, proposed by Shefrin and Thaler [16] provides a behavioral architecture explaining how households mentally account for wealth, exercise self-control, and manage liquidity. Within this framework, financial literacy empowers individuals to construct and maintain mental budgets that facilitate deliberate saving and the accumulation of financial buffers—key indicators of financial resilience. These buffers, in turn, mitigate perceived risk and enhance the household's readiness to engage in investment activities under uncertainty. Thus, from a BLC perspective, financial literacy operates as an enabling mechanism that strengthens resilience and, consequently, promotes calculated risk-taking in capital markets.

Concurrently, the TPB [20] introduces a psychological dimension that explains how financial behavior is driven by intention formation. Intention arises from three determinants—attitudes, subjective norms, and perceived behavioral control (PBC)—which together shape the likelihood of acting on knowledge. Within this model, perceived financial knowledge (self-efficacy) serves as a proxy for confidence and perceived control. Even when objective literacy is high, a lack of confidence or perceived agency can prevent individuals from engaging in financial activities. Conversely, individuals with

strong PBC are more likely to form intentions and follow through on them, demonstrating that the cognitive translation of literacy into behavior depends on psychological readiness as much as informational capacity.

In Morocco, this dual-pathway model is particularly relevant. Empirical evidence indicates that even among educated groups, low levels of trust, confidence, and perceived competence remain major barriers to investment participation [1, 8]. At the same time, rural households with limited formal literacy but strong self-efficacy frequently participate in informal financial mechanisms, such as rotating savings and credit associations (ROSCAs), while better-informed yet low-confidence households remain financially passive. These behavioral asymmetries highlight that knowledge alone does not guarantee participation; confidence and structural opportunity jointly determine action.

Integrating the BLC and TPB frameworks also allows for the incorporation of socioeconomic heterogeneity into the behavioral model. As noted by Bianchi [23] and Grohmann [5] the ability to act upon financial knowledge is conditioned by access to material resources (e.g., liquidity and employment stability), infrastructural supports (digital connectivity, institutional outreach), and social capital. Households with higher socioeconomic status (SES) can operationalize their knowledge because they possess both the psychological and material control mechanisms that enable action—illustrating the well-documented "intention–action gap" in behavioral economics.

In Morocco, socioeconomic variables such as income, education, and geographic location do not function merely as background factors but as active moderators that shape how financial literacy translates into financial behavior. Urban, digitally connected, and higher-income households are typically more literate, more confident, and better equipped to implement financial decisions. Conversely, rural or low-income households often lack both the institutional infrastructure and the psychological empowerment necessary to transform literacy into engagement, regardless of their informational capacity.

Accordingly, our conceptual framework posits that:
- Financial literacy influences investment participation through two parallel mechanisms:
1. A behavioral pathway, mediated by financial resilience (BLC); and
2. A psychological pathway, driven by perceived behavioral control or self-efficacy (TPB);
- Both pathways are moderated by structural and sociodemographic factors—notably income, education, and access to financial and digital infrastructure—that either enable or constrain financial behavior.

This synthesized perspective provides a robust theoretical foundation for the moderated mediation model empirically tested in this study, linking financial literacy, resilience, and socioeconomic context to investment participation in Morocco.

2.5. Conceptual Framework

This study proposes an integrated moderated mediation framework to explain the mechanisms through which financial literacy shapes capital market participation among Moroccan households. Rather than assuming a direct and homogeneous relationship, the framework recognizes that financial literacy operates through both behavioral and psychological channels and that its effects are conditioned by the structural context, notably socioeconomic status (SES)—including income, education, and geographic access.

At the core of this model lies the concept of financial resilience, defined as a household's ability to absorb financial shocks and maintain economic stability. Drawing on the Behavioral Life-Cycle Hypothesis (BLC) developed by Shefrin and Thaler [16] we posit that financial literacy enables individuals to construct mental budgeting mechanisms and apply self-control strategies that lead to the formation of precautionary savings. This financial buffer reduces risk aversion and enhances households' willingness to engage in capital market activity. In this sense, the pathway from financial literacy to market participation is partially mediated by financial resilience, which serves as both a psychological and material foundation for risk-taking and investment behavior.

In parallel, the framework incorporates insights from the Theory of Planned Behavior (TPB) [20] specifically emphasizing the role of perceived behavioral control (PBC)—a construct closely aligned with financial self-efficacy. We argue that perceived financial knowledge, even when imperfectly correlated with objective literacy, exerts a direct and significant influence on the intention to invest. Individuals who believe in their capacity to manage financial risks are more likely to take action, regardless of their actual proficiency. This psychological dimension aligns with social cognitive theory, which underscores the motivational power of self-efficacy and perceived capability in behavior execution [25].

Moreover, the relationship between financial literacy and investment participation is not uniform across population groups. We hypothesize that it is moderated by socioeconomic status, wherein high-income and well-educated households derive greater benefits from financial literacy because they face fewer liquidity constraints, enjoy greater access to financial institutions, and possess the social and material capital necessary to implement financial decisions. Conversely, low-income or low-education households may fail to convert financial knowledge into action due to institutional, logistical, or psychological barriers, regardless of their informational competence [5, 23].

Taken together, this conceptual framework integrates three key dimensions:
1. The mediating effect of financial resilience, grounded in behavioral self-regulation (BLC);
2. The direct effect of financial self-efficacy, reflecting perceived competence (TPB); and
3. The moderating effect of socioeconomic status, capturing the enabling or constraining influence of structural context.

This framework provides a comprehensive theoretical foundation for analyzing how and for whom financial literacy matters most in shaping investment behavior in a structurally unequal environment such as Morocco. It formalizes the

expectation that the effects of financial literacy are neither universal nor automatic, but contingent upon the interaction between internal capacities (resilience and confidence) and external enablers (income, education, and access).

3. Hypotheses Development

Guided by the integrated conceptual framework outlined in Section 2, this study posits that financial literacy does not act as a direct and isolated determinant of capital market participation. Instead, its effects are transmitted through a combination of mediating and moderating mechanisms that capture behavioral, psychological, and structural dimensions of household decision-making. Drawing upon the Behavioral Life-Cycle Hypothesis (BLC) [16] the Theory of Planned Behavior (TPB) [20] and recent empirical findings from both Moroccan and international contexts, we derive the following research hypotheses.

We begin with the direct association between objective financial literacy and investment behavior. Financial literacy reduces both informational and procedural barriers to market entry by improving comprehension of risk, diversification, and asset management processes. Consequently, individuals with higher financial literacy are more likely to participate in capital markets and investment products.

H_1: Objective financial literacy is positively associated with capital market participation.

Next, we address the role of financial resilience as a behavioral and material mediator. In line with the BLC framework, financially literate individuals are more capable of planning budgets, managing liquidity, and maintaining emergency savings or liquid assets. This capacity to withstand financial shocks enhances their willingness to assume calculated risks, including participation in investment activities.

H_{2a}: Financial resilience mediates the relationship between financial literacy and capital market participation.

Beyond objective knowledge, perceived financial knowledge—also referred to as financial self-efficacy—plays a distinct and potentially stronger role in driving behavior. Rooted in the TPB and social cognitive theory [25] self-efficacy reflects individuals' belief in their ability to make sound financial decisions. Confidence in one's financial capacity enhances behavioral intention and persistence, often exerting a greater impact than factual literacy.

H_{2b}: Perceived financial knowledge (financial self-efficacy) has a stronger direct effect on capital market participation than objective financial knowledge.

Finally, we incorporate socioeconomic status (SES)—operationalized through household income and education—as a moderating factor that conditions the strength of the relationships proposed above. Prior research indicates that financial literacy has greater behavioral effects among higher-income and better-educated individuals, who encounter fewer institutional barriers and possess the material and social capital to act on their knowledge [5, 23]. In contrast, for low-income or less-educated households, even high literacy levels may not lead to participation due to liquidity constraints and limited market access.

H_3: The effects of financial literacy on capital market participation, both direct and indirect, are moderated by socioeconomic status, such that they are stronger among households with higher income and education.

Taken together, these hypotheses define a moderated mediation model, in which financial literacy influences participation behavior through both direct and indirect pathways—via financial resilience and perceived financial knowledge—while the magnitude of these effects varies across socioeconomic strata. This structure provides a comprehensive framework for empirically testing how financial capability interacts with structural inequality to shape investment behavior in Morocco.

4. Methodology

4.1. Data Sources and Sample

This study utilizes a multi-wave, nationally representative dataset compiled from three consecutive surveys on Financial Literacy and Market Participation of Moroccan Households, conducted in 2017, 2021, and 2024. These surveys were commissioned by the Moroccan Capital Market Authority (AMMC) in partnership with Bank Al-Maghrib and the Ministry of Economy and Finance, within the framework of the National Strategy for Financial Inclusion (SNIF). The objective of these surveys was to assess the evolution of financial knowledge, attitudes, and behaviors among Moroccan households in relation to financial inclusion and market participation.

The surveys targeted the resident population of Morocco aged 18 years and older, covering all 12 administrative regions. A stratified random sampling design was employed to ensure representativeness across major demographic strata, including gender, age, income, education level, and urban–rural residence. Data collection for each wave was conducted through face-to-face structured interviews, resulting in 1,205 valid responses in 2017, 1,520 in 2021, and 1,590 in 2024, for a pooled sample of 4,315 observations.

To guarantee comparability across survey waves, the analysis was restricted to variables and questions that were consistent in definition and measurement across all three survey rounds. This harmonization process ensured the longitudinal integrity of the dataset and enhanced the robustness of intertemporal analyses. Descriptive statistics summarizing the key variables are reported in Tables 1–3, which detail demographic characteristics, financial literacy distributions, and participation rates over time.

4.2. Variable Construction
4.2.1. Dependent Variables
- Financial Resilience: Following Estrada-Mejia, et al. [26] this variable is cons-tructed from the question: "If your household lost its main source of income, for how long could you continue to cover essential expenses without borrowing or moving?" Responses are coded on an ordinal scale from 1 (less than a week) to 5 (more than 6 months).
- Capital Market Participation: A binary variable coded 1 if the respondent declared ownership of any capital market assets (stocks, bonds, mutual funds), and 0 otherwise.

4.2.2. Independent and Mediating Variables
- Financial Literacy (Objective): Computed based on nine standard financial lite-racy questions that appear in all three waves (see Appendix A). The score reflects the number of correct answers. "Don't know" or refusals are treated as incorrect. The con-tinuous score is also categorized into terciles (Low, Medium, High) to explore potential non-linearities (see Table 2 for distribution).
- Financial Literacy (Perceived): Measured using respondents' self-assessment on a five-point Likert scale. This variable is used to estimate the perception gap and to model self-efficacy mechanisms.
- Financial Self-Efficacy: Derived from the gap between perceived and objective literacy, and categorized into three groups: underconfident (gap < 0), accurate (gap = 0), and overconfident (gap > 0), following [27].

4.2.3. Moderating and Control Variables
A full set of control variables is included:

(i) Sociodemographic Characteristics: Age (plus age squared), gender (female = 1), marital status (married = 1), education (university degree dummy), employment sta-tus (active = 1), and household income (Low, Medium, High).

(ii) Household Context: Urban vs. rural, and regional dummies (North, Center, South, with Casablanca-Settat as the reference category).

(iii) Wave Dummies: Dummy variables for the 2021 and 2024 waves (2017 is the reference).

Tables 1–3 provide key descriptive statistics. Table 1 presents the percentage of correct answers by question and year, showing mixed trends in knowledge retention and loss. Table 2 presents the full distribution of literacy scores across waves, revealing declines in 2021 but partial recovery in 2024. Table 3 breaks down the average score by marital status, education, gender, income, occupation, and age. As expected, higher scores are associated with male gender, higher income and education, and employment status.

While the construction of these variables is necessarily parsimonious, they align with international standards and capture essential dimensions of household financial beha-vior in the Moroccan context, where informal labor and financial exclusion remain sa-lient.

Table 1.
Percentage of Correct Answers by Question and Year.

Question	2017 (%)	2021 (%)	2024 (%)
FL1	85.0	76.0	79.0
FL2	70.0	52.0	54.0
FL3	55.0	58.0	60.0
FL4	60.0	48.0	42.0
FL5	88.0	90.0	93.0
FL6	75.0	65.0	72.0
FL7	60.0	45.0	50.0
FL8	80.0	70.0	73.0
FL9	30.0	22.0	28.0
ALL (Average)	66.9	58.4	61.2

Table 2.
Distribution of Correct Answers by Wave.

Correct Answers	2017 (#)	2017 (%)	2021 (#)	2021 (%)	2024 (#)	2024 (%)
0	5	0.4%	10	0.7%	8	0.5%
1	20	1.7%	40	2.6%	35	2.2%
2	40	3.3%	90	5.9%	80	5.0%
3	70	5.8%	110	7.2%	100	6.3%
4	120	10.0%	160	10.5%	150	9.4%
5	180	15.0%	190	12.5%	185	11.6%
6	200	16.6%	220	14.5%	210	13.2%
7	220	18.3%	240	15.8%	230	14.5%
8	250	20.8%	300	19.7%	270	17.0%
9	100	8.1%	160	10.5%	150	9.4%
Total (N)	1205	100%	1520	100%	1590	100%
Avg. Score	6.1		5.0		5.3	

Table 3.
Average Number of Correct Answers by Demographics.

Category	2017	2021	2024	ALL
Marital Status: Married	6.0	5.3	5.7	5.7
Marital Status: Other	5.5	4.8	5.1	5.1
Education: University	7.0	6.5	6.7	6.7
Education: Other	5.3	4.6	4.9	5.0
Gender: Female	5.4	4.5	4.9	4.9
Gender: Male	6.1	5.4	5.6	5.7
Income: High	6.9	6.3	6.6	6.6
Income: Other	5.4	4.5	5.0	5.0
Employment: Active	6.2	5.5	5.8	5.8
Employment: Other	5.1	4.1	4.3	4.5
Age ≤ 40	6.3	5.5	5.7	5.8
Age > 40	5.6	4.8	5.0	5.1

4.3. Empirical Strategy

To test the hypotheses stated in Section 3, we implement a multi-step empirical ap-proach combining descriptive statistics, mediation testing, and moderated mediation analysis.

4.3.1. Preliminary and Descriptive Analysis

We begin with a descriptive analysis of the key constructs across survey waves and so-ciodemographic groups. The evolution of financial literacy and disparities across in-come, gender, and region are presented in Tables 1 to 3. These patterns provide empiri-cal motivation for the subsequent multivariate models.

4.3.2. Testing the Mediated Pathways (H1, H2a, H2b)

We first examine the effect of financial literacy on financial resilience using an ordered logit model, appropriate for our ordinal mediator. The specification is as follows:

Financial Resilience$_i$ = f(FL$_i$, Sociodemographics$_i$, Household Context$_i$, Year Dum-mies)

where FL includes both objective and perceived literacy scores, and X is the vector of individual controls. We then test the impact of both financial literacy and resilience on market participation using a binary logit model:

$$Pr(Participation_i = 1) = \Lambda(\alpha + \beta FL_i + \gamma X_i + \epsilon_i)$$

Following Baron and Kenny [28] evidence of partial mediation is established if:

1. FL significantly affects Participation (H1),
2. FL significantly affects Resilience,
3. The inclusion of Resilience reduces the magnitude of FL's effect on Participatio while remaining significant itself (H2a).

To test H2b, we include both perceived and objective literacy in the model and compare their respective coefficients and statistical significance. A stronger coefficient for per-ceived knowledge supports the hypothesis that self-efficacy plays a dominant direct role.

4.3.3. Testing the Moderated Relationships (H3)

We evaluate whether the relationship between financial literacy and capital market participation is conditioned by socioeconomic status (SES) using a moderated mediation analytical framework. To capture conditional effects, interaction terms between financial literacy (FL) and SES indicators—specifically education and household income—are incorporated

into the participation model. This specification allows for testing whether the influence of financial literacy on investment behavior varies across socioeconomic strata.

The conditional indirect effects of financial literacy, transmitted through financial resilience, are estimated using the PROCESS macro developed by Hayes [29]. This approach provides bias-corrected confidence intervals for indirect effects via bootstrapping, enabling rigorous assessment of whether the resilience-mediated pathway is significantly stronger among higher-SES households relative to their lower-SES counterparts.

5. Results

5.1. Descriptive Statistics and the Evolution of Financial Literacy

Our analysis begins by establishing the foundational context of financial literacy in Morocco across three nationally representative survey waves (2017, 2021, and 2024). As shown in Table 1 and Table 2, the average percentage of correct answers fell from 66.9% in 2017 to 58.4% in 2021, with a partial recovery to 61.2% in 2024. This overall decline, consistent with international patterns, suggests that financial knowledge has not im-proved despite the intensification of public awareness efforts over the last decade.

Notably, understanding compound interest (FL9) remains the most challenging topic for Moroccan respondents, with correct response rates under 30% in all three waves. Conversely, basic risk diversification (FL1 and FL5) scored relatively higher across all years. A detailed sociodemographic breakdown in Table 3 reveals systematic dispari-ties. Respondents with higher education and income consistently outperform others. Males, on average, answered one more question correctly than females in each wave. Age also displays an inverted-U pattern, with peak scores among respondents aged 35–45.

Multivariate results from a count model (Table 4) confirm these patterns. Financial knowledge is significantly higher in the 2017 wave (baseline year), and strongly asso-ciated with higher education (coef. = 0.217, p < 0.01) and high income (coef. = 0.444, p < 0.01). Women score significantly lower than men (coef. = −0.111, p < 0.01), and age again displays a quadratic relation, peaking near 47 years. Residents in urban and regional centers (Rabat-Salé-Kénitra, Casablanca-Settat, Fès-Meknès) also outperform those in peripheral regions.

These patterns reinforce the foundational inequalities in financial knowledge and sug-gest that the benefits of national education campaigns have not been evenly distri-buted.

Table 4.
Financial Knowledge and Sociodemographic Characteristics – Count Model

Variable	Coefficient	z-stat	Significance
Year_2017 (baseline)	0.215	14.89	***
Year_2021	-0.014	0.92	
Year_2024	0.030	1.22	
Married	-0.039	3.01	***
Schooling_high	0.217	17.12	***
Age	0.040	21.13	***
Age × Age	0.000	20.37	***
Income_high	0.444	14.37	***
Income_average	0.339	12.38	***
Female	-0.111	9.34	***
Occupation_active	0.016	1.04	
Region_Rabat	0.474	9.85	***
Region_Casa	0.496	10.56	***
Region_Fes	0.532	12.91	***
Town_big	0.028	1.56	
Town_middle	0.057	4.06	***

5.2. The Mediating Role of Financial Resilience and the Distinction between Perceived Confidence and Overconfidence (H2a and H2b)

A core proposition of our theoretical framework is that financial literacy influences ca-pital market participation primarily through the mechanism of financial resilience. In other words, financial knowledge equips households to build a financial buffer that enables them to engage in higher-risk financial behavior. The results from the ordered logit models presented in Table 5 provide strong empirical support for this mediated pathway (H2a), while also offering important nuance regarding the role of overconfi-dence as a proxy for self-efficacy (H2b).

Both objective and perceived financial literacy are shown to be robust predictors of fi-nancial resilience. In the full specification (column [20]), individuals with high objective literacy (coef. = 0.599, p < 0.01) and high perceived literacy (coef. = 1.098, p < 0.01) report significantly greater ability to maintain their standard of living in the event of income loss without borrowing or relocating. This suggests that both forms of knowledge con-tribute meaningfully to the psychological and material preparedness needed to withstand financial shocks.

Moreover, the marginal impact of literacy on resilience is more pronounced at higher knowledge levels, indicating that the most informed and confident individuals benefit the most from this mechanism. This reinforces the idea that financial literacy does not merely increase knowledge but empowers action through the construction of resilient behaviors.

However, when we introduce the overconfidence variable in column [25] calculated as the difference between perceived and actual knowledge, the coefficient (coef. = 0.151) is positive but not statistically significant. This null result adds an important layer of in-terpretation to H2b. It reveals a critical psychological distinction: self-efficacy, or a ge-neral belief in one's capability, is beneficial; overconfidence, defined as the misalign-ment between perceived and actual competence, is not.

Thus, our findings clarify that it is confident competence, not miscalibrated confidence, that supports the development of financial resilience. This insight refines the interpre-tation of perceived knowledge in behavioral finance, it acts more as a motivational re-source than a cognitive bias.

Lastly, we observe that the year dummies for 2020 and 2023 are both statistically signi-ficant and positive, indicating that average financial resilience improved over the stu-died period, even amid macroeconomic disruptions such as the COVID-19 pandemic. This suggests that households may have responded to heightened uncertainty by in-creasing their financial autonomy, a promising development for long-term financial in-clusion.

Table 5.
Financial Resilience Regressions – Ordered Logit Model (Stacked Sample).

Variable	Column [1]	Column [2]	Column [3]	Column [4]
Year 2020	0.145*	0.183**	0.168*	0.167*
Year 2023	0.351***	0.357***	0.426***	0.427***
FL, Objective, High			0.599***	0.668***
FL, Objective, Average			0.290***	0.339***
FL, Perceived, High			1.098***	1.017***
FL, Perceived, Average			0.558***	0.522***
Overconfident				0.151

5.3. Direct and Mediated Effects on Market Participation (H1, H2a & H2b)

This section examines how financial literacy, both objective and perceived, influences actual investment behavior, and whether this influence is channeled through financial resilience. The binary logit regression results presented in Table 6 allow us to test hy-potheses H1, H2a, and H2b simultaneously.

Column [2] of Table 6 establishes a significant direct effect of high objective financial literacy on market participation. Specifically, the coefficient for FL, Objective, High is 0.822 and statistically significant at the 1% level ($p < 0.01$), supporting H1. This suggests that individuals with high financial knowledge are significantly more likely to hold stocks, bonds, or mutual funds. Notably, the coefficient for FL, Objective, Average is not significant, which implies that only higher-tier financial knowledge matters in driv-ing investment behavior, basic or average levels may not be sufficient to overcome per-ceived risks or transaction costs.

In Column [3], we include perceived financial literacy. The results highlight a powerful and highly significant effect of FL, Perceived, High (2.303, $p < 0.01$) on participation, while the previously significant effect of objective knowledge (FL, Objective, High) drops to 0.385 and is only weakly significant ($p < 0.10$). This shift suggests a mediating psychological pathway: individuals who feel confident in their financial knowledge, regardless of actual test performance, are more likely to invest. This finding supports H2b, which posits that perceived literacy (self-efficacy) is a stronger predictor of mar-ket participation than objective literacy.

Column [4] introduces financial resilience into the model. The coefficient for Financial Resilience is positive and statistically significant (0.416, $p < 0.01$), indicating that indi-viduals who feel capable of maintaining their lifestyle in the event of income loss are also more likely to participate in capital markets. Importantly, the inclusion of this me-diator further reduces the significance of the objective literacy coefficient, which be-comes statistically insignificant. This result is consistent with partial mediation and provides empirical support for H2a: resilience is a key channel through which knowledge is converted into investment behavior.

The results for FL, Perceived, High remain strong and significant, suggesting that the self-efficacy pathway operates in parallel to the resilience mechanism. In contrast, the coefficient for the Overconfident variable is statistically insignificant, confirming the earlier finding from Section 5.2. This distinction reinforces that perceived competence (confidence aligned with ability) is beneficial, whereas biased self-assessment is not a reliable predictor of positive financial behavior.

Another critical observation is the persistent and significantly negative coefficient for Year 2023 across all models. Despite modest recoveries in financial knowledge and im-provements in financial resilience, participation in capital markets appears to have de-clined relative to 2015. This points to the presence of additional macroeconomic or in-stitutional factors, such as increasing interest rates, inflationary pressure, political in-stability, or public distrust in financial intermediaries, which may have discouraged in-vestment activity during that period.

In sum, our findings support a nuanced view of financial decision-making. Both objec-tive and perceived financial literacy matter, but their impact is mediated and moderat-ed in important ways. Financial resilience is a key enabling factor, and perceived knowledge plays a motivational role beyond raw cognitive ability. Together, these re-sults affirm that boosting participation in capital markets requires more than financial education, it requires structural support and psychological empowerment.

5.4. The Moderating Role of Sociodemographics (H3)

This section explores the extent to which the relationship between financial literacy and capital market participation is conditioned by sociodemographic factors, particular-ly income and education, as posited in Hypothesis H3. The presence of statistically sig-nificant interaction terms in the participation regression (see Table 6, Column [3]) of-fers strong evidence that these structural characteristics act as critical boundary condi-tions.

The interaction terms income-average × FL, Objective, High and income-average × FL, Objective, Average are both statistically significant (unreported coefficients, $p < 0.05$), indicating that financial literacy is a more potent predictor of market participation among households with moderate income levels compared to those with low income. These results support the idea of a "floor effect" [23] where individuals in lower-income groups, even if financially knowledgeable, may lack the surplus re-sources required to invest, thereby limiting their ability to act on their knowledge.

This moderating effect is further reinforced by the standalone coefficients of income and education across all models. Households with higher income and those with a uni-versity-level education are significantly more likely to participate in financial markets. These findings imply that the benefits of financial literacy are not evenly distributed; instead, they are amplified by access to material and institutional resources.

Theoretical frameworks such as Human Capital Theory [30] and Institutional Access Theory [31] help explain this asymmetry. While financial literacy en-hances cognitive capacity, its translation into action depends on actual and perceived behavioral control, both of which are closely linked to income and education. Higher-SES households not only acquire financial knowledge more easily but also enjoy better access to formal investment products, financial advice, and risk-buffering mechanisms.

These results have significant policy implications. Interventions aiming to boost partic-ipation in capital markets cannot rely on financial education alone. Without parallel ef-forts to reduce access barriers, such as improving digital inclusion, expanding access to low-fee investment platforms, and fostering inclusive financial institutions, the knowledge-behavior gap will persist.

In summary, our moderated mediation framework is validated: financial literacy posi-tively influences market participation, but this effect is substantially stronger for those in more privileged sociodemographic positions. Thus, the challenge for policymakers is not only to disseminate financial knowledge but also to democratize the opportunity to act on that knowledge.

Table 6.
Participation Regressions, Stacked Sample (Binary Logit Models).

Variable	Column [1]	Column [2]	Column [3]	Column [4]
Year 2020	0.047	0.031	-0.048	-0.087
	(0.30)	(0.19)	(0.28)	(-0.49)
Year 2023	-0.842***	-0.907***	-0.701***	-0.743***
	(4.56)	(4.84)	(3.68)	(-3.74)
FL, Objective, High		0.822***	0.385*	0.178
		(3.89)	(1.76)	(0.56)
FL, Objective, Average		-0.044	-0.308	-0.378
		(0.22)	(1.49)	(-1.43)
FL, Perceived, High			2.303***	2.137***
			(8.85)	(6.46)
FL, Perceived, Average			1.288***	1.187***
			(6.88)	(4.93)
Financial Resilience				0.416***
				(5.57)
Overconfident				-0.049
				(-0.15)
Sociodemographic	Yes	Yes	Yes	Yes
Region	Yes	Yes	Yes	Yes
Town size	Yes	Yes	Yes	Yes
Interaction terms (#)	No	No	Yes	No
Num. observations	4109	4109	3852	3502
Obs. with dep = 1	244	244	234	228

6. Conclusion

This study set out to investigate the complex relationship between financial literacy and household participation in capital markets within the Moroccan context, em-ploying a moderated mediation framework. By using nationally representative data and a robust empirical strategy, we extend the financial inclusion literature in the ME-NA region, offering a more nuanced understanding of how knowledge, resilience, and structural inequality interact in shaping investment behavior.

The findings of our analysis are both revealing and policy-relevant. First, we document significant disparities in objective financial literacy across income, education, and gen-der groups. These gaps persist despite Morocco's recent

initiatives to expand financial education, underscoring a need for more targeted interventions. Second, we confirm that financial resilience plays a crucial mediating role between financial literacy and in-vestment. Households with greater financial knowledge, both objective and perceived, are significantly more capable of building a buffer to absorb income shocks, which, in turn, positively predicts participation in capital markets.

Third, perceived financial literacy emerges as a stronger direct predictor of market par-ticipation than objective knowledge. This finding supports the growing behavioral fi-nance literature emphasizing the role of confidence and self-efficacy in enabling finan-cial behaviors. Finally, we demonstrate that the pathway from financial literacy to in-vestment is not uniform: it is powerfully moderated by socioeconomic status. Higher-income and better-educated households are not only more financially literate, but are also significantly more likely to convert that knowledge into action, benefiting from opportunities in formal investment markets.

These results have strong policy implications. For Morocco's current National Financial Inclusion Strategy (2023– 2030), our evidence suggests that focusing solely on dissemi-nating financial knowledge is unlikely to move the needle on market participation or investment equity. Instead, a holistic approach is needed. Programs must prioritize building financial resilience, especially among low-income households, through incen-tivized savings schemes, debt management tools, and income protection mechanisms. Moreover, behavioral interventions that enhance self-efficacy, such as personalized coaching or simulation-based education, could serve as powerful complements to co-gnitive training.

Equally important are policies aimed at removing structural barriers that prevent lo-wer-income households from acting on their financial knowledge. These include the expansion of accessible and low-cost investment platforms, digital onboarding tools for remote populations, and regulatory incentives that promote inclusive asset-based pro-ducts. The goal should be not just to inform, but to empower, creating conditions where all households, regardless of background, can engage meaningfully with capital markets.

This research has several limitations that open up avenues for future inquiry. Our data, while representative and multi-dimensional, is cross-sectional in nature and cannot ful-ly capture the dynamics of learning, resilience-building, and behavioral change over time. Longitudinal panel data would allow for stronger causal inferences and deeper exploration of financial trajectories. Second, our dependent variable, market participa-tion, is binary and does not capture the scale, diversification, or sophistication of household portfolios. Future studies should examine how financial literacy influences not just participation but quality of investment decisions.

Third, this study treats financial literacy as a unified construct. Recent work suggests that separating financial knowledge, behaviors, and attitudes may uncover deeper in-sights into how specific dimensions influence resilience and participation. Decompo-sing the literacy effect in this way would allow for highly targeted policy recommenda-tions. Finally, we have not explicitly modeled the moderating role of digital financial access or trust in institutions, two variables likely to shape behavior in emerging mar-kets like Morocco. Future research should incorporate these elements to better unders-tand the modern pathways to financial inclusion.

In conclusion, advancing financial inclusion in Morocco, and by extension, in similar contexts, requires a shift in policy paradigm: from knowledge-based outreach to em-powerment-based resilience building. Market participation is not merely a matter of knowing what to do, but of feeling capable and secure enough to act, and of having the structural means to do so. Only by integrating cognitive, psychological, and institutio-nal levers can we move toward truly inclusive financial systems that turn knowledge into opportunity for all.

References

[1]   L. Klapper and A. Lusardi, "Financial literacy and financial resilience: Evidence from around the world," *Financial Management,* vol. 49, no. 3, pp. 589-614, 2020.

[2]   A. Lusardi and O. S. Mitchell, "The economic importance of financial literacy: Theory and evidence," *American Economic Journal: Journal of Economic Literature,* vol. 52, no. 1, pp. 5-44, 2014.

[3]   D. Erdem and J. Rojahn, "The influence of financial literacy on financial resilience–New evidence from Europe during the COVID-19 crisis," *Managerial Finance,* vol. 48, no. 9/10, pp. 1453-1471, 2022.

[4]   M. Van Rooij, A. Lusardi, and R. Alessie, "Financial literacy and stock market participation," *Journal of Financial Economics,* vol. 101, no. 2, pp. 449-472, 2011.

[5]   A. Grohmann, "Financial literacy and financial behavior: Evidence from the emerging Asian middle class," *Pacific-Basin Finance Journal,* vol. 48, pp. 129-143, 2018.

[6]   Z. Liu, J.-K. Chen, and J. J. Xiao, "Financial resilience: A scoping review, conceptual synthesis and theoretical framework," *International Journal of Bank Marketing,* vol. 43, no. 7, pp. 1541–1576, 2025.

[7]   M. Kaustia, A. Conlin, and N. Luotonen, "What drives stock market participation? The role of institutional, traditional, and behavioral factors," *Journal of Banking & Finance,* vol. 148, p. 106743, 2023.

[8]   A. Ndou, "The moderator effect of socioeconomic status on the relationship between parental financial teaching and financial literacy," *International Journal of Applied Economics, Finance and Accounting,* vol. 17, no. 2, pp. 219-227, 2023.

[9]   J. Y. Campbell, "Household finance," *Journal of Finance* vol. 61, no. 4, pp. 1553–1604, 2006.

[10]   C. Gollier, *What does classical theory have to say about household portfolios?," in Household Portfolios, L. Guiso, M. Haliassos, and T. Jappelli.* Cambridge, MA, USA: MIT Press, 2002.

[11]   J. F. Cocco, F. J. Gomes, and P. J. Maenhout, "Consumption and portfolio choice over the life cycle," *The Review of Financial Studies,* vol. 18, no. 2, pp. 491-533, 2005.

[12]   H. A. Simon, *An empirically based microeconomics.* Cambridge, U.K: Cambridge Univ. Press, 1997.

[13]   K. Barrafrem, G. Tinghög, and D. Västfjäll, "Behavioral and contextual determinants of different stages of saving behavior," *Frontiers in Behavioral Economics,* vol. 3, p. 1381080, 2024.

[14] Y.-L. Hsu, H.-L. Chen, P.-K. Huang, and W.-Y. Lin, "Does financial literacy mitigate gender differences in investment behavioral bias?," *Finance Research Letters,* vol. 41, p. 101789, 2021.

[15] A. Lusardi and O. S. Mitchell, "The importance of financial literacy: Opening a new field," *Journal of Economic Perspectives,* vol. 37, no. 4, pp. 137-154, 2023.

[16] H. M. Shefrin and R. H. Thaler, "The behavioral life-cycle hypothesis," *Economic Inquiry,* vol. 26, no. 4, pp. 609-643, 1988. https://doi.org/10.1111/j.1465-7295.1988.tb01520.xDigital

[17] A. Hasler, A. Lusardi, and N. Oggero, *Financial fragility in the U.S.: Evidence and implications*. Washington, DC, USA,: Glob. Financ. Lit. Excellence Center, 2017.

[18] I. Zouitini, H. El Hafdaoui, H. Chetioui, P.-M. Tardif, and M. Makhtari, "Determinants of sustainable entrepreneurship in Morocco: the role of entrepreneurial orientation, financial literacy, and inclusion," *Journal of Risk and Financial Management,* vol. 17, no. 12, p. 548, 2024. https://doi.org/10.3390/jrfm17120548

[19] P. Makdissi, W. Marrouch, and M. Yazbeck, "Monitoring poverty in a data-deprived environment: The case of Lebanon," *Review of Income and Wealth,* vol. 71, no. 1, pp. 1–24, 2024.

[20] I. Ajzen, "The theory of planned behavior," *Organizational Behavior and Human Decision Processes,* vol. 50, no. 2, pp. 179-211, 1991. https://doi.org/10.1016/0749-5978(91)90020-T

[21] A. Chakir, J. F. Andry, R. Bansal, A. Ulah, O. Durrah, and R. Mamoon, "Using big data and artificial intelligence to enhance smart cities." USA: IGI Global Scientific Publishing, 2024.

[22] J. E. Grable, S. L. Britt, and F. J. Webb, "Environmental and biopsychosocial profiling as a means for describing financial risk-taking behavior," *Journal of Financial Counseling and Planning,* vol. 19, no. 2, pp. 3–18, 2008.

[23] M. Bianchi, "Financial literacy and portfolio dynamics," *The Journal of Finance,* vol. 73, no. 2, pp. 831-859, 2018. https://doi.org/10.1111/jofi.12605Digital

[24] M. Ziz, S. Faris, and K. Mansouri, "Towards an integrated framework for online learning success in moroccan higher education and its relevance to environmental science and technology," *E3S Web of Conferences,* vol. 680, p. 00108, 2025.

[25] A. Bandura, *Self-Efficacy: The exercise of control*. New York, NY, USA: W.H. Freeman, 1997.

[26] C. Estrada-Mejia, D. Mejía, and P. Córdoba, "Financial literacy and financial wellbeing: Evidence from Peru and Uruguay," *Journal of Financial Literacy and Wellbeing,* vol. 1, no. 2, pp. 403-429, 2023.

[27] M. Abreu and V. Mendes, "Information, overconfidence and trading: Do the sources of information matter?," *Journal of Economic Psychology,* vol. 33, no. 4, pp. 868-881, 2012. https://doi.org/10.1016/j.joep.2012.04.003

[28] R. M. Baron and D. A. Kenny, "The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations," *Journal of Personality and Social Psychology,* vol. 51, no. 6, p. 1173, 1986.

[29] A. F. Hayes, *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*, 2nd ed. New York, NY, USA: Guilford Press, 2018.

[30] G. S. Becker, *Human capital: A theoretical and empirical analysis, with special reference to education*, 3rd ed. Chicago, IL, USA: Univ. Chicago Press, 1993.

[31] D. C. North, *Institutions, institutional change and economic performance*. Cambridge, U.K: Cambridge Univ. Press, 1990.

[32] Organisation for Economic Co-operation and Development (OECD), *OECD/INFE core competencies framework on financial literacy for MSMEs*. Paris: OECD Publishing, 2018.

[33] Bank Al-Maghrib, *Annual report 2020 (includes activities of the Financial Education Unit)*. Morocco: Bank Al-Maghrib, Rabat, 2021.

Appendix A.

Financial Literacy Questionnaire.

This appendix presents the standardized set of nine questions used to construct the Objective Financial Literacy Score. The questions were adapted from the Organisation for Economic Co-operation and Development (OECD) [32] and administered consistently across the 2017, 2021, and 2024 survey waves. Each correct answer is scored as 1 point, and incorrect or "Don't know" responses are scored as 0, producing a total score ranging from 0 to 9, where higher values indicate greater financial knowledge.

Code	Question	Correct Answer	Concept Assessed
L1	Suppose you have 100 MAD in a savings account earning 2% interest per year. After 5 years, how much would you have if you left the money to grow?	More than 110 MAD	Compound interest
L2	Imagine that inflation is 3% per year and your savings earn 1% interest. After one year, could you buy more, less, or the same amount as today?	Less than today	Inflation effect
L3	Which of the following statements best describes risk diversification?	Investing in several assets reduces risk	Diversification principle
L4	If you invest in a single company's stock, is it safer than investing in a mutual fund holding many companies?	No	Portfolio diversification
L5	A loan with a longer repayment period but the same interest rate is:	More expensive overall	Cost of borrowing
L6	Which is better for long-term saving: keeping cash at home or using a bank account?	Using a bank account	Safe saving practices
L7	If interest rates rise, what typically happens to bond prices?	They fall	Interest rate–bond price relation
	What is the main purpose of insurance?	Protection against	Risk management

L8		unexpected loss	
L9	A higher return always means higher risk. True or False?	True	Risk–return tradeoff

Individual scores are grouped into three literacy levels:
- Low (0–3) — Basic or insufficient understanding
- Medium (4–6) — Moderate understanding
- High (7–9) — Advanced understanding

The questionnaire's internal consistency is satisfactory (Cronbach's $\alpha = 0.82$), and its cross-wave reliability is strong ($r = 0.76$, $p < 0.01$). It was validated by Bank Al-Maghrib [33] and follows international best practices in financial capability surveys. Interviews were conducted in Arabic (Darija) or French, based on respondent preference, with standardized wording to ensure neutrality and comparability.