

Behavioral Heterogeneity and the Evolution of Financial Decision-Making in Contemporary Markets

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Abstract

This paper examines the relationship between investor behavior, market volatility, and financial decision-making by synthesizing recent contributions from behavioral finance, household finance, market microstructure, sustainable investment, and digital finance. The literature shows that financial decisions cannot be explained exclusively by conventional assumptions of rational expectations and efficient information processing. Investor sentiment, attention, risk perception, overconfidence, personal experience, social interaction, and financial literacy influence portfolio allocation, market participation, and responses to uncertainty. These behavioral mechanisms also contribute to market volatility by affecting trading intensity, herding, disagreement, and reactions to economic or policy shocks. The development of digital trading platforms, social media, crowdfunding, FinTech, and blockchain further modifies the channels through which investors receive information and make financial choices. At the same time, environmental and sustainability preferences increasingly influence portfolio construction and asset pricing. The literature therefore suggests that financial outcomes result from interactions among economic fundamentals, behavioral characteristics, information structures, institutional conditions, and technological change. Understanding these relationships provides a broader framework for explaining heterogeneous investment decisions and short-term market fluctuations.

Keywords: Investor behavior; Market volatility; Behavioral finance; Portfolio choice; Digital finance

JEL classification: G11; G12; G14; G40; G41

Introduction

Financial decision-making has traditionally been examined through models in which investors process available information rationally and allocate resources according to expected returns and risk. However, a substantial body of research demonstrates that observed financial behavior frequently departs from these assumptions. Investor sentiment, attention, subjective expectations, prior experiences, cognitive biases, financial knowledge, and social interaction influence both participation in financial markets and the composition of portfolios. Audrino et al. (2020), Andrei and Hasler (2015), and Da et al. (2015), for example, show that sentiment and investor attention contain information relevant to return and volatility dynamics. Other contributions emphasize the role of behavioral biases and personal experience. Hoffmann et al. (2015) demonstrate that changes in perceived risk and expectations influence investment behavior,



while Andersen et al. (2019) show that financial losses can produce persistent changes in subsequent risk taking. These findings indicate that investors facing similar financial information may reach different decisions because their beliefs, experiences, and psychological characteristics differ. Financial behavior consequently emerges from a combination of objective economic conditions and subjective interpretations of those conditions rather than from a uniform process of optimization.

The behavioral dimension of finance becomes particularly relevant when examining market volatility and the transformation of investment channels. Uncertainty, information-seeking behavior, sentiment, disagreement, and herding can influence the intensity and direction of trading, thereby affecting price variability. Baker et al. (2016) associate economic-policy uncertainty with increased stock-market volatility, while Dimpfl and Jank (2016) demonstrate that internet search activity contains predictive information about subsequent volatility. Crisis conditions can strengthen these mechanisms, as illustrated by Baker et al. (2020), Haroon and Rizvi (2020), and Espinosa-Méndez and Arias (2021) during the COVID-19 period. At the same time, new forms of financial participation have changed how information circulates among investors. Retail brokerage platforms, social media, crowdfunding, FinTech services, and blockchain-based instruments facilitate participation while generating new informational and behavioral mechanisms. Sustainable preferences also increasingly affect investment decisions, as shown by Riedl and Smeets (2017), Pástor et al. (2021), and Pedersen et al. (2021). The purpose of this paper is therefore to examine how investor behavior interacts with volatility and financial choice across conventional and emerging financial environments.

1. Behavioral Foundations of Investor Decision-Making

1.1. Investor Sentiment, Attention, Beliefs and Expectations

Audrino et al. (2020) imply that behavioral variables should be incorporated directly into financial risk assessment because sentiment and investor attention provide additional information for forecasting stock-market volatility. Their findings suggest that behavioral indicators affect not only directional expectations but also the anticipated variability of returns. This implication is consistent with Andrei and Hasler (2015), who show that investor attention interacts with economic uncertainty and strengthens market reactions to information, thereby increasing return variance when attention becomes elevated. Smales (2017) adds that fear-oriented sentiment affects stock-market returns by influencing risk tolerance and precautionary investment behavior, linking psychological conditions to broader market performance. Da et al. (2015) provide a complementary digital measure through their FEARS index, showing that increases in negative internet search activity predict short-term return reversals, higher volatility, and shifts from equities toward safer assets. Taken together, these contributions imply that attention, fear, and digitally expressed sentiment operate through interconnected mechanisms affecting both expected returns and market risk. When uncertainty intensifies investor attention, negative behavioral states can influence portfolio reallocations, strengthen reactions to incoming information, and increase short-term volatility, suggesting that observed market fluctuations partly reflect changes in the behavioral environment surrounding financial decision-making.

Antoniou et al. (2016) imply that conventional measures of systematic risk cannot be interpreted independently of investor sentiment because optimistic market conditions can alter the pricing relationship between beta and expected returns. Their finding that high-beta securities become relatively overpriced during periods of elevated sentiment suggests that investors' willingness to hold risky securities varies with prevailing market psychology. Huang et al. (2015)



reinforce the pricing relevance of sentiment by demonstrating that an aligned measure combining several conventional indicators predicts aggregate stock-market returns once measurement noise is reduced. Renault (2017) extends this relationship to intraday markets by showing that sentiment extracted from StockTwits messages predicts very short-term return patterns, particularly where less sophisticated investors are involved. Giglio et al. (2021) provide direct evidence at the individual level by linking heterogeneous subjective expectations concerning returns and downside risk to actual portfolio allocations and subsequent trades. Together, these studies imply that sentiment influences asset prices through both aggregate and investor-specific channels. Market optimism can distort compensation for systematic risk, digitally expressed mood can affect short-horizon trading, and differences in subjective expectations can translate into heterogeneous portfolio positions, thereby contributing to predictable variation in returns across securities and over time.

Jiang et al. (2019) imply that behavioral expectations relevant to financial markets are not confined to household investors, since managerial optimism extracted from corporate disclosures predicts lower subsequent aggregate returns and has particularly strong effects among difficult-to-value firms. This finding broadens the role of sentiment by indicating that beliefs expressed by corporate decision-makers can convey information associated with subsequent market valuation. Giglio et al. (2021) complement this perspective by demonstrating that investors themselves hold heterogeneous expectations about returns and downside risks and adjust their portfolio allocations and trades accordingly. Huang et al. (2015) show that when common variation across sentiment indicators is isolated effectively, these behavioral conditions possess significant predictive content for aggregate stock returns. Da et al. (2015) further demonstrate that negative household search activity captures changing sentiment that precedes return reversals, volatility increases, and movements toward safer assets. Considered together, these contributions imply that market prices emerge from interacting belief systems rather than from a single representative expectation. Managerial optimism, household sentiment, and heterogeneous investor beliefs can each affect valuation or trading behavior, while improved measurement of these behavioral states helps identify predictable patterns in returns and portfolio adjustment.

1.2. Behavioral Biases, Risk Perception, Experience and Social Influence

Hoffmann et al. (2015) imply that changes in investors' expectations, perceived risk, and risk tolerance translate into observable adjustments in trading behavior and portfolio exposure, indicating that financial decisions evolve with subjective assessments rather than remaining fixed over time. Andersen et al. (2019) reinforce this implication by showing that severe personal financial losses can produce persistent reductions in subsequent risk-taking, suggesting that individual experience modifies future responses to otherwise similar market conditions. Toma (2015) adds that retail investors exhibit systematic biases such as overconfidence and the disposition effect, which can influence trading intensity, security selection, and portfolio risk. Prossad et al. (2015) further demonstrate that cognitive and emotional biases coexist and vary across investors according to personal and investment characteristics. Taken together, these findings imply that investment behavior is shaped by the interaction between subjective expectations, prior financial experiences, and heterogeneous behavioral tendencies. Investors facing the same information may therefore select different levels of risk or trading activity because they interpret expected returns and uncertainty through different psychological and experiential frames. This heterogeneity can persist over time and may become particularly relevant in markets where individual investors represent a substantial share of transactions and repeatedly translate behavioral predispositions into actual portfolio decisions.



Merkle (2017) implies that overconfidence should not be treated as a static investor characteristic because its expression changes according to whether individuals assess future outcomes, past forecasts, or their own informational abilities. This dynamic perspective helps explain why excessive confidence can survive repeated exposure to market feedback. Chang et al. (2016) provide a related implication for the disposition effect by showing that psychological ownership of investment decisions influences the tendency to sell winners more readily than losers and that delegation can modify this behavior. Heimer (2016) extends the argument by demonstrating that social interaction among retail foreign-exchange traders can reinforce the disposition effect rather than eliminate it, indicating that communication does not necessarily correct biased choices. Cookson and Niessner (2020) similarly show that interaction within investor networks does not automatically produce agreement because individuals sort into social groups and continue to hold heterogeneous beliefs. Together, these studies imply that behavioral biases are shaped not only by individual cognition but also by the institutional and social organization of decision-making. Delegation can alter psychological responsibility, peer communication can reinforce existing tendencies, and network formation can sustain disagreement. Consequently, market participation may preserve or amplify behavioral differences even when investors receive feedback, communicate with others, and observe overlapping sets of financial information. Barberis et al. (2018) imply that biased belief formation at the individual level can generate aggregate market instability when investors extrapolate recent price growth too strongly into expectations about future performance. Such behavior can reinforce rising demand, contribute to bubbles, and eventually produce reversals when prices become disconnected from fundamentals. Merkle (2017) complements this mechanism by showing that overconfidence can persist in several forms despite market feedback, suggesting that investors may continue to place excessive weight on their own judgments even after observing previous outcomes. Cookson and Niessner (2020) add that social interaction does not necessarily eliminate heterogeneous expectations, since investor networks can preserve disagreement through selective social connections and persistent belief differences. Heimer (2016) further demonstrates that communication among traders can strengthen the disposition effect, meaning that social environments may transmit or reinforce biased behavior rather than consistently promoting more rational decision-making. Considered together, these contributions imply that market-level anomalies can emerge from interactions between extrapolative expectations, excessive confidence, social reinforcement, and persistent disagreement. Individual biases therefore need not remain isolated portfolio phenomena; when they are sustained or transmitted through investor networks, they can contribute to correlated trading, prolonged deviations in expectations, and broader fluctuations in asset prices.

1.3. Financial Literacy, Advice, Market Participation and Borrowing Decisions

Kaiser et al. (2022) imply that financial capabilities can be improved through intervention, since financial education increases knowledge and produces measurable changes in subsequent financial behavior. This implication complements von Gaudecker (2015), who shows that limited financial literacy is associated with greater portfolio diversification losses, particularly when households also lack access to high-quality professional advice. Financial knowledge therefore affects not only market participation but also the efficiency with which investors allocate their assets. Calcagno and Monticone (2015) qualify the potential compensating role of advice by demonstrating that less informed individuals do not necessarily seek professional assistance, whereas more knowledgeable households may be better able to obtain and use advice effectively. This creates a situation in which those facing the largest knowledge deficits may remain insufficiently supported. Stolper and Walter (2017) broaden this relationship by showing that



the effectiveness of financial advice depends on investor characteristics, possible conflicts of interest, and the institutional environment. Together, these contributions imply that improving investment decisions requires more than increasing access to information. Financial education can strengthen individual capabilities, but its effects are conditioned by investors' willingness and ability to use professional guidance, the quality of that guidance, and the institutional conditions under which financial advice is delivered.

Allgood and Walstad (2016) imply that financial decision-making depends on both actual knowledge and individuals' perceptions of their own financial competence, since subjective knowledge can influence behavior independently of objectively measured literacy. This distinction connects financial literacy with behavioral tendencies because confidence and competence may diverge. Sivaramakrishnan et al. (2017) extend this implication by showing that stock-market participation depends not only on financial knowledge but also on attitudes, perceptions, and behavioral predispositions toward equities. Akhtar and Das (2019) similarly demonstrate that behavioral attitudes, perceived control, and social influences contribute to individual intentions to invest, suggesting that psychological and social factors intervene before investors even enter financial markets. Raut (2020) adds a temporal dimension by showing that past investment behavior contributes to subsequent investment intentions and that financial literacy affects how individuals evaluate participation opportunities. Taken together, these findings imply that financial participation emerges from an interaction between knowledge, self-assessment, attitudes, perceived behavioral control, social influences, and previous experience. Increasing objective literacy alone may therefore be insufficient to eliminate participation gaps when individuals remain reluctant to invest, misjudge their own competence, or form intentions on the basis of prior behavior and subjective perceptions rather than financial knowledge alone.

Ayad et al. (2024) imply that behavioral-finance mechanisms extend beyond securities investment into corporate borrowing decisions, since overconfidence and anchoring increase borrowing propensity among Moroccan SMEs, whereas risk aversion and confirmation bias reduce it. Their findings suggest that managerial financing choices can reflect psychological characteristics alongside conventional economic determinants. Allgood and Walstad (2016) provide a related implication by showing that perceived financial knowledge can influence behavior independently of actual competence, indicating that decision-makers may act partly on how capable they believe themselves to be. Raut (2020) further demonstrates that previous financial behavior contributes to subsequent investment intentions, implying that current decisions are influenced by accumulated experience rather than being formed independently at each decision point. Akhtar and Das (2019) complement this perspective by showing that attitudes, perceived control, and social influences shape intentions to participate in stock markets. Considered together, these contributions imply that both investment and financing decisions are behaviorally conditioned processes in which self-perception, prior experience, attitudes, social influences, and specific cognitive biases affect economic choices. Financial behavior therefore cannot be explained exclusively by access to information or objective financial conditions, because psychological mechanisms may influence whether individuals invest, how they evaluate opportunities, and whether managers decide to increase or limit reliance on external borrowing.

2. Market Volatility and Trading Dynamics

2.1. Uncertainty, Information, Sentiment and Volatility

Baker et al. (2016) imply that uncertainty surrounding economic policy can influence financial markets through both valuation and real-economy channels, since greater policy uncertainty is



associated with higher stock-price volatility and weaker corporate investment and employment. This relationship can be connected to Dimpfl and Jank (2016), who show that internet search activity contains forward-looking information about subsequent market volatility, suggesting that investors' information-seeking behavior may precede changes in market risk. Kumari and Mahakud (2015) add that investor sentiment itself contributes to volatility formation in the Indian stock market, although its influence varies with prevailing market conditions. Siganos et al. (2017) further demonstrate that disagreement among investors can increase both trading volume and volatility even when average sentiment remains relatively stable. Together, these contributions imply that financial-market volatility emerges from several interacting dimensions of uncertainty. Policy ambiguity changes expectations about future economic conditions, search behavior reflects heightened investor attention, sentiment alters risk perceptions, and disagreement converts heterogeneous expectations into greater trading activity. Market risk can therefore increase not only because fundamentals deteriorate but also because investors process uncertain information differently and react through intensified information acquisition and trading, thereby amplifying short-run price variability.

Shen et al. (2017) imply that investor sentiment should not be interpreted entirely as irrational psychology because it contains both components related to underlying economic conditions and components that are less easily explained by fundamentals. This distinction is relevant for understanding how sentiment becomes incorporated into asset prices. Yang and Zhou (2015) complement this perspective by showing that sentiment interacts with actual trading behavior, indicating that psychological assessments affect markets through transactions that alter demand and prices. Dimpfl and Jank (2016) provide a related information channel by demonstrating that increased internet search activity can predict subsequent stock-market volatility, suggesting that heightened attention precedes adjustments in trading and risk. Siganos et al. (2017) add that disagreement among investors produces higher trading volume and volatility because heterogeneous expectations encourage investors to trade against one another. Considered together, these studies imply that the market consequences of sentiment depend on how beliefs are formed, differentiated, and translated into transactions. Some sentiment reflects evolving fundamentals, while other components may contribute to mispricing; at the same time, investor attention determines how intensively information is processed, and disagreement determines the extent to which contrasting beliefs generate trading. Volatility therefore reflects both informational responses and behavioral heterogeneity rather than a single source of investor uncertainty.

Baker et al. (2020) imply that extreme external shocks can produce unusually large financial-market movements when economic consequences, policy responses, and rapidly changing information interact simultaneously. Their evidence from the COVID-19 crisis shows that pandemic-related market fluctuations exceeded those observed during earlier disease outbreaks. Haroon and Rizvi (2020) reinforce the informational dimension of this mechanism by demonstrating that greater pandemic-related media coverage is associated with increased volatility across several sectors, suggesting that news intensity can amplify uncertainty as investors repeatedly reassess evolving conditions. Zhang et al. (2020) broaden this implication internationally by documenting substantial increases in market risk and cross-market instability during the pandemic, accompanied by rapid portfolio adjustments across global financial markets. Baker et al. (2016) provide a related framework by showing that policy uncertainty itself is associated with greater stock-market volatility and weaker real investment. Taken together, these contributions imply that crisis-related volatility is generated by an interaction between external shocks, policy uncertainty, media intensity, and changing investor expectations. During periods of exceptional uncertainty, information arrives rapidly and unevenly, policy responses remain



difficult to anticipate, and investors adjust portfolios across markets simultaneously, producing volatility that reflects both deteriorating economic expectations and intensified reactions to the surrounding information environment.

2.2. Herding, Contagion and Crisis-Driven Volatility

Fei and Liu (2021) imply that herding should be treated as a potential determinant of market volatility rather than merely as a reaction to turbulent conditions, since their direct measure based on cross-sectional stock betas both Granger-causes volatility and improves its forecasting. This implication is consistent with Litimi et al. (2016), who show that herding and excessive risk vary substantially across U.S. stock-market sectors, suggesting that collective behavior is shaped by industry-specific information environments and investor participation. Bouri et al. (2019) extend this relationship to cryptocurrency markets, where valuation uncertainty and weaker fundamental anchors can encourage investors to rely more heavily on the observed actions of others. Vidal-Tomás et al. (2019) further demonstrate that cryptocurrency herding is not constant but emerges under particular market regimes, especially when price movements or uncertainty intensify. Together, these contributions imply that herding is a conditional and heterogeneous source of financial-market risk. Its strength depends on the asset class, sector, and prevailing market environment, while its consequences can extend from correlated trading to higher volatility and nonlinear price movements. Collective behavior therefore becomes especially relevant when investors face limited valuation anchors or heightened uncertainty and increasingly substitute private assessments with signals derived from broader market movements.

Espinosa-Méndez and Arias (2021) imply that severe crises can alter investor decision rules by increasing reliance on market-wide behavior and reducing the weight placed on private assessments. Their finding that COVID-19 strengthened herding in European capital markets suggests that extreme uncertainty can increase cross-security correlation and weaken informational diversity. Dhall and Singh (2020) provide a related implication for India, where stronger industry-level herding emerged after the COVID-19 outbreak despite limited evidence across the broader sample. This sectoral pattern connects with Baek et al. (2020), who show that pandemic-related volatility differed considerably across industries because sectors were exposed differently to changing economic and behavioral conditions. Litimi et al. (2016) reinforce the importance of this cross-sectional perspective by demonstrating that herding and excessive risk are not distributed uniformly across industries. Considered together, these studies imply that crisis-induced behavioral effects should not be interpreted solely at the aggregate-market level. Acute uncertainty may strengthen imitation, but the magnitude of this response depends on sector-specific exposure, information structures, and investor participation. Consequently, aggregate volatility can conceal substantial differences in how collective behavior develops across industries and how strongly it contributes to market instability during periods of exceptional uncertainty.

Engelhardt et al. (2021) imply that institutional trust can moderate market reactions to extreme uncertainty, since countries characterized by higher trust experienced less severe stock-market volatility during COVID-19. Their findings suggest that confidence in institutions may reduce uncertainty about policy implementation and collective responses, thereby limiting panic-driven adjustments in investor behavior. Zaremba et al. (2020) complement this implication by showing across 67 equity markets that more stringent government responses to the pandemic were associated with increased volatility, indicating that investors reacted not only to health developments but also to the anticipated economic consequences of policy interventions. Baek



et al. (2020) add that these effects were heterogeneous across industries, as sector-specific exposure determined how pandemic conditions translated into financial risk. Espinosa-Méndez and Arias (2021) further demonstrate that the crisis strengthened herding in European markets, implying that investors increasingly relied on collective market signals when uncertainty intensified. Together, these contributions imply that crisis volatility emerges from an interaction between policy responses, institutional credibility, sectoral exposure, and investor behavior. Government intervention may increase uncertainty about economic outcomes, while greater institutional trust can moderate these reactions and reduce the tendency for uncertainty to translate into synchronized trading and elevated market volatility.

2.3. Retail Trading, Digital Attention and Market Quality

Barber et al. (2022) imply that investor attention can directly influence security selection and short-term price dynamics, since highly visible stocks on mobile brokerage platforms attract concentrated retail buying followed by identifiable return patterns. This mechanism connects with Broadstock and Zhang (2019), who show that social-media sentiment contains information relevant to intraday stock returns, suggesting that digital communication can rapidly convert changes in collective mood into trading activity. Ante (2023) extends this implication to cryptocurrency markets by demonstrating that highly visible social-media communication can generate significant reactions in prices, trading volumes, and overall market activity. Liu and Tsyvinski (2021) provide a broader explanation for this sensitivity by showing that cryptocurrency returns are strongly related to investor attention and momentum while traditional macroeconomic risk factors have comparatively limited explanatory power. Together, these contributions imply that digital financial environments strengthen the role of attention in market formation. Platform visibility, social-media sentiment, influential public communication, and attention-driven momentum can shape the set of assets investors consider and the timing of their transactions. These mechanisms are particularly relevant when conventional valuation benchmarks are weak, because investors may rely more heavily on salient digital signals and recent price behavior when forming expectations and allocating capital.

Boehmer et al. (2021) imply that retail trading should not be treated simply as uninformed noise, since individual-investor activity contains information about future returns and can influence liquidity and price discovery. Welch (2022) reinforces this interpretation by showing that aggregate Robinhood holdings display meaningful patterns and respond systematically to market events, indicating that retail behavior can combine behavioral tendencies with informative positioning. Ozik et al. (2021) add that increased retail participation during COVID-19 lockdowns improved liquidity in affected stocks, suggesting that household investors can support market functioning under conditions in which other forms of participation are constrained. Eaton et al. (2022), however, qualify this favorable interpretation by showing that brokerage-platform outages produce different market-quality effects depending on the clientele involved. The finding that Robinhood outages can reduce volatility and improve some liquidity measures indicates that retail investors are heterogeneous in sophistication and market impact. Considered together, these studies imply that the consequences of retail participation depend on investor composition, trading environment, and market conditions. Retail investors may provide liquidity and information, but they may also contribute to volatility or weaker market quality when attention-driven or less sophisticated trading becomes concentrated through particular platforms.

Makarov and Schoar (2020) imply that cryptocurrency prices can remain fragmented across trading venues because capital-flow constraints, localized demand, and limits to arbitrage prevent rapid elimination of price differences. This finding connects with Liu and Tsyvinski (2021),



who show that cryptocurrency returns are strongly associated with attention and momentum rather than with conventional macroeconomic risk factors, suggesting that market-specific behavioral forces play an important role in digital-asset valuation. Ante (2023) adds that influential social-media events can rapidly coordinate investor attention and produce abrupt changes in cryptocurrency prices and trading activity. Broadstock and Zhang (2019) provide a comparable mechanism in equity markets by demonstrating that social-media sentiment can affect intraday returns through rapid transmission of collective interpretations. Together, these contributions imply that digital markets are particularly sensitive to the interaction between attention, communication, and market structure. Social-media signals can generate localized or synchronized demand, while fragmented trading venues and arbitrage constraints determine how quickly such demand is incorporated across markets. As a result, short-term price movements may reflect not only changing expectations about underlying value but also the speed of information diffusion, the concentration of investor attention, and institutional limits on the correction of temporary price discrepancies.

3. Financial Decision-Making, Portfolio Choice and New Investment Channels

3.1. Household Portfolio Choice, Wealth, Experience and Risk Taking

Guiso et al. (2018) imply that portfolio behavior cannot be explained solely by changes in wealth or expectations because investors' willingness to bear risk itself varies over time. Their finding that risk aversion rose substantially during the financial crisis suggests that participation in risky assets may decline even when objective financial constraints are held constant. Bach et al. (2020) complement this perspective by showing that wealthier households earn higher investment returns partly because they assume greater systematic risk and possess stronger investment skills. Campbell et al. (2019) similarly demonstrate that stock-market outcomes differ across wealth groups, with more sophisticated households better able to manage diversification and trading decisions. Gomes et al. (2021) place these differences within the broader household-finance literature by emphasizing the combined effects of participation costs, limited knowledge, borrowing constraints, and behavioral factors on saving and portfolio allocation. Taken together, these contributions imply that household investment outcomes emerge from interactions among changing risk preferences, financial sophistication, wealth, and market frictions. Investors exposed to the same financial environment may therefore make substantially different decisions because their tolerance for risk, capacity to diversify, investment knowledge, and access to financial opportunities differ, producing persistent heterogeneity in portfolio performance and potentially contributing to long-term differences in household wealth accumulation.

Malmendier and Nagel (2016) imply that financial expectations are shaped by personal economic histories because individuals place greater weight on inflation outcomes experienced during their own lifetimes, particularly more recent episodes. This experience-based learning can generate persistent differences in expectations across generations even when investors observe the same current macroeconomic information. Kuchler and Zafar (2019) reinforce this implication by showing that individuals use salient local experiences when forming beliefs about broader economic conditions, despite the limited representativeness of those experiences for aggregate outcomes. Choi and Robertson (2020) add that actual portfolio choices reflect heterogeneous considerations involving perceived risks, expected returns, past performance, and personal beliefs, rather than a single common investment objective. Hirshleifer et al. (2018) broaden the range of subjective influences by demonstrating that culturally salient superstitious



beliefs can affect economically significant financial decisions even when the underlying symbolic information lacks conventional fundamental value. Considered together, these studies imply that investor expectations are constructed through personal histories, local experiences, individual motives, and culturally embedded beliefs. Consequently, apparently similar households may reach different saving, borrowing, and portfolio decisions because they assign different weights to experienced events, subjective assessments, and non-fundamental signals when interpreting financial opportunities and risks.

Frydman et al. (2018) imply that investors do not always evaluate financial assets as components of an integrated portfolio because rolling mental accounts cause prior gains and losses to be assessed within changing reference structures. This behavior can alter realization decisions and contribute to persistent departures from optimal portfolio management. Choi and Robertson (2020) complement this implication by showing that investors themselves report multiple motives behind their portfolio choices, including expected returns, risk perceptions, prior performance, and personal beliefs. Guiso et al. (2018) further demonstrate that risk aversion varies with economic conditions, indicating that the subjective evaluation of portfolio alternatives may change substantially during periods of financial stress. Malmendier and Nagel (2016) add that expectations are influenced by lifetime economic experiences, meaning that investors interpret current financial conditions through personal historical reference points. Together, these contributions imply that portfolio decisions depend on how individuals frame previous outcomes, evaluate current risk, and interpret economic information through accumulated experience. Mental accounting can affect the treatment of gains and losses, changing risk preferences can modify willingness to retain risky assets, and experience-based beliefs can shape expectations about future conditions. Financial choices therefore reflect evolving subjective reference points rather than a stable and uniform process of portfolio optimization.

3.2. Sustainable Preferences and Investor Decision-Making

Pástor et al. (2021) imply that sustainable investment preferences can affect equilibrium asset prices because investors derive utility from holding green assets and respond to changes in environmental concerns. Their framework suggests that stronger demand for sustainable securities can raise their prices and lower expected returns, while unexpected shifts in environmental preferences can generate temporary outperformance. Riedl and Smeets (2017) provide complementary empirical evidence by showing that investors hold socially responsible mutual funds partly because of non-pecuniary preferences, even when they do not expect superior financial performance. Bauer et al. (2021) reinforce this interpretation experimentally, demonstrating that individual investors are willing to adopt more sustainable investment policies despite potential financial trade-offs. Pedersen et al. (2021) integrate these considerations into portfolio construction through the ESG-efficient frontier, where sustainability characteristics can enter as preferences, information about fundamentals, or constraints. Taken together, these contributions imply that portfolio choice cannot always be represented solely as an optimization between expected return and financial risk. Sustainable characteristics can modify investor utility, alter security demand, and reshape portfolio allocation, while the financial consequences depend on whether ESG considerations reflect intrinsic preferences, expected economic effects, or restrictions imposed on investment opportunities.

Krueger et al. (2020) imply that environmental considerations increasingly influence institutional portfolios because investors interpret climate exposure as a financially relevant source of risk rather than solely as an ethical issue. Their evidence that institutions use risk management, engagement, and investment strategies to address climate change suggests that expectations about environmental exposure can influence valuation and capital allocation. Bolton and



Kacperczyk (2021) complement this implication by showing that corporate carbon emissions are associated with differences in stock returns, indicating that investors require compensation for carbon-related exposure and/or adjust demand away from carbon-intensive firms. Gibson Brandon et al. (2021) add that incorporating sustainability into investment decisions introduces informational uncertainty because disagreement among ESG-rating providers is associated with higher stock returns, particularly where environmental assessments diverge. Pedersen et al. (2021) provide a framework for interpreting these relationships by showing that ESG information can affect optimal portfolios when it conveys signals about fundamentals or modifies investor constraints and preferences. Considered together, these studies imply that sustainable investing involves both risk assessment and information processing. Climate exposure can affect expected returns, carbon characteristics can influence security selection, and disagreement over ESG quality can create additional uncertainty that investors must incorporate when constructing portfolios and determining required compensation.

Hartzmark and Sussman (2019) imply that the salience and presentation of sustainability information can materially alter capital allocation, since the introduction of easily interpretable Morningstar sustainability ratings led investors to shift money toward highly rated funds and away from poorly rated alternatives. Ammann et al. (2019) provide closely related evidence showing that high-rated retail funds received greater net inflows after sustainability ratings were introduced, whereas poorly rated funds experienced withdrawals, with weaker reactions among institutional investors. These findings suggest that standardized ESG indicators reduce information-processing costs and make non-financial fund characteristics more visible during portfolio selection. Riedl and Smeets (2017) provide an underlying behavioral explanation by showing that investors possess genuine social preferences that can motivate holdings of responsible funds even without expectations of superior financial returns. Gibson Brandon et al. (2021), however, demonstrate that ESG information is not necessarily uniform, since substantial disagreement across rating providers creates uncertainty that is associated with differences in required stock returns. Together, these contributions imply that investor responses to sustainability depend both on underlying preferences and on the quality, comparability, and salience of available ESG information. Standardized ratings can facilitate sustainable portfolio allocation, while disagreement among information providers can complicate valuation and introduce additional uncertainty into investment decisions.

3.3. Crowdfunding, FinTech and Blockchain-Based Financial Decisions

Hornuf and Schwienbacher (2018) imply that investment decisions in equity crowdfunding are shaped by social learning as well as by information supplied directly by entrepreneurs. Their finding that investors respond to updates, comments, and the investment behavior of other participants suggests that uncertain project valuation encourages individuals to use observable crowd behavior as an additional informational input. Ahlers et al. (2015) provide a related signaling perspective by showing that entrepreneurial equity retention and detailed risk disclosure increase the probability of attracting financing, indicating that credible signals can reduce information asymmetry between entrepreneurs and dispersed investors. Vismara (2016) extends this relationship by demonstrating that retained ownership also influences participation while online social networks contribute to funding dynamics. Block et al. (2018) further show that campaign updates increase both the number and value of investments and that communication effectiveness depends on timing, content, and language accessibility. Taken together, these contributions imply that digital financing decisions emerge from the interaction between credible entrepreneurial signals, socially transmitted information, and communication design. Investors confronted with uncertain ventures do not rely exclusively on project fundamentals;



they also interpret ownership commitments, risk disclosures, campaign updates, network activity, and other investors' behavior when deciding whether and how much capital to provide. Errassaa et al. (2023) imply that SME adoption of crowdfunding depends on informational and behavioral conditions in addition to conventional financing constraints, since knowledge, favorable perceptions, social-network strength, perceived risk, and digitalization influence adoption while restricted access to bank credit does not automatically increase crowdfunding demand. This implication connects with Ait Hbib et al. (2021), who show that FinTech adoption among individuals in Morocco's informal sector is shaped by perceived relative advantage, compatibility, complexity, and observability, whereas trialability does not have a comparable effect. Ait Hbib et al. (2024) extend this reasoning to Moroccan SMEs by demonstrating that B2B FinTech-platform adoption reflects expected cost reductions, improved financing access, market expansion, firm size, innovation culture, and government support. Makhrouf et al. (2024) further show that blockchain-adoption intentions depend on perceived complexity, costs, regulatory risk, compatibility, experimentation opportunities, regulatory trust, and financing access. Together, these studies imply that digital-finance adoption cannot be explained by financial need or technological availability alone. Individuals and firms evaluate new financial technologies through perceived usefulness, compatibility, uncertainty, organizational readiness, institutional support, and social conditions, meaning that adoption occurs when expected benefits sufficiently outweigh technological, regulatory, and implementation constraints.

Makhrouf et al. (2024) imply that perceived uncertainty plays a central role in emerging-technology decisions because complexity, implementation costs, and regulatory risk discourage blockchain adoption among Moroccan SMEs, whereas compatibility and opportunities for experimentation encourage acceptance. Errassaa et al. (2023) provide a comparable implication for crowdfunding by showing that perceived risk influences adoption alongside knowledge, favorable perceptions, network strength, and digitalization, suggesting that alternative-finance decisions require both informational preparedness and confidence in the financing mechanism. Ait Hbib et al. (2024) add that expected economic benefits, including cost reductions, financing access, and market expansion, interact with organizational characteristics and government support when firms evaluate B2B FinTech platforms. Ahlers et al. (2015) provide a related investor-side perspective by demonstrating that credible disclosure and entrepreneurial equity retention can mitigate information asymmetry in equity crowdfunding. Considered together, these contributions imply that digital financial markets depend on mechanisms capable of reducing uncertainty on both sides of financing relationships. Firms must perceive technological and institutional conditions as sufficiently manageable to adopt new platforms, while investors require credible signals to assess uncertain projects. Digital-finance expansion therefore depends on the joint management of information asymmetry, perceived risk, organizational readiness, regulatory confidence, and expected economic benefits.

4. Discussion

The literature first demonstrates that investor behavior is fundamentally heterogeneous and that this heterogeneity has direct implications for financial decisions. Hoffmann et al. (2015) show that expectations, perceptions of risk, and risk tolerance vary over time and translate into changes in trading and portfolio exposure. This dynamic interpretation is reinforced by Andersen et al. (2019), whose findings indicate that severe financial losses can reduce subsequent willingness to assume risk. Behavioral biases further modify these responses. Merkle (2017) shows that overconfidence can take different forms depending on the judgment being made, while Chang et al. (2016) and Heimer (2016) demonstrate that the disposition effect is affected by psychological ownership and social interaction. Financial knowledge does not fully eliminate



such heterogeneity. Kaiser et al. (2022) find that financial education improves knowledge and financial behavior, whereas Calcagno and Monticone (2015) show that individuals with limited financial knowledge do not necessarily compensate by obtaining professional advice. Allgood and Walstad (2016) further distinguish objective knowledge from perceived competence. Taken together, these studies indicate that investment choices reflect interactions among information, confidence, experience, risk perception, social influences, and financial capabilities. This helps explain why individuals exposed to comparable investment opportunities may adopt substantially different strategies.

A second major result concerns the transmission of behavioral conditions into market volatility. Baker et al. (2016) show that economic-policy uncertainty is associated with higher stock-price volatility, while Kumari and Mahakud (2015) identify investor sentiment as an additional determinant whose influence varies according to market conditions. Siganos et al. (2017) demonstrate that disagreement itself can increase trading volume and volatility because investors holding heterogeneous expectations trade more intensively against one another. These mechanisms become stronger during periods of crisis. Baker et al. (2020) document exceptional financial-market movements during COVID-19, while Haroon and Rizvi (2020) associate greater pandemic-related media coverage with stronger sectoral volatility. Herding provides another channel. Fei and Liu (2021) find that herding contains predictive information for volatility, whereas Espinosa-Méndez and Arias (2021) show that the pandemic strengthened herding in European capital markets. Institutional conditions can nevertheless moderate market reactions. Engelhardt et al. (2021) report that countries characterized by greater institutional trust experienced less severe volatility during COVID-19. The combined evidence therefore indicates that market volatility reflects not only changing fundamentals but also the manner in which investors interpret uncertainty, observe other participants, process information, and respond collectively to exceptional events.

A third contribution of the literature is to show that financial decision-making is being transformed by digitalization and by the widening range of investor objectives. Barber et al. (2022) demonstrate that visibility on mobile brokerage platforms influences retail stock purchases, while Broadstock and Zhang (2019) show that social-media sentiment contains information relevant to intraday returns. In cryptocurrency markets, Liu and Tsyvinski (2021) emphasize the importance of investor attention and momentum, and Ante (2023) shows that highly visible social-media events can affect prices and trading activity. Similar informational mechanisms arise in alternative financing. Ahlers et al. (2015) demonstrate that equity retention and detailed risk disclosure provide credible signals to crowdfunding investors, while Hornuf and Schwienbacher (2018) show that investors also respond to updates and other participants' behavior. Investor objectives are simultaneously broadening beyond conventional financial returns. Riedl and Smeets (2017) identify non-pecuniary motives for socially responsible investment, and Pástor et al. (2021) show theoretically how sustainable preferences can influence equilibrium asset prices. Pedersen et al. (2021) further integrate ESG characteristics into portfolio selection. Modern financial decisions therefore combine behavioral preferences, digital information, technological infrastructures, social signals, and increasingly diverse definitions of investment value.

Conclusion

The reviewed literature confirms that investor behavior constitutes an important component of financial-market dynamics and cannot be separated from the study of portfolio choice and volatility. Investors differ in their expectations, perceptions of risk, financial experience, knowledge, confidence, and sensitivity to social information. These differences influence



whether individuals participate in financial markets, which assets they select, how frequently they trade, and how they respond to gains, losses, and uncertainty. Behavioral conditions also affect aggregate outcomes when individual reactions become correlated. Sentiment, disagreement, attention, and herding can intensify trading activity and contribute to short-term fluctuations in asset prices. Crisis periods make these relationships particularly visible because rapidly changing information and heightened uncertainty encourage investors to reassess expectations and, in some cases, rely more strongly on market-wide signals. The evidence therefore supports an interpretation of financial markets in which observed prices and volatility arise from interactions between fundamental information and heterogeneous behavioral responses. Traditional financial determinants remain important, but their effects are mediated by the ways investors perceive, interpret, and act upon economic and financial information.

The development of new investment channels further reinforces the need for an integrated approach to financial decision-making. Digital brokerage platforms and social media increase the speed with which attention and sentiment can be converted into transactions, while crowdfunding and FinTech platforms introduce new mechanisms of signaling, social learning, and perceived technological risk. Blockchain and cryptocurrency markets additionally illustrate how attention, regulatory uncertainty, market structure, and limited valuation anchors can interact in emerging financial environments. Sustainable investing introduces another dimension by showing that investors may pursue environmental and social objectives alongside expected financial performance. The resulting financial system is therefore characterized by a wider diversity of participants, information sources, technologies, and preferences. Future research can build on these findings by examining how behavioral characteristics interact with institutional quality, digital financial literacy, platform design, regulation, and changing market structures. Greater attention to differences across investor categories and financial environments may also clarify why comparable information or shocks generate different responses across countries, sectors, and asset classes. Such an approach provides a more comprehensive understanding of contemporary financial decision-making and the behavioral mechanisms underlying market volatility.

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