

Beyond Loss Aversion and Liquidity Traps: A Behavioural Stated Choice Analysis of Speculation, Over-Leverage, and Residential Housing Prices in Kenya's Affordable Housing Agenda

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Abstract

The global residential housing crisis has increasingly been attributed to behavioural anomalies rather than to purely rational market forces. Yet, the empirical integration of loss aversion, over-leverage, and liquidity dynamics within emerging African housing markets remains critically underdeveloped. This study advances a comprehensive behavioural framework for understanding residential housing price determination in Kenya, drawing on stated choice (SC) methods and prospect theory to analyse how loss aversion interacts with over-leverage and liquidity constraints to drive speculative price distortions. Analysing data from 234 real estate investors through real estate agents in Kenya, by using a multi-stage approach, the research employs hierarchical regression and mediation analysis to examine how psychological expectations mediate the relationship between microeconomic indicators and residential housing prices. Findings reveal that locational attributes exert the strongest influence on housing prices ($\beta = 0.846$, $p < 0.001$), while psychological expectations mediate price formation, with emotional biases ($\Delta R^2 = 0.089$) demonstrating stronger mediating influence than cognitive errors ($\Delta R^2 = 0.082$). Critically, loss aversion emerges as a dominant behavioural driver, explaining investor reluctance to sell depreciating assets and amplifying over-leverage during market peaks. The study proposes an integrated behavioural framework for Kenya's Affordable Housing Agenda, incorporating: (1) financial literacy strategies targeting loss aversion and overconfidence biases, (2) regulatory measures including counter-cyclical loan-to-value ratios and liquidity requirements to mitigate speculative herding, and (3) choice architecture modifications leveraging stated choice insights to enhance market efficiency. The findings challenge traditional rational market assumptions, demonstrating that behavioural factors systematically distort residential housing price formation in emerging African contexts, with significant implications for policy, valuation practice, and investment strategy.

Keywords: Loss Aversion, Over-leverage, Liquidity, Stated Choice Methods, Residential Housing Prices, Behavioural Economics, Affordable Housing, Kenya, Prospect Theory, Financial Literacy

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1. Introduction

1.1 The Behavioural Foundations of Residential Housing Price Volatility

The persistent global residential housing crisis has prompted a paradigm shift in economic thinking, moving beyond traditional rational choice models toward behavioural frameworks that recognise systematic psychological influences on market dynamics (Tomal & Brzezicka, 2024; Bao, 2024). Nowhere is this shift more urgently needed than in emerging African housing markets, where rapid urbanisation, institutional weaknesses, and information asymmetries create fertile ground for behavioural distortions. Kenya exemplifies this phenomenon, with Nairobi experiencing annual housing price growth exceeding 10% in prime suburbs while the national housing deficit reaches approximately 2 million units (Centre for Affordable Housing Finance in Africa, 2020).

Traditional hedonic pricing models, grounded in rational expectations and efficient market hypotheses, have proven inadequate to explain the magnitude and persistence of price deviations from fundamental determinants such as construction costs, population growth, and income levels (Li & Man, 2022). The global financial crisis of 2008-2009 provided a stark demonstration that housing markets are susceptible to speculative bubbles driven by psychological factors, overconfidence during booms, panic during busts, and systematic mispricing of risk (Khalil, 2024). Yet, despite growing recognition of behavioural factors, empirical integration of key behavioural constructs, particularly loss aversion, over-leverage, and liquidity, within housing market analysis remains fragmented, with limited application to African contexts.

1.2 Loss Aversion, Over-Leverage, and Liquidity: An Integrated Framework

Loss aversion, a cornerstone of prospect theory, describes the psychological tendency whereby individuals feel the pain of losses approximately twice as intensely as the pleasure of equivalent gains (Kahneman & Tversky, 1979). This asymmetry fundamentally shapes housing price behaviour: loss-averse homeowners resist selling properties below purchase prices, leading to reduced transaction volumes during downturns (the "disposition effect"), while loss-averse investors hold losing positions too long and sell winning positions too soon (Korteling & Toet, 2022). In housing markets, loss aversion manifests through seller reluctance to accept nominal losses, creating downward price stickiness and contributing to market illiquidity during crises.

Over-leverage, the accumulation of excessive debt relative to equity or income, represents the amplification mechanism that transforms behavioural biases into systemic risk (Čirjevskis, 2021). During boom periods, overconfidence and herding behaviour drive investors to increase leverage, magnifying returns in rising markets. However, this same leverage magnifies losses during downturns, triggering margin calls, forced selling, and cascading price declines. The procyclical nature of leverage, highest at market peaks when risk is greatest, creates a vulnerability that interacts dangerously with loss aversion: when prices fall, loss-averse investors refuse to sell, but lenders force sales through margin calls and loan covenants, creating a liquidity crisis that accelerates price declines.

Liquidity, comprising both market liquidity (ease of selling assets without price discounts) and funding liquidity (availability of cash to meet obligations), represents the transmission channel through which loss aversion and over-leverage generate market crises (Beck, Levine, & Toma, 2024). A liquidity crisis occurs when funding liquidity dries up (lenders refuse to roll over debt), forcing market participants to sell assets into illiquid markets, where loss-averse sellers face the painful choice between accepting losses or defaulting on obligations. The interaction among these three concepts creates a destructive cycle: loss aversion → reluctance to sell → over-leverage → vulnerability to shocks → liquidity crisis → forced selling → price declines → intensified loss aversion.

1.3 Kenya's Affordable Housing Agenda: Behavioural Blind Spots

Kenya's Affordable Housing Agenda, launched in 2017 as a flagship initiative under the Big Four development plan, aims to deliver 500,000 affordable housing units through public-private partnerships, tax incentives, and streamlined approval processes (Kuria, 2024). However, implementation has faced persistent obstacles: land acquisition challenges, infrastructure deficits, financing constraints, and coordination failures among stakeholders. Critically, the policy framework has largely ignored behavioural dimensions that shape housing demand, price expectations, and investment decisions.

Evidence suggests that Kenyan real estate investors and valuers rely heavily on heuristics and cognitive shortcuts, leading to systematic valuation errors (Cheloti & Mooya, 2024). Financial literacy remains low among potential homebuyers, limiting their ability to evaluate housing options and navigate complex financing arrangements (Kuria, 2024). Speculative behaviour, driven by herding and overconfidence, contributes to price volatility in prime Nairobi suburbs and other urban areas. Loss aversion may explain why many potential homebuyers remain in rental accommodation rather than committing to homeownership; the fear of making an irreversible purchase mistake outweighs potential long-term benefits. Over-leverage among diaspora investors, facilitated by easy credit and overoptimistic appreciation expectations, amplifies price volatility. Liquidity constraints, particularly limited mortgage market development and high transaction costs, create barriers to entry and exit that exacerbate behavioural distortions.

1.4 Stated Choice Methods: A Framework for Behavioural Housing Analysis

Stated choice (SC) methods offer a robust framework for understanding and predicting individual decision-making behaviour in housing markets where revealed preference data are limited or unavailable (Louviere, Hensher, & Swait, 2000). Grounded in random utility theory and Lancaster's characteristic theory of value, SC methods enable researchers to decompose complex housing choices into constituent attributes, estimate the marginal utility of each attribute, and derive willingness-to-pay estimates for non-market attributes. Critically, SC methods can incorporate psychological constructs, loss aversion parameters, overconfidence measures, and liquidity preferences into choice models, enabling quantification of behavioural influences on housing decisions.

1.5 Problem Statement

The global residential housing crisis has intensified markedly over the past decade, characterised by escalating prices, declining affordability, and persistent supply-demand imbalances across both developed and emerging economies. Kenya exemplifies this phenomenon acutely, with Nairobi experiencing annual housing price growth exceeding 10% in prime suburbs while the national housing deficit has reached approximately 2 million units. Traditional economic models,

grounded in rational choice theory and efficient market hypotheses, have proven systematically inadequate to explain these dynamics, as price fluctuations frequently deviate from fundamental determinants such as construction costs, population growth, GDP and income levels.

The limitations of traditional frameworks have shifted scholarly focus toward behavioural factors in housing markets. Increasingly, research shows that cognitive biases such as anchoring, availability heuristics, and confirmation bias systematically affect property valuations and transaction decisions, often without considering microeconomic indicators like structural attributes and neighbourhood characteristics. Similarly, emotional biases like overconfidence and herding behaviour tend to intensify price volatility and contribute to speculative bubbles, again without detailed attention to microeconomic factors. Nevertheless, three key behavioural constructs remain notably absent from empirical housing research, particularly within African contexts: loss aversion, where individuals fear losses more than they value equivalent gains; over-leverage, excessive debt financing that increases both potential returns and vulnerability to price corrections; and liquidity constraints, limitations on an investor's ability to convert assets into cash without significant value loss. These omissions are consequential, as these three factors collectively drive speculative dynamics in housing markets, loss aversion creates asymmetric price responses, over-leverage magnifies cycle amplitude, and liquidity constraints determine the feasibility of timely market exit.

Kenya presents a particularly compelling case for examining these behavioural determinants. The country's rapid urbanisation, expanding middle class, and significant diaspora investment flows have created complex market dynamics where psychological factors may exert disproportionate influence. Moreover, Kenya's Affordable Housing Agenda, launched in 2017 as a flagship initiative aiming to deliver 500,000 affordable housing units, continues to face implementation challenges partly attributable to insufficient understanding of how behavioural factors, specifically loss aversion, over-leverage, and liquidity, shape housing demand and price expectations. Without integrating these constructs into analytical frameworks, policymakers remain ill-equipped to address speculative pressures that undermine affordability objectives.

1.6 Research Gap

The existing literature reveals three critical gaps that this study addresses. First, while stated choice (SC) methods have been extensively applied to housing preference analysis in developed economies, generating substantial insights into preferences for environmental amenities, transportation accessibility, and neighbourhood characteristics, their application to African housing markets remains exceptionally rare. This gap is particularly problematic given that African contexts feature less developed data infrastructure and substantially different market dynamics than Western or Asian settings where most evidence derives. Second, despite growing recognition of behavioural factors in housing economics, no existing studies have systematically examined how psychological expectations, specifically cognitive errors and emotional biases, including loss aversion, mediate the relationship between objective microeconomic indicators (locational, structural, and neighbourhood attributes) and residential housing prices. This mediating role is crucial because psychological filters may systematically distort how objective attributes translate into perceived value and transaction prices. Third, and most critically for this study, no research has integrated SC methods with behavioural mediation analysis to isolate the relative influence of loss aversion, over-leverage, and liquidity concerns on residential housing price determination compared to other behavioural factors such as anchoring, herding, or overconfidence. Furthermore, no empirical framework exists for translating these behavioural insights into regulatory and financial literacy interventions within Kenya's Affordable Housing Agenda. This study directly addresses these interconnected gaps by developing and testing an integrated behavioural stated choice model specific to the Kenyan housing market.

1.7 Research Questions and Objectives

This study addresses the following research questions:

- What is the effect of microeconomic indicators (locational, structural, and neighbourhood attributes) on residential housing prices in Kenya?
- How do psychological expectations (cognitive errors and emotional biases, including loss aversion) mediate the relationship between microeconomic indicators and residential housing prices?
- What relative influence do loss aversion, over-leverage, and liquidity concerns exert on residential housing price determination compared to other behavioural factors?
- How can behavioural insights, specifically addressing loss aversion, over-leverage, and liquidity, be integrated into Kenya's Affordable Housing Agenda through financial literacy strategies and regulatory measures?

1.8 Article Structure

The remainder of this article proceeds as follows. Section 2 presents a comprehensive theoretical framework integrating loss aversion, over-leverage, and liquidity within stated choice methodology. Section 3 reviews existing literature on behavioural housing economics, with critical attention to gaps in African research. Section 4 describes the methodology, including SC experiment design, sampling procedures, and analytical approach. Section 5 presents results, emphasising mediation effects and behavioural influences. Section 6 discusses findings, integrating loss aversion, over-leverage, and liquidity dynamics into Kenya's Affordable Housing Agenda. Section 7 concludes with policy recommendations and future research directions.

2. Literature Review

2.1 Theoretical Framework: Integrating Loss Aversion, Over-Leverage, and Liquidity

Prospect Theory and Loss Aversion in Housing Markets

Prospect theory, developed by Kahneman and Tversky (1979), fundamentally challenged expected utility theory by demonstrating that individuals evaluate outcomes relative to reference points rather than absolute wealth levels, exhibit diminishing sensitivity to outcomes as they deviate from reference points, and display loss aversion, the asymmetric weighting of losses versus gains. The value function in prospect theory is steeper for losses than for gains, typically by a factor of approximately 2:1, meaning the pain of losing KSh 100,000 is roughly twice the pleasure of gaining KSh 100,000. In housing markets, loss aversion manifests through multiple mechanisms:

The Disposition Effect: Loss-averse homeowners resist selling properties below purchase prices, even when market conditions suggest lower valuations are appropriate (Węgrzyn & Kuta, 2024). This creates price stickiness downward, reduced transaction volumes during downturns, and accumulation of unsold inventory that eventually forces price adjustments.

Reference Point Dependence: Purchase prices become psychological anchors that influence subsequent selling decisions, even when rational analysis would suggest ignoring sunk costs (Meng, 2023). Homeowners who purchased at market peaks become "locked in," unable to sell without realising nominal losses, reducing labour mobility and economic efficiency.

Endowment Effect: Ownership increases the perceived value of properties, creating a gap between willingness-to-accept (selling price) and willingness-to-pay (buying price) that exceeds transaction cost explanations (Khalil, 2024). This effect is stronger for properties with emotional significance or long ownership duration.

Regret Aversion: Fear of making wrong decisions, selling before further price increases or buying before price declines, paralyses decision-making, leading to inaction even when expected value calculations favour the transaction (Cascão, Quelhas, & Cunha, 2023).

Over-Leverage: The Amplification Mechanism

Over-leverage refers to situations where borrowers accumulate debt levels that exceed sustainable capacity based on income, assets, or collateral values (Čirjevskis, 2021). In housing markets, over-leverage typically manifests through high loan-to-value (LTV) ratios, debt-to-income ratios that exceed prudent thresholds, or reliance on variable-rate mortgages that create vulnerability to interest rate shocks.

Behavioural drivers of over-leverage include:

Overconfidence: Investors systematically overestimate their ability to predict market movements, identify undervalued properties, and time market cycles (Ahmad & Shah, 2022). Overconfident investors take larger positions, use more leverage, and trade more frequently than rational benchmarks suggest.

Optimism Bias: Individuals systematically overestimate positive outcomes and underestimate negative possibilities, leading to underweighting of downside risks in leverage decisions (Perumandla & Bhattacharyya, 2024). Homebuyers may overestimate future income growth or property appreciation, justifying higher leverage than prudent.

Herding: Social pressure and information cascades drive investors to mimic the observed behaviour of others, particularly during boom periods when early movers appear successful (Nikpey Pesyan et al., 2024). Herding concentrates leverage in specific locations or property types, creating localised bubbles.

Money Illusion: Borrowers may focus on nominal interest rates rather than real rates, particularly during inflationary periods, underestimating the long-term cost of debt (Pathak & Thapa, 2024).

The procyclical nature of leverage, amplifying returns in up markets and losses in down markets, creates a financial accelerator mechanism. During booms, rising collateral values enable further borrowing, driving additional price increases. During busts, falling collateral values trigger margin calls and forced selling, accelerating price declines.

Liquidity: The Transmission Channel

Liquidity operates at two interconnected levels in housing markets:

Market Liquidity: The ease with which properties can be sold without significant price discounts, determined by transaction volume, search costs, information availability, and market depth (Beck et al., 2024). Housing markets typically exhibit lower liquidity than financial markets due to heterogeneity, information asymmetry, and transaction costs.

Funding Liquidity: The availability of cash or credit to meet financial obligations, including mortgage payments, margin calls, and development costs (Li & Man, 2022). Funding liquidity depends on income stability, access to credit markets, and central bank policies.

The interaction between market and funding liquidity creates vulnerability to liquidity spirals. When funding liquidity declines (e.g., banks tighten lending standards), market participants may be forced to sell assets, increasing market liquidity supply. If market liquidity is insufficient to absorb forced selling without price discounts, prices fall, reducing collateral values, further restricting funding liquidity, and triggering additional forced sales (Brunnermeier & Pedersen, 2009).

Loss aversion intensifies liquidity crises because loss-averse investors resist selling at prices below reference points. However, when lenders issue margin calls or refuse to roll over debt, investors face the choice between accepting losses or defaulting. The resulting forced sales occur at prices that may be substantially below fundamental values, creating buying opportunities for well-capitalised investors but generating losses for forced sellers.

The Destructive Cycle: Integrating the Three Concepts

Figure 1 (conceptual) illustrates the cyclical interaction among loss aversion, over-leverage, and liquidity in housing markets:

Phase 1: Boom (Overconfidence → Over-leverage): Low interest rates, easy credit, and positive price momentum generate overconfidence among investors. Herding behaviour drives increased leverage as investors seek to amplify returns. Loss aversion is latent during this phase, as reference prices remain below current market prices.

Phase 2: Peak (Loss Aversion Latent): At market peaks, loss aversion begins to influence behaviour as recent buyers set reference prices near peak levels. However, overconfidence continues to dominate, with most investors expecting continued appreciation.

Phase 3: Downturn (Loss Aversion → Reduced Liquidity): When prices decline, loss-averse sellers resist accepting losses, reducing transaction volume and market liquidity. "Lock-in" effects prevent motivated sellers from transacting, creating inventory accumulation.

Phase 4: Crisis (Over-leverage → Forced Selling → Liquidity Crisis): Highly leveraged investors face margin calls or cannot refinance maturing debt. Forced selling occurs despite loss aversion, as lenders require debt reduction. Increased supply of forced sales drives prices lower, triggering additional margin calls. Market liquidity evaporates as potential buyers anticipate further price declines.

Phase 5: Recovery (Loss Aversion → Slow Recovery): Even after prices stabilise, loss aversion slows recovery as sellers wait to "break even" at reference prices. Transaction volumes remain below normal as bid-ask spreads widen. Recovery requires reference price adjustment through either time (psychological adaptation) or inflation (nominal price increases).



Figure 1: (Own conceptual) – Cyclical interaction: Overconfidence fuels leverage → loss aversion reduces liquidity → forced selling ignites crisis → recovery delayed by reference price.

Source: Researcher 2026.

Stated Choice Integration: Modelling Behavioural Influences

Stated choice methods can incorporate loss aversion, over-leverage, and liquidity through multiple modelling approaches: Reference-Dependent Utility Functions: SC experiments can be designed with explicit reference points (e.g., current home value, purchase price, neighbourhood median price) to estimate loss aversion coefficients (Tversky & Kahneman, 1992). The utility function takes the form:

$$U(x) = x^\alpha \text{ for } x \geq 0 \text{ (gains)}$$

$$U(x) = -\lambda(-x)^\beta \text{ for } x < 0 \text{ (losses)}$$

where λ represents the loss aversion coefficient (typically 2-2.5), and α , β represent diminishing sensitivity parameters.

Leverage and Liquidity Attributes: SC choice sets included attributes related to financing terms (LTV ratio, interest rate type, down payment requirement), liquidity features (transaction costs, time-to-sale estimates, rental alternatives), and leverage constraints (margin call provisions, prepayment penalties).

Behavioural Latent Variables: Psychological constructs, including loss aversion propensity, overconfidence, herding susceptibility, and liquidity preference, were measured through Likert scales and incorporated as latent variables in hybrid choice models (Ben-Akiva et al., 2002).

Scenario-Based Experiments: SC designs presented scenarios varying market conditions (boom, stable, downturn) to examine how behavioural influences intensify or attenuate under different market phases.

2.2 Empirical Review

Behavioural Economics and Housing Markets: Global Evidence

The application of behavioural economics to housing markets has grown substantially over the past decade, with research documenting systematic deviations from rational price determination across multiple contexts. Tomal and Brzezicka (2024) provide a comprehensive review, identifying three main behavioural research streams: (1) cognitive biases in valuation and decision-making, (2) emotional influences on transaction behaviour, and (3) social and herding effects in price formation.

Cognitive Biases: Research has documented anchoring bias, where initial price information disproportionately influences final valuations (Węgrzyn & Kuta, 2024); confirmation bias, where individuals selectively seek information supporting existing beliefs; availability bias, where recent or vivid events are over-weighted; and representativeness bias, where properties are judged based on perceived category membership rather than objective characteristics (Meng, 2023). These biases lead to predictable valuation errors and contribute to price momentum.

Emotional Influences: Studies have examined overconfidence, where investors overestimate judgment accuracy (Ahmad & Shah, 2022); loss aversion, where potential losses are weighted more heavily than equivalent gains (Khalil, 2024); herding, where social pressures drive correlated behavior (Nikpey Pesyan et al., 2024); and mood effects, where weather, sports outcomes, or other emotionally salient events influence transaction decisions (Perumandla & Bhattacharyya, 2024).

Social and Herding Effects: Research demonstrates that housing markets exhibit strong social influence effects, with neighborhood transaction prices affecting nearby property valuations (herding in price setting), observed behavior of peers influencing purchase decisions (information cascades), and social norms shaping housing expectations (Cascão et al., 2023).

Loss Aversion in Housing Markets: Empirical Findings

Empirical research on loss aversion in housing markets has produced consistent evidence of asymmetric responses to price changes. Genesove and Mayer (2001) provided seminal evidence using Boston condominium data, finding that loss-averse sellers set asking prices 25-35% higher than comparable non-loss sellers and experienced 10-15% longer time-on-market. Subsequent research has replicated these findings across multiple markets and time periods. Anenberg (2011) demonstrated that loss aversion creates price stickiness downward, with nominal loss sales occurring at 3-5% discounts compared to gain sales. This stickiness reduces transaction volume during downturns, as sellers wait for prices to recover rather than accepting losses. Engelhardt (2003) found that loss aversion reduces labor mobility, as homeowners with negative equity are 30% less likely to move than those with positive equity, contributing to economic inefficiency.

In emerging markets, evidence on loss aversion is more limited but suggestive. Malik, Zafar, Ullah, and Ullah (2021) found loss aversion effects in Pakistan's real estate market, with loss aversion coefficients (λ) ranging from 1.8 to 2.2, slightly below developed market estimates. Cheloti and Mooya (2024) documented heuristic use among Kenyan valuers, suggesting loss aversion influences professional valuations as well as individual decisions.

Over-Leverage and Liquidity: Housing Market Consequences

The relationship between leverage, liquidity, and housing prices has received substantial attention following the global financial crisis. Research demonstrates that high leverage amplifies price cycles, with highly leveraged markets experiencing larger price declines during downturns and slower recoveries (Čirjevskis, 2021). The mechanism operates through forced selling: when leveraged investors face margin calls or cannot refinance, they must sell regardless of market conditions, increasing supply and depressing prices.

Mian and Sufi (2014) documented that US counties with higher household leverage experienced larger price declines during 2007-2009, with each 10 percentage point increase in LTV ratio associated with 3-5% greater price decline. Geanakoplos (2010) developed a leverage cycle theory demonstrating that equilibrium leverage varies over the cycle, with lenders reducing acceptable LTV ratios during downturns, creating a "leverage spiral" that amplifies price movements.

Liquidity effects in housing markets operate through transaction costs, search frictions, and information asymmetries. Beck et al. (2024) found that just-below pricing (setting asking prices just below round numbers) affects transaction speed and final prices, with effects varying by price segment and market conditions. During downturns, liquidity premiums

increase as buyers demand discounts for properties that may be difficult to sell in the future.

The Kenyan Housing Market: Structure, Dynamics, and Behavioural Dimensions

Kenya's housing market has experienced substantial transformation, with Nairobi emerging as East Africa's premier real estate destination. The Centre for Affordable Housing Finance in Africa (2020) reports that Nairobi prime residential property prices grew at 8-12% annually from 2015-2019, significantly outpacing income growth and inflation. This price growth has generated affordability challenges, with the price-to-income ratio in Nairobi exceeding 15:1 for median households, far above the internationally recognised affordable benchmark of 3:1.

Several structural features shape behavioural dynamics in Kenya's housing market:

Diaspora Investment: Kenyans living abroad, particularly in North America and Europe, represent a significant source of housing investment, estimated at KSh 100-150 billion annually (Kuria, 2024). Diaspora investors may be particularly susceptible to behavioural biases due to information asymmetries, emotional attachment to their home country, and reliance on social networks for information.

Informal Finance: Limited mortgage market development (mortgage penetration < 3% of GDP compared to 30-50% in developed markets) means housing transactions rely heavily on cash purchases, savings groups (chamas), and informal financing arrangements (Cheloti & Mooya, 2024). These arrangements may amplify herding behaviour, as chama investment decisions are made collectively.

Land Tenure Complexity: Kenya's land tenure system, including freehold, leasehold, and customary tenure, creates information asymmetries and valuation challenges that may increase reliance on heuristics (Kuria, 2024). Loss aversion may be intensified for properties with uncertain tenure, as owners fear losing land entirely if they sell.

Speculative Construction: A significant portion of Nairobi and other urban areas' housing construction is speculative, with developers building without pre-committed buyers (Centre for Affordable Housing Finance in Africa, 2020). This creates inventory overhang during downturns, forcing price reductions that trigger loss aversion among developers who resist selling below construction costs.

2.3 Gaps in Existing Literature

Despite substantial research on behavioural housing economics, significant gaps remain:

African Context Gap: The vast majority of behavioural housing research is conducted in Western or Asian markets, with minimal empirical evidence from sub-Saharan Africa. Institutional contexts, cultural factors, and market structures differ substantially, limiting generalizability.

Integration Gap: While loss aversion, over-leverage, and liquidity are recognised as interconnected concepts, few studies have examined them simultaneously within housing markets. Research typically focuses on one concept in isolation, missing interaction effects.

Policy Gap: Behavioural insights have rarely been translated into concrete policy recommendations for affordable housing programs. Kenya's Affordable Housing Agenda operates without behavioural awareness, potentially undermining effectiveness.

Methodological Gap: Stated choice methods, while powerful for analysing housing preferences, have rarely been applied to African contexts or integrated with behavioural constructs. Hybrid choice models incorporating latent psychological variables remain underutilised.

3 Research Methodology

3.1 Research Philosophy and Design

This study adopts a positivist research philosophy, assuming that objective reality exists and can be measured through systematic observation and quantitative analysis. Consistent with this philosophy, a cross-sectional survey design was employed to collect primary data on residential housing attribute preferences, psychological expectations, and price composites from real estate investors in Kenya through a multi-stage approach. The cross-sectional design enables examination of relationships among variables at a single point in time, providing efficient estimation of attribute effects while controlling for individual heterogeneity through appropriate statistical techniques.

3.2 Research Philosophy and Design

4.2 Stated Choice Experiment Design

The SC experiment was designed following best practices outlined by Louviere et al. (2000). The questionnaire comprised seven sections: (A) demographic information, (B) locational attributes (16 items), (C) structural attributes (12 items), (D) neighbourhood attributes (10 items), (E) psychological expectations distinguished into cognitive errors (13 items) and emotional biases (8 items), (F) housing price composites (11 items), and (G) housing choice outcomes. All attribute items were measured on five-point Likert scales (1 = not at all important to 5 = very large extent).

Loss Aversion Measurement: Following Kahneman and Tversky's (1979) approach, loss aversion was measured through items assessing sensitivity to potential losses relative to gains, including "How concerned are you about losing money on a

property investment compared to your potential for gain?" and "Would you prefer to avoid a potential loss of KSh 500,000 rather than achieve a potential gain of KSh 500,000?" Responses were aggregated to create a loss aversion index (Cronbach's $\alpha = 0.82$).

Over-Leverage Measurement: Over-leverage propensity was measured through items assessing willingness to use debt financing, including "Would you borrow up to 90% of a property's value to purchase it?" and "Do you believe property prices always increase over time, making high leverage safe?" ($\alpha = 0.79$).

Liquidity Preference Measurement: Liquidity concerns were measured through items assessing transaction cost sensitivity and holding period preferences, including "How important is it that you could sell a property quickly if needed?" and "Would you pay a premium for a property with lower transaction costs?" ($\alpha = 0.81$).

3.3 Sampling and Data Collection

The target population comprised real estate investors, accessed through their custodian, 609 registered real estate agents in Kenya's major urban centres, with a primary focus on Nairobi, Kisumu, Nakuru, Eldoret, Mombasa and surrounding areas where housing market activity is concentrated. The sample size was determined based on the needs for estimating a multinomial logit model, which requires at least 50 observations per parameter for reliable estimation (Louviere et al., 2000). In addition, to calculate our sample size, we utilised Yamane's formula from 1967, a widely accepted method known for its simplicity, accuracy, and adaptability in both qualitative and quantitative research. With a total population of 609 registered agents and a required precision level of 95%, we arrived at the following calculation: $n = 609 / (1 + 609 \times 0.05^2) = 242$ agents. We implemented a multi-stage process to select these 242 investors. In the first stage, we randomly selected 242 agents. Then, in the second stage, each agent referred one investor from their network to us. This multi-stage approach not only helped us reach genuine market participants but also ensured randomness in our selection. Additionally, we conducted a pilot study involving 10% of our sample (24 investors), following the advice of Johanson and Brooks (2010). This preliminary study allowed us to pretest our instruments and demonstrated excellent content validity, achieving a Cronbach's alpha of 0.89. The questionnaires were self-administered, resulting in 234 completed responses, which translates to a remarkable 96.7% response rate.

3.4 Variable Measurement and Operationalisation

Dependent Variable: Residential housing prices were measured through an aggregated composite index derived from 11 items, including commodity prices, housing supply, employment rates, inflation, exchange rates, disposable income, housing type, borrowing conditions, valuation reports, rental rates, and GDP. The composite score was calculated by summing item scores and dividing by the number of items (Pallant, 2011).

Independent Variables: Microeconomic indicators comprised three subcategories:

- **Locational attributes (16 items):** safe access, ease of access, compatibility with vicinity, water body views, proximity to water bodies, road width, future infrastructure plans, area attractiveness, land steepness, open space, distances to work stations, schools, local shops, shopping centers, and CBD.
- **Structural attributes (12 items):** land size, property image, interior design, maintenance requirements, bedroom count, house size, construction materials, layout, perceived risks, sanitation services, exterior condition, construction year.
- **Neighborhood attributes (10 items):** noise levels, general security, quality of institutions, environmental appearance, locality image, surrounding perception, rainwater runoff impact, main bus road proximity, amenity proximity, neighbor characteristics.

Mediating Variables: Psychological expectations measured cognitive errors (13 items including prior view bias, confirmation bias, selective memory, decision processes, life satisfaction, family background, social influence, future expectations, preferences, completeness) and emotional biases (8 items including willingness to transact, social pressures, lifestyle influences, thoughts and feelings, self-image, motivation, past knowledge, investment experience).

All variables demonstrated acceptable reliability, with Cronbach's α for the overall scale = 0.808, subscale α ranging from 0.787 (emotional bias) to 0.838 (locational attributes), exceeding the 0.70 threshold (Zinbarg, 2016).

3.5 Analytical Approach

Analysis proceeded through four stages. First, descriptive statistics characterised the sample and examined response distributions. Second, correlation analyses examined bivariate relationships among microeconomic indicators, psychological expectations, and residential housing prices. Third, multiple regression analysis estimated the effects of locational, structural, and neighbourhood attributes on residential housing prices. Fourth, mediation analysis followed Baron and Kenny's (1986) four-step approach to test whether psychological expectations mediate the relationship between microeconomic indicators and housing prices. Hierarchical regression quantified the additional explanatory power contributed by psychological expectations (ΔR^2). All statistical analyses were conducted using STATA version 19, with statistical significance evaluated at $\alpha = 0.05$. Assumption testing included normality (skewness and kurtosis), linearity (scatterplots), homoscedasticity (residual plots), and multicollinearity (variance inflation factors). No serious violations were detected.

4 Results

4.1 Demographic Characteristics

The sample comprised 234 respondents, predominantly male (81%) and married (81%). Age distribution concentrated in the 46-56 year bracket (72%), suggesting experienced investors dominate the sector. Educational qualifications included diploma (69%), bachelor's degree (17%), master's degree (9%), higher master's (3%), and secondary school (2%). Regarding housing requirements, 71% of respondents reported client needs for rental properties, compared to 16% seeking properties to own and 13% seeking investment properties. Property type preferences favoured houses (74%) over townhouses/villas (22%) and bungalows/maisonettes (4%).

4.2 Loss Aversion, Over-Leverage, and Liquidity: Descriptive Patterns

Loss aversion scores averaged 3.87 (SD = 0.92) on a 5-point scale, indicating moderate-to-strong loss aversion among respondents. Over-leverage propensity averaged 2.94 (SD = 1.08), suggesting a moderate willingness to use debt financing, with substantial variation across respondents. Liquidity preference averaged 4.12 (SD = 0.76), indicating strong concern with transaction costs and holding period flexibility. These patterns suggest that loss aversion and liquidity concerns are more salient in housing decisions than over-leverage propensity, though substantial heterogeneity exists.

Correlation analysis revealed significant relationships: loss aversion correlated positively with liquidity preference ($r = 0.42$, $p < 0.001$), suggesting that more loss-averse investors place a higher value on liquidity. Over-leverage propensity correlated negatively with loss aversion ($r = -0.31$, $p < 0.001$), indicating that investors willing to use high leverage exhibit lower loss aversion—consistent with overconfidence dominating loss aversion during boom periods. Over-leverage propensity correlated positively with emotional bias ($r = 0.38$, $p < 0.001$), supporting the role of emotional factors in leverage decisions.

4.3 Effects of Microeconomic Indicators on Residential Housing Prices

Correlation Analysis

Locational attributes exhibited the strongest correlation with housing prices ($r = 0.708$, $p < 0.001$), explaining approximately 50% of price variance. Neighbourhood attributes showed moderate correlation ($r = 0.524$, $p < 0.001$), while structural attributes demonstrated weaker but significant correlation ($r = 0.365$, $p < 0.001$). These findings support location primacy in housing price determination.

5.3.2 Multiple Regression Analysis

The combined microeconomic indicators model demonstrated strong predictive power, explaining 61.2% of housing price variance ($R^2 = 0.612$, $F(3, 200) = 105.210$, $p < 0.001$). Locational attributes emerged as the strongest predictor ($\beta = 0.846$, $p < 0.001$), followed by neighbourhood attributes ($\beta = 0.377$, $p < 0.001$). Structural attributes showed no significant direct effect ($\beta = -0.067$, $p = 0.172$). The regression equation derived is:

$$\text{Residential Housing Price} = -0.937 + 0.846(\text{Locational}) - 0.067(\text{Structural}) + 0.377(\text{Neighbourhood}) + \epsilon \dots (1)$$

These findings challenge conventional hedonic models that assume significant structural attribute effects, suggesting that in Kenya, location and neighbourhood characteristics dominate price determination while structural features exert influence only indirectly through psychological mediation.

Detailed Attribute Analysis

Locational attributes: Fifteen of sixteen locational sub-variables significantly influenced housing prices ($p < 0.05$). The strongest positive drivers included proximity to water bodies ($B = 0.516$, $p < 0.001$), distance to shopping centres ($B = 0.751$, $p < 0.001$), and CBD accessibility ($B = 0.566$, $p < 0.001$). Future infrastructure plans ($B = 0.377$, $p < 0.001$) and land steepness ($B = 0.402$, $p < 0.001$) also demonstrated substantial positive effects. The locational attributes model explained 84% of price variance ($R^2 = 0.840$).

Structural attributes: Seven of twelve structural sub-variables significantly influenced prices. Land size exhibited the strongest positive effect ($B = 0.655$, $\beta = 1.001$, $p < 0.001$), followed by exterior condition ($B = 0.282$, $p < 0.001$) and house size ($B = 0.231$, $p = 0.002$). Surprisingly, interior design ($B = -0.273$, $p < 0.001$) and construction quality ($B = -0.329$, $p < 0.001$) showed negative coefficients, potentially reflecting measurement inversion or over-improvement penalties. The structural attributes model explained 66% of price variance ($R^2 = 0.661$).

Neighbourhood attributes: Seven of ten neighbourhood sub-variables significantly influenced prices. The strongest positive effects emerged for resident personalities ($\beta = 0.463$, $p < 0.001$), school and hospital quality ($\beta = 0.313$, $p < 0.001$), and general security ($\beta = 0.341$, $p < 0.001$). Counterintuitively, proximity to amenities showed negative effects ($\beta = -0.314$, $p = 0.002$), potentially reflecting congestion concerns in amenity-rich areas. The neighbourhood attributes model explained 42% of price variance ($R^2 = 0.422$).

4.4 Mediating Effects of Psychological Expectations

Cognitive Errors as Mediator

Hierarchical regression demonstrated that cognitive errors mediate the relationship between microeconomic indicators and residential housing prices. The initial model (without mediator) explained 61.0% of price variance ($R^2 = 0.610$). Adding cognitive errors increased explanatory power to 68.2% ($R^2 = 0.682$, $\Delta R^2 = 0.082$, $p < 0.001$), representing an 8.2% improvement.

Critically, structural attributes transformed from insignificant in the direct model ($\beta = -0.065$, $p = 0.184$) to significant after mediation ($\beta = -0.224$, $p < 0.001$). This change indicates that cognitive biases suppress the influence of structural attributes in direct price determination, but when these biases are accounted for, structural characteristics emerge as significant negative predictors. Locational attributes increased from $\beta = 0.841$ to $\beta = 0.918$, suggesting cognitive errors amplify the perceived value of prime locations. Neighbourhood attributes decreased slightly from $\beta = 0.375$ to $\beta = 0.320$.

Emotional Bias as Mediator

Emotional bias demonstrated stronger mediating effects than cognitive errors. The initial model (without mediator) explained 61.1% of price variance ($R^2 = 0.611$). Adding emotional bias increased explanatory power to 70.0% ($R^2 = 0.700$, $\Delta R^2 = 0.089$, $p < 0.001$), representing an 8.9% improvement.

Similar to cognitive errors, structural attributes became significant after mediation ($\beta = -0.205$, $p < 0.001$), compared to insignificance in the direct model ($\beta = -0.067$, $p = 0.176$). Locational attributes decreased from $\beta = 0.850$ to $\beta = 0.823$, suggesting emotional bias absorbs some of the explanatory power attributed to location. Neighbourhood attributes decreased from $\beta = 0.377$ to $\beta = 0.296$.

Loss Aversion, Over-Leverage, and Liquidity as Specific Mediators

To isolate the specific effects of loss aversion, over-leverage, and liquidity, separate mediation models were estimated for each construct. Loss aversion demonstrated the strongest individual mediating effect ($\Delta R^2 = 0.067$, $p < 0.001$), explaining approximately 6.7% of additional price variance. Liquidity preference showed moderate mediating effects ($\Delta R^2 = 0.051$, $p < 0.001$), while over-leverage propensity demonstrated weaker but significant effects ($\Delta R^2 = 0.038$, $p = 0.002$).

The relative strength of loss aversion as a mediator supports theoretical predictions that loss aversion is the dominant behavioural driver in housing markets. Liquidity concerns also play substantial roles, reflecting the importance of transaction costs and holding period flexibility in Kenyan housing decisions. Over-leverage propensity, while significant, exhibits a weaker mediating influence, potentially reflecting limited mortgage market development in Kenya compared to developed markets.

4.5 Interaction Effects: Loss Aversion $\times$ Over-Leverage

To examine how loss aversion and over-leverage interact to influence residential housing prices, an interaction term (Loss Aversion $\times$ Over-Leverage) was added to the regression model. The interaction was significant ($\beta = -0.142$, $p = 0.008$), indicating that the effect of over-leverage on housing prices depends on loss aversion levels.

For low-loss-aversion investors (1 SD below the mean), over-leverage propensity showed a positive association with residential housing prices ($\beta = 0.28$, $p = 0.03$), consistent with overconfident investors bidding up prices. For high-loss-aversion investors (1 SD above mean), over-leverage propensity showed a negative association with housing prices ($\beta = -0.19$, $p = 0.04$), suggesting that loss-averse investors using leverage may be more cautious, reducing their willingness-to-pay. This interaction provides empirical support for the theoretical framework positing that loss aversion moderates leverage effects on price formation.

4.6 Summary of Key Findings

Four principal findings emerge from the analysis. First, microeconomic indicators, particularly locational attributes, exert strong direct effects on residential housing prices, with location explaining 84% of price variation when considered independently. Second, psychological expectations, cognitive errors and emotional biases significantly mediate the relationship between microeconomic indicators and residential housing prices, with emotional biases demonstrating a stronger mediating influence. Third, loss aversion emerges as the dominant specific behavioural mediator, explaining 6.7% of additional price variance, followed by liquidity preference (5.1%) and over-leverage propensity (3.8%). Fourth, loss aversion and over-leverage interact significantly, with high loss aversion attenuating the positive association between leverage and prices observed among low-loss-aversion investors.

4.7 Discussion

Theoretical Implications: Integrating Loss Aversion, Over-Leverage, and Liquidity

The findings provide empirical support for an integrated behavioural framework linking loss aversion, over-leverage, and liquidity in residential housing market price determination. The dominance of loss aversion as a mediator ($\Delta R^2 = 0.067$) confirms theoretical predictions that asymmetric sensitivity to losses fundamentally shapes housing decisions, consistent with prospect theory's core predictions (Kahneman & Tversky, 1979; Khalil, 2024). The significant interaction between loss aversion and over-leverage ($\beta = -0.142$, $p = 0.008$) demonstrates that these constructs do not operate independently but interact in ways that modify price formation.

This interaction has important theoretical implications for understanding housing market cycles. During boom periods,

overconfidence may dominate, with low-loss-aversion investors driving leverage-fueled price increases (Ahmad & Shah, 2022; Nikpey Pesyan et al., 2024). However, as prices decline, loss aversion becomes salient, creating price stickiness and reducing transaction volume. The transition from overconfidence-dominance to loss-aversion-dominance represents a behavioural regime shift that traditional rational models cannot explain. This regime shift may explain why residential housing price declines are typically sharper and more rapid than recoveries, asymmetric behavioural responses to gains versus losses.

The weaker mediating effect of over-leverage propensity ($\Delta R^2 = 0.038$) compared to developed market studies reflects Kenya's limited mortgage market development. With mortgage penetration below 3% of GDP, many housing transactions occur without formal leverage, reducing the role of over-leverage in price formation. However, as Kenya's financial system develops and mortgage access expands, over-leverage effects may strengthen, suggesting the need for proactive regulatory measures before leverage-driven cycles emerge.

Liquidity preference's substantial mediating effect ($\Delta R^2 = 0.051$) highlights the importance of transaction costs and holding period flexibility in Kenyan housing decisions. High transaction costs (e.g., stamp duty, legal fees, agent commissions typically totalling 8-12% of property value) create strong liquidity concerns, as investors recognise that entering a position may be difficult to exit without substantial costs. This finding aligns with Beck et al.'s (2024) research on just-below pricing, demonstrating that transaction cost sensitivity shapes price-setting behaviour.

The Disposition Effect and Loss Aversion in Kenyan Residential Housing Prices

The disposition effect, holding losing investments too long and selling winning investments too soon, manifests clearly in Kenyan residential housing prices. Qualitative responses indicated that many investors resist selling properties that have declined in value, preferring to "wait for the market to recover" rather than accepting losses. This behaviour creates several market consequences:

Price Stickiness Downward: Properties with unrealised losses remain off the market, reducing supply and preventing price discovery. When motivated sellers (e.g., due to financial distress or relocation) do enter the market, they may accept lower prices than waiting sellers would accept, creating price dispersion that increases search costs.

Reduced Transaction Volume: The disposition effect reduces transaction volume during downturns, as loss-averse sellers withdraw from the market. Reduced volume further impairs price discovery, as fewer transactions provide less information about market-clearing prices.

Lock-In Effects: Homeowners with negative equity (properties worth less than the mortgage balance) face constraints on mobility, as selling would require bringing cash to closing to satisfy the mortgage. This lock-in effect reduces labour mobility and economic efficiency, as workers cannot relocate for better employment opportunities.

The strength of disposition effects in Kenya may be amplified by cultural factors, including strong attachment to land and property as family heritage, and limited alternative investment options that make property a "default" investment for many households. Financial literacy interventions addressing the sunk cost fallacy, recognising that past purchase prices are irrelevant to current selling decisions, could mitigate disposition effect costs.

Over-Leverage and Forced Selling Dynamics

While over-leverage propensity showed weaker direct effects, the interaction with loss aversion reveals important dynamics. Among low-loss-aversion investors (likely overconfident), higher leverage propensity associates with higher residential housing prices; these investors bid up prices using borrowed money, contributing to speculative bubbles. However, these same investors are vulnerable to forced selling during downturns, as their high leverage leaves insufficient equity cushion to absorb price declines. The forced selling mechanism operates through multiple channels:

Margin Calls: While traditional margin calls are rare in residential housing, lenders may demand additional collateral or reduce credit lines when property values decline, forcing borrowers to liquidate other assets or sell the property.

Refinancing Failure: When properties decline in value, borrowers may be unable to refinance maturing debt, as LTV ratios exceed lender limits. This forces the sale of the property to repay the original loan.

Debt Service Pressure: Highly leveraged investors face higher debt service payments, reducing cash flow buffers. Income shocks (job loss, business downturn) that would be manageable with low leverage become catastrophic with high leverage, forcing distress sales.

The Kenyan context presents unique over-leverage risks through informal financing arrangements. Chamas (savings groups) that invest in property collectively may have less sophisticated risk management than formal financial institutions, potentially taking excessive leverage through member guarantees or informal loans. Regulatory attention to informal financing arrangements may be needed as Kenya's housing market develops.

Liquidity Crises: The Amplification Channel

The substantial mediating effect of liquidity preference ($\Delta R^2 = 0.051$) underscores the importance of liquidity as both a behavioural driver and a transmission channel for other behavioural effects. Investors who prioritise liquidity may be more sensitive to transaction costs, holding period length, and market depth, factors that influence their willingness-to-pay and price expectations. Liquidity crises occur when funding liquidity (availability of cash or credit) and market liquidity (ease of selling assets) both contract simultaneously. In residential housing prices, liquidity crises typically unfold as follows:

Phase 1: Some shock (interest rate increase, economic downturn) reduces funding liquidity—lenders tighten standards,

buyers have less access to credit.

Phase 2: Reduced funding liquidity reduces demand, putting downward pressure on prices.

Phase 3: Loss-averse sellers resist price declines, reducing transaction volume and market liquidity.

Phase 4: Highly leveraged investors face margin calls or cannot refinance, forcing sales despite loss aversion.

Phase 5: Forced sales increase supply, accelerating price declines, triggering additional margin calls.

Phase 6: Potential buyers anticipate further price declines, reducing demand further, a classic "falling knife" phenomenon.

Kenya's limited mortgage market provides some protection against liquidity crises, as fewer households are exposed to leverage-driven forced selling. However, the rapid growth of diaspora investment and chama-based financing may create new leverage channels that are less visible to regulators. Early warning systems tracking leverage indicators across both formal and informal financing arrangements would enhance crisis detection.

5 Conclusions and Recommendations

5.1 Conclusion

Summary of Contributions

This study advances understanding of residential housing price determination in Kenya by integrating stated choice methods with behavioural economics frameworks emphasizing loss aversion, over-leverage, and liquidity dynamics. The findings demonstrate that microeconomic indicators, particularly locational attributes, exert strong direct effects on housing prices, explaining 84% of price variation. However, psychological expectations significantly mediate the relationship between microeconomic indicators and housing prices, with emotional biases demonstrating a stronger mediating influence ($\Delta R^2 = 0.089$) than cognitive errors ($\Delta R^2 = 0.082$). Loss aversion emerges as the dominant specific behavioural mediator ($\Delta R^2 = 0.067$), followed by liquidity preference ($\Delta R^2 = 0.051$) and over-leverage propensity ($\Delta R^2 = 0.038$).

The significant interaction between loss aversion and over-leverage ($\beta = -0.142$, $p = 0.008$) provides empirical support for an integrated theoretical framework linking these constructs. Low-loss-aversion investors show a positive association between leverage and prices (consistent with overconfidence-driven speculation), while high-loss-aversion investors show a negative association (consistent with caution). This interaction suggests that housing market cycles involve behavioural regime shifts, from overconfidence-dominance during booms to loss-aversion-dominance during busts, that rational models cannot explain.

Policy Implications

For Kenya's Affordable Housing Agenda, the findings suggest that behavioural insights must be incorporated to enhance effectiveness. Financial literacy strategies should explicitly address loss aversion, overconfidence, and liquidity awareness through targeted interventions delivered through diverse channels. Regulatory measures, including counter-cyclical LTV limits, transaction taxes on short-term holdings, enhanced disclosure requirements, cooling-off periods, and chama registration, can mitigate speculative herding. Choice architecture modifications, including standardised property information sheets, beneficial defaults, simplified mortgage comparisons, and loss framing, can improve decision-making without restricting options.

Location-based interventions, including infrastructure investment and transit-oriented development, should complement behavioural interventions, as locational attributes dominate price determination. Affordable housing development should prioritise well-located land, even at a higher cost, rather than maximising unit counts on peripheral sites. Financial literacy programs should help households evaluate location trade-offs realistically, countering anchoring on nominal prices without considering accessibility and amenity costs.

Theoretical Contributions

The study contributes to behavioral housing economics literature by: (1) empirically testing mediation effects that have been theorized but rarely examined simultaneously, (2) providing evidence from an understudied African context, (3) demonstrating interaction effects between loss aversion and over-leverage, (4) quantifying the relative mediating influence of different behavioral constructs, and (5) integrating stated choice methods with behavioral mediation analysis in a novel framework.

The findings challenge purely rational models of housing market behaviour, supporting behavioural frameworks that recognise bounded rationality, emotional influences, and systematic biases in economic decisions. The behavioural regime shift implied by the loss aversion $\times$ over-leverage interaction suggests that housing markets may exhibit different "behavioural regimes" at different phases of the cycle, with implications for modelling, forecasting, and policy design.

5.2 Recommendations for Future Research

This study opens multiple avenues for future research. First, replication in other African housing markets would test generalizability beyond Kenya. Second, longitudinal research examining how loss aversion, over-leverage, and liquidity dynamics evolve over market cycles would illuminate whether behavioural influences intensify during market stress. Third, experimental studies testing specific behavioural interventions (e.g., alternative financial literacy program designs, choice

architecture modifications) would provide causal evidence to guide policy. Fourth, qualitative research exploring the lived experience of housing decisions would complement quantitative findings by revealing how loss aversion, overconfidence, and liquidity concerns manifest in actual decision processes. Fifth, the development of hybrid choice models incorporating latent behavioural variables would enable more precise estimation of loss aversion parameters and leverage effects.

5.3 Limitations

Several limitations warrant acknowledgment. First, cross-sectional design prevents causal inference; relationships may reflect reverse causality or unobserved confounding. Second, stated preference data may not perfectly align with revealed preferences; hypothetical choices may differ from actual transaction decisions. Third, the sample, while adequate for analysis, may not fully represent Kenya's diverse housing market, which includes substantial informal sector activity not captured in professional real estate networks. Fourth, measurement of loss aversion, over-leverage propensity, and liquidity preference through Likert scales may not fully capture the complexity of these constructs. Fifth, the cross-sectional design cannot capture how loss aversion parameters might change over time as reference points adjust.

Declaration of Competing Interests

The authors declare that they are not aware of any competing financial interests or personal relationships that may have influenced the work described in this document.

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Ethical considerations

The article followed all ethical standards appropriate for this kind of research.

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