# Value Creation and Mass Timber Apartment Renters

Research Write-up of a consumer willingness-to-pay study uncovering revealed and stated preferences for mass timber market-rate apartments, translated to the proforma

DRAFT

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Keywords: mass timber, housing, consumer willingness to pay, rent premiums (absence of), retention, credit quality, counterparty quality, stated preference, search and credence attributes, option value, asset differentiation, tenancy, occupancy benefits, leasing velocity, proforma, underwriting adjustments, hedonic pricing, revealed preferences, behavioral economics, consumer behavior, unpriced value attributes, sustainable construction, real estate valuation, real estate economics, emerging technologies valuation, mixed methods, consumer profiling, non-leaser behavior, qualitative thematic analysis, diffusion of innovation, biophilic design, psychographic segmentation.

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# 0.0 Abstract

Across mass timber's growing ecosystem, demand-side insights focused on end-user drivers remain largely unstudied, misunderstood and anecdotal. Lacking a data driven business case, firms, investors and governments face material headwinds. To accelerate their business planning, underwriting and policy design interests, this research advances consumer willingness-to-pay topics in the context of two market-rate mass timber apartment developments. Common mass timber industry value creation claims are tested, and mechanisms identified, to better answer the technical questions of capital providers. From the 1,500 codable data points collected from 26 renters, four revealed-preference points are detected: renters' willingness *not* to pay more, their tendency to stay longer, pay on time and be of high credit. The candidate value-creation mechanisms detected are experiential in nature, and include beauty, architectural differentiation and feelings of calm. These value-creation channels require wood to be visible, thus building codes that require mass timber to be covered likely hinder its market rate adoption. Little consumer created value is observable from credence attributes like heritage and cultural connection, carbon footprints, locally made or personal identity value-signaling. No downside consumer impacts are detected, suggesting the story is one of positive option-value. All impacts detected are mapped to development proformas (retention, turnover cost, concessions, credit loss and marketing) to show how to underwrite mass timber's business case. All findings are directional in nature; their sizing is left to a larger study extension.



*Figure 1: The Wilson Forest Park Townhomes in Portland Oregon - a development by the paper's author featuring mass timber in the form of Doug Fir CLT ceilings, complemented by white oak wood floors.*[1]

[1] For more info, please refer to: https://wilsonpdx.com and https://www.thinkwood.com/construction-projects/wilson-forest-park-townhomes

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# 1.0 Introduction

Real estate development, and its connected industries, are witnessing the emergence of a new type of building. In combination with, or in lieu of, steel and concrete, large and complex projects are increasingly using engineered wood products to deliver differentiated building environments and real estate assets. Generally referred to as "mass timber" products or buildings, these developments are enabled by advances in manufacturing, engineering, and regulatory realms. Combined with today's consumer preferences, wood elements and structures at scales and complexities previously reserved for conventional materials exist for study.

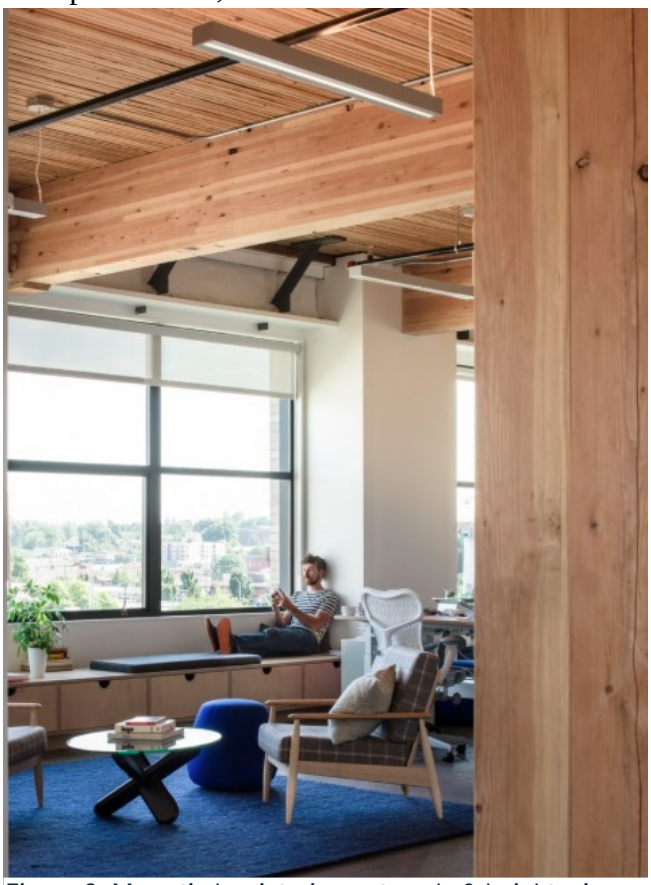


*Figure 2: Mass timber interiors, at scale & height, via Clay Creative – a 2015 vintage ~100' tall market rate development.*

Mass Timber buildings are notable because of their unique characteristics and broad range of positive externalities. Appeal can be found by most any stakeholder: reduced carbon creation and carbon storage, improved construction safety, revitalization of domestic supply chains and rural regions, healthier environs, durable asset differentiation. As a result, mass timber is transitioning from a niche development and construction idea into a broad-based residential, commercial, and institutional real estate solution.

Across forestry, architecture, engineering, sustainability and building codes, critical-path technical and regulatory questions have been addressed. This progress unleashes potential; however, comparatively little attention has been paid to finance and consumer considerations. Missing is the expertise found amongst business schools and entrepreneurship centers, finance and marketing departments and mainstream financial services and marketing professionals.[2] The absence can be measured. In a separate study, the author classified 837 "moments of attention" which manifest as every talk at Europe's Forum Holzbau congresses from 2024 to Sept. 2026 (441), every presentation at America's International Mass Timber Conference from 2024–26 (203) and via the 193 references identified by Prakosa et al. (2026) in their effort to review all mass timber academic literature pertaining to its economics, costs and

[2] Via two years of searching at the biggest mass timber conferences – the 2024 and '25 editions of Forum Holzbau IHF (Innsbruck) and the 2024, '25 '26 editions of the International Mass Timber Conference (Portland) - the author could find no one, excepting himself, who teaches these topics and who is a mass timber development practitioner. Introductions to others with this expertise is welcomed.

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markets. The observation, in short, is that business topics and finance expertise are mostly missing.

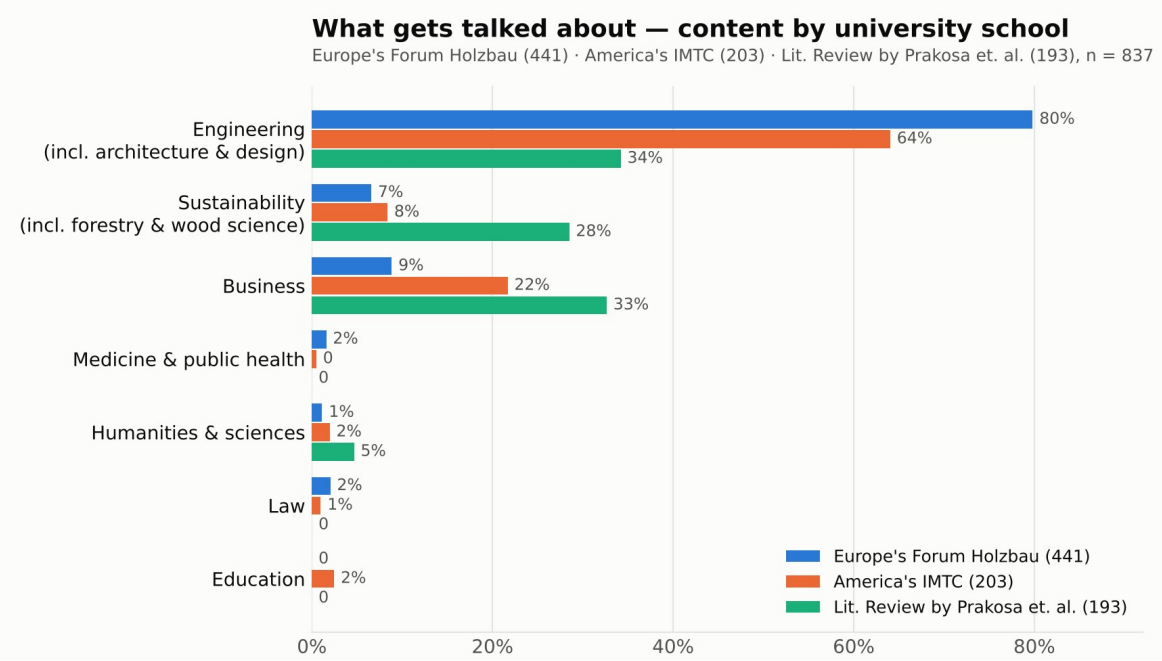



*Figure 3. Content, organized by standard university structures; n = 837 items from the 2024–26 programs of Europe's Forum Holzbau (n=441) and America's IMTC (n=203) as well as per the Lit. Review (n=193) by Prakosa et al. (2026).*

From this, important, applied capital or customer (i.e. demand-side) questions remain unanswered. *Do occupants actualize mass timber's distinct value attributes? And if so, does that translate into observable outcomes, or investable economics*?

Driven by mass timber's ability to tangibly answer the dual mandates of today's capital sources (deliver competitive risk-adjusted returns and positive social impacts) developer and institutional investor interest is growing. As institutional apartment fund manager Dillon Lorda notes, "*Mass timber developments align well for pension fund tensions – they can give their beneficiaries and political stakeholders a genuine solution*".[3]

The present study operationalizes these questions through primary data collected at two Portland, Oregon mass timber rental developments: Wilson Forest Park Townhomes and The Canyons. Both are early market-rate assets featuring exposed cross-laminated timber (CLT) ceilings and glue-laminated (glulam) structural elements. The professionals agreed to support this research with expertise and data provided in-kind. From this, over the summer of 2026 a structured, in-person survey was administered to 26 current or former residents, with the information gathered spanning their actions, motives and context.

These outcomes are cross-referenced against: A) occupant mass timber awareness and move-in salience, B) a forced-choice battery in which residents choose between paired statements about health and comfort, beauty, connection to nature, identity, sustainability and material familiarity,

[3] Institutional Fund Manager Dillon Lorda, December 2025 interview with author.

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C) an importance battery that probes which value dimensions (aesthetic, biophilic, carbon, cultural, sustainability, identity, resilience, design, innovation, construction-disruption) are relevant and actualized, and D) household profile (income, credit, education, age, technology-adoption disposition, civic affiliations) that both segments respondents and verifies that the convenience sample method used collected market-rate representative answers. A distinct strand examines whether occupants proactively brand-signal the mass timber feature to their social network — a leading indicator of category-level demand formation.



*Figure 4a: The Canyons Apartments Townhomes*



*Figure 4b: Wilson Forest Park*

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These investment trends dovetail with today's architectural, engineering and construction systems which offer broad options in wood construction – as illustrated below[4]. The supply-side has advanced these new construction means and methods by leveraging the qualities of the products - like cross-laminated timber (CLT) and glue-laminated timber (glulam) - across manufacturing, design, engineering, political/regulatory and construction applications. Major

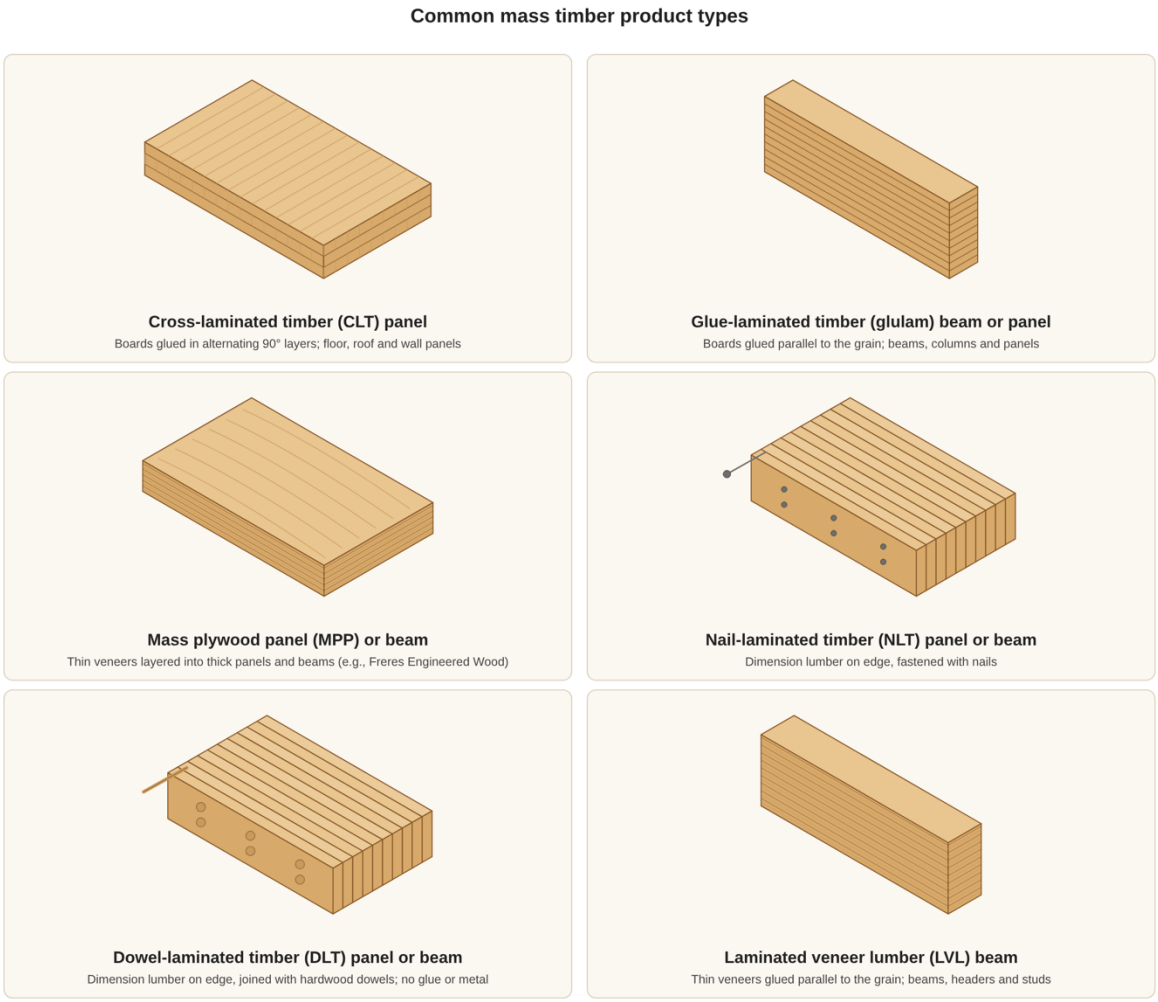



*Figure 5: Common mass timber product types (original schematic; not to scale).*

manufacturing investments are underway to expand capacities or create customization of products – the worry – will demand be aligned, of the nature and scale hoped for? According to industry association WoodWorks, the U.S. mass timber sector has expanded in project count more than sixfold – a 25% CAGR - from 2018 into 2026[5]; however, most of this volume is non-market in nature whereas most of the total building activity is market rate and market bound – driven by finance and consumer considerations.[6]

[4] Original schematic illustration prepared for this paper (2026); product types drawn from generic descriptions and not to scale.

[5] WoodWorks, *Mapping Mass Timber: U.S. Mass Timber Construction Projects*, reporting 439 U.S. projects in September 2018 and 2,746 U.S. projects in March 2026, https://www.woodworks.org/resources/mapping-mass-timber/ (accessed April 16, 2026).

[6] According to the U.S. Census Bureau, approximately three-quarters of total U.S. construction spending occurs in the private sector, indicating that market-rate development constitutes the

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These projects offer hope across many of society's pressing issues: affordability, sustainability, health, economic vitality, labor safety, supply chain security, forest management, and housing production. Aligned with such a moment, this paper aims to advance demand-side insights via specific consideration of one of mass timber's three primary end-users: mass timber building occupants.

Such insights serve the other end-users who are not occupants; the investors as well as policymakers. For contextual understanding, mass timber buildings matter for myriad reasons, such as:

- As the built environment seeks to decarbonize, timber-based structural systems offer a tangible pathway to lower embodied carbon and use a renewable (circular) resource in a pro-growth fashion (i.e. more homes for the world's citizens that "*pickle the carbon*[7]*" in the form of expanding cities*.)
- The distinctive aesthetic and comfort attributes of exposed wood, like its warmth, calm and biophilic resonance, appear to benefit occupant experience in ways not offered by conventional indoor materials (e.g. plastics, paints, drywall, metals, concrete.)
- The rise of mass timber signals deeper shifts in supply-chain, regulatory, and certification frameworks for sustainable built environments — changes that in turn may have feedback loops which impact developer, investor, and consumer behaviors.

Across these motivations for why mass timber matters, a fundamental question remains: will end users pay more for these attributes? Will voters support public policy favoring its use? The answer this study returns is that value impacts exist, but not where most people expected them: end users do not pay more, but value shows up in their tenure and counterparty strength.

dominant share of national building activity. U.S. Census Bureau, *Value of Construction Put in Place Survey*, Monthly Construction Spending, January 2026 reporting of $1.661 trillion private construction spending, versus $529 billion public construction spending (seasonally adjusted annual rate), https://www.census.gov/construction/c30/current/index.html (accessed April 16, 2026)

[7] The notion of using mass timber buildings to pickle carbon – store carbon outside of the atmosphere for longer than one growing rotation, and thus incrementally addressing global warming trends, being often credited to Clark Binkley, former Dean of UBC Forestry and co-founder of forest investment firm Greenwood Resources (now a division of Nuveen.)

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*Figure 6: Two "class A" apartment developments built by author, one with mass timber and another per traditional norms. Does unique apartment look and feel translate to underwritable value? This research suggests it does.*

If not, the opportunity falls to a socio-political question – in the way that citizens value clean air and water but require governmental actions to realize progress yet are hard pressed to reward elected leaders for doing so. But if consumers do value mass timber, public policy prerogatives should be of an opposite direction – towards hastening the development of an economically self-sustaining, institutional capital flows driven evolution of the built environment. In short, it becomes a consumer education and market development question.

This study therefore addresses that gap by applying a revealed preference framework (following basic Paul Samuelson, 1938 notions) to how end users actually chose, paid for and stayed in (i.e. re-leased / purchased again) a housing unit featuring mass timber elements. By pairing it with stated-preference evidence, the dataset starts to explain why mass timber apartment renters appear to consume their housing in observable different ways than if they were in a status-quo, commoditized equivalent. Rather than relying on stated preferences alone (what people say they would pay), the research observes reported behavior and adds verifications and tests for reasonableness via ownership records and the property managers and asset managers who know their renters, buildings and submarkets. From this, four anchors emerge: Do renters pay more, the same, or less than the alternatives they weighed? Do they stay longer than they planned? Do they pay on time? What credit quality do they bring as counterparties?

Through this lens, the study infers directionality and relative scale across implicit monetary value reveals of consumers. The insights are relevant not only for developers and investors but also for policymakers, building-material supply chains, and the academic community. This behavioral and financial evidence is rare for this nascent but potentially transformative building system ecosystem of mass timber. Said simply, this is the pronounced demand-side gap in academic research regarding the financial implications of mass timber. Across mass timber features affecting market behavior, valuation, and willingness to pay, capital markets and investment community are left to grapple with how to translate and apply investment activity around mass timber given the scarcity of clear demand metrics.

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This study provides both the quantitative rigor and qualitative depth required to begin filling that gap. The gap is visible from both sides of the capital markets. On the supply side, the same 837-item classification mentioned above shows the subjects capital providers ask about to be mostly absent: across three years of Europe's defining wood-construction congresses, no presentation addressed preference or willingness to pay, and the four talks that touched occupant perception did so through wellbeing or psychoacoustics (Johnson, 2026b). On the demand side, the author's "Listening to Institutional Investors" research for the Pacific Northwest Mass Timber Tech Hub (Johnson, 2026a) recorded the questions that fund managers, investment officers, lenders and development principals at fourteen institutions actually ask when confronted with a mass timber proposal.

Distilled from this research, 33 questions were established, of which 17 are economic. Among them:

- By what means does mass timber create value, and how do those means rank (Q11)?
- Do occupants behave differently — in lease velocity, retention and credit quality (Q13)?
- What sensory differences separate wood from steel, concrete, plastic and glass, and do they matter to users (Q14)?
- Have the reported rent premiums been distilled into data, tested by academically sound methods and translated into underwriting tools (Q16)?
- Are there other effects on net operating income, in its scale or its volatility (Q18)?

Lacking answers, the investors' own conclusions were to step carefully and/or wait. Thus, for the mass timber industry the contribution of this research is twofold: tested answers to a question the supply side has been answering by assertion, and data-driven mechanism distillation to understand what is behind the observations. Finding that beauty, distinctiveness, warmth and calm are the attributes residents consistently tie to staying and to choosing again — while sustainability, provenance and identity are valued by an identifiable minority — tells a developer what to build and how to present it, and tells a lender which underwriting assumptions a differentiated asset can defend. Section 6.6 distills the findings into the specific proforma inputs a developer would adjust when using mass timber.

The paper proceeds as follows. Section 2 opens with why separating what residents do from why they do it is academically founded, then sets out each theoretical strand, the hypothesis it suggests for this study, and whether the data aligned with it. Section 3 describes the method as executed. Section 4 covers the data and analysis. Section 5 reports the results question by question. Section 6 synthesizes: the four anchors against market norms, the channels triangulated across elicitation methods, what not to pitch, the option-value asymmetry, the visibility condition and the proforma inputs a developer would adjust. Section 7 sets out limitations and the extension; Section 8 concludes.

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# 2. Theoretical / Academic Context

The framework used herein attempts to be interdisciplinary, and rest on well-founded academic notions. For example:

- In choice modeling, it is assumed that revealed-preference data has the stronger claim on what a market does, because it records real choices under real budgets. Stated-preference data is needed to recover the attribute trade-offs behind those choices (Ben-Akiva & Morikawa, 1990; Hensher, Louviere & Swait, 1998; Louviere, Hensher & Swait, 2000). However, understanding the "what" is only valuable for developers if there is a related "why" do consumer do what they do available for reference with future decisions.
- In survey economics, this work assumes that subjective answers belong on the explanatory side of a model rather than as outcomes (Bertrand & Mullainathan, 2001), and revealed choices are themselves distorted by complexity, inexperience and marketing. Thus, triangulating behavior with reported preferences and checking for reasonableness with experts is a recommended practice followed throughout (Beshears, Choi, Laibson & Madrian, 2008).
- In program evaluation, in this case, the program for incorporating mass timber to create a comparatively more valuable real estate development, an effect documented in one place is assumed to generalize to other places through its mechanisms (Deaton & Cartwright, 2018; Heckman, 2010). Here, a pharmaceutical analogy may help: outcome trials establish what a therapy does, while mechanism-of-action work and patient-reported outcomes explain why and for whom. Applied to mass timber, the four behavioral measures are the outcomes; the stated items are the candidate value creation mechanisms and the respondent-level consistency checks are the test of whether a stated channel actually tracks the observed behavior.

Each strand of theory that follows suggests a hypothesis about what this study may reasonably expect to find. Subsections are briefly introduced and discussed, along with their implied hypothesis. To reduced cross referencing to the findings, a quick discussion of results alignment is presented, with Section 2.9 collecting it all in one table.

## 2.1 Revealed Preference Theory and Its Application

To better understand how consumers value mass timber, this study builds upon Paul Samuelson's (1938) Revealed Preference Theory (RPT), which proposes that consumer preferences are best understood through observed behavior, rather than through what individuals claim in surveys or what economists assume in utility functions. For this study, consumers (or end users) are understood to fall into three broad groupings: (1) occupants of mass timber buildings, (2) investors who finance or develop them, and (3) political stakeholders who influence policy, zoning, or incentives around their adoption. The focus of this research is on the occupant group — examining this group's consumer behavior in relation to mass timber. Within this framework, every purchase or rental choice implicitly reveals how consumers rank bundles of housing attributes under real-world constraints such as location, building age and condition, price, proximity to amenities, and other property-specific factors that influence value. The present study treats four measures as revealed-preference anchors — rent paid relative to alternatives,

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tenure against plan and market norms, payment history and credit standing against market norms — and reads the remaining survey content as stated preferences that explain them.

In the context of housing, each dwelling can be viewed as a composite good — a bundle of functional and experiential attributes that together generate utility. The inclusion of mass timber (e.g., exposed CLT ceilings and floors, or glulam beams and columns) introduces a unique and emerging attribute that is perceptible to occupants. Residents can see the difference and feel the difference in being surrounded by natural materials, which is an experiential response often associated with biophilic design; warmth and calm are what residents in this study report noticing, while scent, as it turns out, is not. They can also signal affluence, identity or ideological affiliation (Akerlof & Kranton, 2000). For whatever reason, if consumers systematically choose, pay more for, or remain longer in homes incorporating mass timber then to some degree their behavior reveals a preference for that material. Of note, the directionality, magnitude and urgency of this preference being of great importance, governed by the nature and scale of data and the resources available to procure it. The hypothesis this strand suggests is simple: if residents value the material, the preference will show in what they do with their own money and time — in the rent they accept relative to alternatives, in staying rather than moving, in choosing the product again — whatever they say about it. The data align, with a twist that organizes the rest of the paper: the preference is revealed, but through tenure, payment and counterparty quality rather than through rent (Sections 5 and 6).

## 2.2 Integration of Behavioral Economics Perspectives

While Samuelson's model assumes rational, utility-maximizing behavior, behavioral economics — particularly the work of Daniel Kahneman and Amos Tversky (1979) — provides evidence that real-world decision-making often deviates from this ideal. Their Prospect Theory demonstrated that people evaluate choices relative to reference points and exhibit systematic biases such as loss aversion and framing effects. Originally, a gain-versus-loss framing battery was envisioned for this study; however, it not fielded as designed because the forced-choice block was built instead around the value themes residents might hold (health and comfort, beauty, nature, identity, sustainability, material familiarity) which leaves framing effects for an possible research extension (Section 7), with the behavioral mechanisms that the completed data do speak to now being set via four mechanisms.

- First, salience: attributes that stand out against the choice set receive disproportionate decision weight (Bordalo, Gennaioli & Shleifer, 2013), and exposed wood is salient by construction against a drywall comparison set. The hypothesis: residents will notice the wood without being told to look. Aligned — all 23 who toured in person noticed it immediately (A8), none needed the leasing agent to point it out.
- Second, the information economics of product attributes: Nelson (1970, 1974) distinguishes search qualities, verified by inspection before purchase, from experience qualities learned through use, and Darby and Karni (1973) add credence qualities that cannot be verified even after use and require third-party attestation. Visible wood is a search attribute; the structural system and its carbon story are credence attributes. The distinction predicts which parts of the mass timber value proposition sell themselves and

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which need a label. The hypothesis: the visible wood will sell itself while the structural and carbon story will not be known unless told. Aligned — the wood was noticed by every resident on the tour, but only 11 of 26 knew before touring that the home was mass timber, and one asked for "a LEED certified plaque on the building" so as to know (A9). This is also the threshold on which the one prior study of residents, Jussila et al. (2024), falls short: in the Finnish buildings they studied, fire regulations kept the timber covered inside the apartments (visible only in stairways), and in the Swedish cases it was only sometimes left visible, so residents could report mainly on credence attributes and never on its search and experience qualities; Section 2.8 develops the point.

- Third, differentiation and switching costs: a non-substitutable home blunts the concession-driven churn that characterizes homogeneous apartment markets (Chamberlin, 1933; Klemperer, 1995; Sirmans, Sirmans & Benjamin, 1994), and attached consumers are less price-sensitive (Krishnamurthi & Raj, 1991). The hypothesis: a home with no close substitute will be left less readily and need fewer concessions to retain. Aligned — 14 of 25 have stayed longer than they planned and none sooner; 24 of 26 say the feel of the home makes them want to stay, and the reasons they give are comparative ("would not be able to find something else with this combination") (C2, C4).
- Fourth, the limits of self-report: people have limited introspective access to why they chose (Nisbett & Wilson, 1977), and hypothetical choice items overstate real behavior by a median factor of about 1.35 (Murphy, Allen, Stevens & Weatherhead, 2005; List & Gallet, 2001), which is why stated items are used here to explain behavior rather than as outcomes. Decision heuristics — such as representativeness or availability bias — may still lead consumers to infer that "wood equals comfort" or "steel equals safety" without detailed analytical comparison. The hypothesis: answers to hypothetical items will run ahead of behavior. Treated as a design rule rather than tested — the re-choose item (F5: 23 of 26 would choose mass timber again) is read as corroboration of the tenure anchor, not as an anchor.

Richard Thaler's work in behavioral finance further informs this approach. His concept of mental accounting (Thaler, 1999) suggests that consumers segment their spending into categories — such as "housing quality," "sustainability," or "health" — and may allocate different willingness-to-pay thresholds to each. A renter might justify paying a premium for mass timber if it fits within a mental category of responsible living or personal well-being or both, even when the decision is not strictly financial. In short, the consumer is purchasing more than shelter, location, views, etc. The question is if value is created via these "credence" attributes. The hypothesis this suggests is that a renter who files mass timber under "responsible living" will pay a premium for it. Not supported: no rent premium is detectable (A6), and the residents for whom sustainability is a live account are an identifiable minority — 7 of 26 claim the sustainability statement (D2), and they are the civically affiliated (H6). If a mental account is at work for the majority, it is "a home I feel good in," which is experiential, not credence.

Such factors may also lengthen occupancy; for example, because it is comparatively more difficult to find a roughly equal substitute. The switching-cost mechanism above is the economic form of that observation, and the results in Section 5 (C4, F5) bear it out. Thaler's nudge theory (Thaler & Sunstein, 2008) adds interpretive depth: building design, marketing language, and

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environmental cues may subtly nudge renter behavior via natural materials, climate credentials, or health-benefit trappings; the survey includes questions on whether residents noticed the wood unprompted, knew what it was before moving in, and would mention it to others. Together, these behavioral insights expand the revealed preference framework beyond pure rational choice, making it more reflective of **real human decision processes** in housing markets. The hypothesis from the nudge strand is that cues which make the material legible — knowing it is mass timber — will strengthen attachment. Partly aligned: prior awareness of mass timber shows the largest lean of any item toward staying longer than planned (1.36 against 0.64 on a 0–2 scale, A9), while the sustainability cue does not move rent or retention.

## 2.3 Hedonic Valuation of Non-Market Attributes Frames

The hedonic pricing model (Rosen, 1974) posits that the market price of a differentiated good equals the sum of its parts, with each attribute contributing an implicit price. Numerous studies have confirmed how a "bundle of characteristics can be detected, directionally defined and scaled to its magnitude of monetary value impact even as it is a objectively a non-market good. For example,

- Harrison & Rubinfeld (1978) and then Chay & Greenstone (2005) found that homes in areas with cleaner air (an experiential attribute) commanded measurable price premiums, demonstrating that consumers reveal monetary valuation for environmental quality even when it is not directly priced.
- Banfi et al. (2008) applied a stated-preference choice experiment to Swiss residential buildings and found a positive willingness to pay for energy-efficient features (a credence attribute: verified through labels or utility bills rather than by inspection), confirming that sustainability attributes carry economic value in the housing market.
- Sirmans, Macpherson & Zietz (2005) synthesize 125 hedonic studies and establish location, unit size and configuration, and structural quality (search attributes, verified by inspection before leasing) as the standard priced attributes of residential property; Guntermann & Norrbin (1987) show the same variables transfer to apartment rents, and Sirmans & Benjamin (1991) review the determinants of market rent for apartments specifically. These are the market-standard attributes against which the present study observes where mass timber lands.
- Bond & Devine (2016) find that LEED-certified apartments (a credence attribute carried by a label) earn roughly an 8.9% rent premium while self-described "green" marketing without certification does not — the multifamily evidence that credence attributes are capitalized through labels rather than claims; Kahn & Kok (2014) show that label premia in housing vary with local environmental ideology.
- Leishman, Abebe, Baker, Kim & Reid (2026) show, for Australian private renters, that rent reflects tenant choice in addition to physical and neighborhood attributes and that intentions to move depend on satisfaction with the dwelling, the neighborhood and the landlord (experiential attributes, learned by living there) as well as on rent paid — willingness to pay and willingness to stay are jointly determined. The present study observes both for a single building attribute and finds that the attribute moves one and not the other.

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- Anderson & West (2006) and Liebelt et al. (2018) provide multiple hedonic studies documenting the potential value proposition of nature and/or biophilic aspects via their examinations which detected positive, context-dependent residential value effects from proximate access to green space (trees, parks, water — an experiential attribute, seen and used daily.)
- Akerlof & Kranton (2000) formalize social identity as an argument in the utility function, providing a framework for interpreting housing goods whose value derives in part from the identity they signal (a credence attribute: it rests on what the material is understood to mean, not on what it looks or feels like). This framework helps explain why identical physical attributes may command heterogeneous hedonic premia across psychographic segments.
- Dichter (1966) and Berger (2014) document why consumers talk about products — to manage impressions, share emotion and bond with others — and Trusov, Bucklin & Pauwels (2009) show that word of mouth has a measurably larger and longer-lasting effect on demand than traditional marketing. Proactive consumer-to-consumer mention thus provides a non-price signal of how deeply mass timber has been internalized as a differentiating attribute.
- Tuan (1977) as well as Williams & Stewart (1998) provide a framework for interpreting the culturally-specific attachment to wood construction in timber-rich regions via their work pertaining to sense-of-place and regional-identity (credence attributes). Sections 5 and 6 report that the identity and sense-of-place channels these frameworks predict are the dimensions residents rank last; the word-of-mouth channel is present but is carried by the building's distinctiveness rather than by identity.
- Brändle, Füss, Schläpfer & Weigand (2026) examine low-carbon rent premiums in the Swiss residential market by merging $CO_2$ emissions data with 92,600 Swiss rental contracts using a hedonic framework to identify that apartments in low-carbon buildings (a credence attribute, carried by emissions data) command measurably higher net rents.

Across these studies, the hedonic approach consistently detected positive monetary value for environmental and sustainable features. The hypothesis this strand suggests is the one the supply side asserts: that exposed mass timber, as a differentiating attribute, will carry an implicit price in rent as cleaner air, energy labels and green space do. Not supported as stated — and the pattern of the studies above explains why. The attributes that earn rent premia without a label are experiential and are priced into the market's standard list (location, size, quality); the credence attributes earn premia only through labels. Exposed wood is experiential but new to the list, and it enters the market as the Sirmans et al. attributes do: priced within the band for its unit type, with its value expressed through retention and counterparty quality rather than through rent levels (Sections 5 and 6). The central research question is therefore both if such value can be detected, and through which behavioral mechanisms it is expressed.

## 2.4 Wood Materials and Biophilic Considerations

A parallel and rapidly maturing body of evidence extends this hedonic logic into the specific domain of wood and biophilic interior environments. For example, Nyrud & Bringslimark (2010) reviewed the accumulated psychological literature on interior wood use and concluded that wood surfaces are consistently associated with perceived well-being, warmth, aesthetic appeal, and

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eco-friendliness. This work suggests that occupants do not merely notice wood but assign it positive valence across sensory and attitudinal dimensions. Burnard & Kutnar (2020) found lower salivary cortisol — a biomarker of stress — among participants working in an office furnished in oak than in a control room. A recent systematic review of psychophysiological responses to indoor wood use (Cavaliere, Calvano, Molina & Negro, 2026) finds the experimental record dominated by short visual-exposure studies — one to fifteen minutes, mostly on students, measured by heart rate, heart-rate variability and prefrontal activity — and calls for longer exposures and more diverse participants; evidence from people who have lived with the material for years, as here, is what it asks for.

Most recently, Kumpulainen, Kilpiäinen, Koski & Pesola (2024) compared ten minutes in a wooden room with ten minutes in a plaster room in a randomized crossover of 45 adults and found higher positive affect, lower negative affect, slower breathing and more favorable sensory ratings in the wooden room, with mixed heart-rate-variability results — a finding with direct relevance to the leasing-tour context in which prospective renters first encounter a mass timber building. Taken together, this body of work was synthesized by the University of Washington's Life Cycle Lab in April 2025 (Hariadi & Carlisle, 2025): a review of 41 studies which found mixed results on indoor air quality, early evidence of better attention and mood, lower markers of stress (sympathetic activation and cortisol) and physiological relaxation from seeing, smelling or touching wood — documented mostly in offices, healthcare and schools, with residential mass timber research described as very limited. That record provides a theoretical and empirical basis for expecting analogous effects in the residential rental market this study examines, and makes this study one of the first residential data points.

Cleo Valentine's work in neuroarchitecture supplies mechanisms that connects these observations. Her framework of architectural allostatic overloading (Valentine, 2023; Valentine, Mitcheltree, Sjövall & Khalil, 2025) holds that subtle features of built form — proportion, surface, pattern, window arrangement — elicit stress responses that are harmless once but, repeated daily over the years people spend indoors, can keep the body's allostatic (stress-regulating) systems switched on and contribute to chronic inflammation; biophilic and biomorphic design, which integrates natural materials and the fractal, organic patterns of nature, is the counter-case, associated with downregulation of stress. In a pilot study, Valentine, Steffert, Mitcheltree & Steemers (2024) recorded EEG from participants viewing two buildings and found lower relative delta power — their proxy for neuroinflammatory activity — when viewing the building richer in natural materials, fractal pattern and organized complexity. Wood is the natural material most readily built into a dwelling at scale, and its grain is exactly the kind of biomorphic pattern her framework predicts to calm rather than load; the finding here that residents describe the wood in the vocabulary of warmth and calm (A7, D1, D2) is what that framework would lead one to expect, though it should be said that her studies are conceptual and pilot-scale, do not name wood specifically, and have not yet been run on occupied homes.

In the present sample these effects are reported rather than inferred: 20 of 26 residents say they noticed feeling warmer and calmer when they first moved in; 24 of 26 chose "being surrounded by wood makes me feel calmer and more at ease" when forced to choose between paired statements; and the vocabulary residents use for the wood is thermal-emotional — warm, cozy, calm, homey — rather than olfactory, acoustic, engineering or fact-based (Section 5, A7, D1,

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D2). Alapieti, Mikkola, Pasanen & Salonen (2020) reviewed the effect of wooden interior materials on the indoor environment across chemical emissions, moisture buffering, antibacterial activity, acoustics and psychological response, and concluded that the effects are mainly positive or neutral: wood is widely perceived as natural, warm and comfortable and is often preferred to other materials, most studies find it creates less stressful environments, exposed wood moderates daily humidity swings, and the only negative effects are volatile emissions, mostly terpenes, which rarely exceed sensory-irritation thresholds at indoor levels and which some evidence links to relaxation. Three of their conclusions map directly onto the present data. The perception of warmth and comfort is what residents report unprompted. Scent, which their review notes can reach odor thresholds in some settings, was noticed by only 10 of 26 residents here (A7) and appears once in open text, qualified ("like the timber aisle of Home Depot, not like a forest"), consistent with finished interiors in which emissions sit below perception for most people. And wood's acoustic character — sound-reflecting, with low absorption — is why acoustics appears in these data as neither a channel nor a risk: softer sound was recalled by 8 of 26 and the open comments cut both ways. The University of Washington review's conclusions — improved perceived air quality, cognitive performance, reduced stress and physiological relaxation, documented mostly in offices and institutions — transfer to this residential sample in the one form a survey can detect: nearly universal reports of calm. The hypothesis this strand suggests — that residents will report warmth, calm and well-being from the wood — is aligned with the data.

## 2.5 Rationality, Consistency, and Market Implications on Consumer Demand

A complementary dimension of this framework is the examination of rationality and consistency in consumer behavior. The Weak Axiom of Revealed Preference (WARP) and Afriat's Theorem (1967) provide criteria for assessing whether observed choices are consistent with rational utility maximization; applying them formally requires repeated observed choices at observed prices, which a single cross-sectional survey cannot supply and which are left to the rent-roll panel proposed in Section 7. The hypothesis this strand suggests is that if residents' preference for the material is stable rather than situational, it will survive re-choice and re-statement: a resident who renews is choosing the bundle again, and a resident who names an attribute most important will have rated it so. Consistency is tested here in two ways that the data permit, and both align. The first is behavioral: a resident who renews a lease is choosing the same bundle again, at market-rate terms, while better informed than at the initial decision. Fourteen of 25 respondents have stayed longer than they planned at move-in and none has left sooner; 23 of 26 would choose mass timber again at equal price and location and none would choose conventional construction.

The second is within-respondent consistency across elicitation formats. Each respondent's named "most important" and "least important" value dimension was compared with that respondent's own importance ratings: 23 of 24 who named a most important dimension had rated it, or its thematic twin, at their personal maximum; 20 of 21 who named a least important dimension had rated it at their personal minimum; and 32 of 33 unprompted "most important" move-in factors had been rated "very important" by the same person on the closed scale. The one exception on every check is the same respondent, who also completed only two of five forced-choice pairs — a low-engagement flag, not a pattern. Stated preferences that are this coherent

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across formats can be read as stable rather than as artifacts of question wording, which is the practical content of the rational-consistency criterion in a survey setting. Such consistency implies that consumers perceive durable utility benefits from mass timber (e.g., comfort, aesthetics), supporting a rational basis for long-term market demand.

The broader implication of this analysis is strategic: because residents exhibit consistent preferences favoring mass timber — expressed through retention, concessions avoided and counterparty quality rather than through rent — this provides a credible behavioral justification for future development and investment to adopt timber systems in place of traditional steel or concrete. The world's primary money allocators, from BlackRock to BlackStone to Principal to Prudential to AEW to BentallGreenOak to Goldman Sachs to Clarion to Ares to Carlyle to JP Morgan Chase, or other similar firms who provide capital in the form of equity or debt, should find reason to "get smart" about mass timber and build their internal knowledge and professional skills. Consistency in preference data thus indicates not only that mass timber has monetary value, but also that the market is psychologically and economically ready for growth, and holds latent opportunity for comparatively superior risk-adjusted investment gains compared to normal, standard new housing development – be it apartments, flats, townhomes or single family detached in nature.

### 2.6 Rogers' Diffusion of Innovation and Consumer Typologies Implications

A critical theoretical lens for understanding why some renters embrace mass timber while others do not is Everett Rogers' Diffusion of Innovations framework (Rogers, 2003). Rogers identifies five adopter categories — Innovators, Early Adopters, Early Majority, Late Majority, and Laggards — each characterized by distinct attitudes toward novelty, risk tolerance, social influence, and information-seeking behavior.

Applied to the mass timber housing context, this framework predicted that the initial population of renters at early mass timber developments would skew toward the Innovator and Early Adopter segments: individuals who actively seek out novel experiences, identify with sustainability values, are curious about emergent building systems, and for whom the novelty itself carries social or identity value. By contrast, Late Majority and Laggard renters might be deterred by unfamiliarity with wood construction, concerns about durability or fire safety, or simply a preference for established conventions. The prediction did not hold. Asked to describe their disposition toward new or innovative products (H5), 17 of 26 residents chose "I like using new technology once it is proven and popular," 5 chose "I seek out the latest technology before it goes mainstream," and 4 chose "I prefer to stick with the technology I already know and love." Only 2 of 26 find wood surfaces unfamiliar and 5 prefer "proven, industrial materials" for structure, and none of those seven is leaving sooner than planned or would choose a conventional building instead.

The methodological implication reverses the one anticipated. Mass timber housing in these two assets is not being carried by an innovator niche; it is occupied by pragmatist adopters living in a not-yet-mainstream product without detectable friction, which is to say there is no stigma to "sell through." (This is unlike, for instance, the early electric-vehicle market.) The consumer value

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detected is therefore more universally applicable across early and late majorities than the framework predicted, which matters for scaling into mass-market, mainstream apartment development: a product whose appeal depended on innovators would face a ceiling that this one does not. The non-leaser population envisioned in the original design remains a useful target for the extension (Section 7), where it would map the conditions under which the late majority converts.

The consumer profiling strand of this study explicitly operationalizes Rogers' framework by including a self-reported innovator type question, which classifies respondents as early adopters, pragmatists ("once proven and popular"), or late adopters. This variable is used to segment the sample and to test the prediction above. The intersection of Rogers' adopter categories with Thaler's mental accounting and Kahneman's framing effects creates a theoretically rich lens for understanding mass timber as a product category navigating its early commercialization phase.

## 2.7 Social Signaling and Identity (Virtue Signaling) Forces

A fifth theoretical strand completes the framework. Beyond the private utility a resident derives from living among natural materials, differentiated housing goods can generate additional social utility when adoption is communicated to peers. Akerlof & Kranton's (2000) identity economics formalizes this channel by including category membership ("the kind of person who lives in a mass timber building") as an argument in the utility function. This predicts that a subset of residents will derive measurable disutility from non-disclosure and measurable utility from proactive disclosure. Complementing this, Berger (2014) explains the social functions that drive product-related word of mouth, and Trusov, Bucklin & Pauwels (2009) show its effect on demand to be larger and longer-lasting than that of traditional marketing.

The hypothesis this strand suggests is that a subset of residents will value the building for what it says about them, and that these will be the residents who talk about it. The study tested that prediction and it did not hold. The dimension "reflects my personal values or identity" is the lowest-rated of eight (2.35 of 4) and, with Pacific Northwest culture, draws 21 of the 27 "least important" nominations made by the 21 respondents who named one; 12 of 26 accept the identity statement when forced to choose, but acceptance is unrelated to word of mouth. Word of mouth is real — 11 of 26 bring the building up proactively and 26 of 26 say everyone who visits likes it — and it is carried by the building being distinctive and beautiful: proactive mentioners rate distinctiveness and beauty higher than the rest but are no more likely to endorse the identity statement. The pride residents express is pride in a distinctive asset, which is the owner's to capture, rather than value signaling about themselves.

## 2.8 Prior, Similar Consumer Evidence, and the International Dimension

The consumer literature on preceding this research is almost nil. A multi-storey wood construction paper grown from Nordic forest-sector research offers some comparable help in that it measures attitudes among people who do not live in the product. Lähtinen et al. (2021), with a 2,191-respondent panel across Denmark, Finland, Norway and Sweden, find that prejudice against wood construction is reduced where consumers value aesthetics and natural surroundings, and that ecological sustainability reduces it only among Finnish respondents.

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Wallius et al. (2024), with 7,007 respondents in seven European countries, report that 46% had never heard of wood-frame multi-storey buildings and that young urban professionals rate them most attractive. Shang, Pheng & Fai (2025) find broad acceptance among young Singaporeans alongside low knowledge of the product. Prakosa et al. (2026), reviewing 143 peer-reviewed studies of the economics, costs and markets of mass timber, find no measure of a rent premium or of occupant willingness to pay at all — the gap this research addresses.

The one published study of actual residents is Jussila et al. (2024), who interviewed occupants of newly built wooden multi-storey buildings in Finland and Sweden. If the Nordic findings transfer, the expectation is that conventional criteria will dominate the move-in decision and that no stigma will attach to the wood — and both hold here, with the difference that exposure lets this study see what lies beyond acceptance. Its findings are generally in line with the more statistically supported results reported here: conventional housing-choice criteria — location, floor plan, affordability — mattered more than the material (a point the hedonic literature had already established.) Perhaps more useful, it is noted that no negative stigma or headwind to the use of wood was detected; just as with this dataset.

It should be noted that this study's reach was materially more limited due to three reasons that bear directly on the present research. First, Finnish fire regulations kept the timber covered inside the apartments studied and the Swedish cases only sometimes left it visible, so most of its residents could report only on theoretical (credence) attributes, having little opportunity to see or feel mass timber products. Thus, the experiential channels documented in this study were not available for detection. Second, its dataset was seven households (six of them owner-occupiers), each interviewed for a duration roughly similar to the administration of this survey, supplemented by the impressions of three property managers treated as part of the data; it relied on verbal impressions rather than a quantitative, comparative approach. The present dataset is more than three times larger, uses closed scales, forced choices and respondent-level consistency checks, and treats the informed opinion of property and asset managers as a check on the reasonableness of findings derived from the data rather than as data. Third, and in consequence, that study produced no new knowledge usable by industry beyond the absence of consumer resistance, whereas research conducted at sites with exposed mass timber was able to uncover directly impactful insights about where value is created and where it is not. The contrast is itself a finding. It is an early indication that European and American building codes, encapsulation required by the former, exposed timber permitted in the later, have materially different consequences for the business case of mass timber, a point developed in Section 6.5 and carried into the extension in Section 7.4.

## 2.9 Summary

This theoretical framework integrates classical revealed preference theory with modern behavioral economics, innovation diffusion theory and identity (signaling) and in so doing acts to bridge rational choice with today's psychological understanding of decision-making. It respects housing markets as laboratories of real-world behavior, where consumers' environmental and emotional motivations interact with functional and financial realities.

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By combining Samuelson's logic of observable choice, the information economics of search, experience and credence attributes, Thaler's mental accounting, Rogers' innovation diffusion typologies, and Akerlof & Kranton's identity economics alongside Berger's word-of-mouth framework, this study documents where mass timber may add value, and how consumers manifest it. It also points out usable channels for use by developers and investors, and which are likely more or less powerful. The resulting evidence extends both academic theory and practical market understanding, offering developers, investors, and policymakers a data-driven, technical insights for their developments, capital allocation and regulatory or policy decisions.

**Academic / Research Alignment Breakdown / Summary**

| Theoretical strand | Hypothesis it suggests (example) | What the data showed | Alignment |
|---|---|---|---|
| 2.1 Revealed preference (Samuelson) | If residents value the material, the preference will show in ways that cashflows are materialized | Market rent (A6); 14 of 25 stayed longer than planned, 0 sooner (C2); 26/26 on time (C3); 23/26 mid-700s+ credit (H2) | Aligned |
| 2.2 Salience (Bordalo et al.) | Residents will notice the wood unprompted, without marketing costs | 23 of 23 who toured noticed it immediately (A8) | Aligned |
| 2.2 Search / experience / credence (Nelson; Darby & Karni) | Experiential attributes sells themselves; credence attributes (i.e carbon ) needs label & marketing support | Wood noticed by all; only 11 of 26 knew it was mass timber beforehand; "LEED plaque" request (A8, A9) | Aligned |
| 2.2 Switching costs (Chamberlin; Klemperer) | A non-substitutable home is left less readily and needs fewer concessions; it is stickier | 24/26 say the feel makes them want to stay; reasons are comparative; 7 of 10 one-year planners stayed longer (C1, C2, C4) | Aligned |
| 2.2 Mental accounting (Thaler) | A "responsible living" account will support a rent premium | No rent premium; sustainability account live for 7 of 26, the civically affiliated (A6, D2, H6) | Not supported |
| 2.2 Nudges (Thaler & Sunstein) | Cues that make the material legible strengthen attachment | Prior awareness leans with staying longer (1.36 vs 0.64); sustainability cue does not move value (A9) | Lightly aligned |
| 2.3 Hedonic pricing (Rosen; Sirmans et al.) | A differentiating attribute carries an implicit price | Rent within the market band; value through retention and counterparty quality (A6; Section 6) | Lightly aligned |
| 2.4 Wood and biophilic evidence (Nyrud & Bringslimark; Burnard & Kutnar; Alapieti et al.; Valentine) | Residents will report warmth, calm and well-being from the wood | Warm 20/26 and calmer 20/26 unprompted (A7); calm statement 24/26 (D2); vocabulary thermal-emotional (D1) | Aligned |
| 2.5 Rational consistency (Afriat; WARP) | A stable preference survives re-choice and re-statement | 23/24, 20/21 and 32/33 consistency checks; 23/26 would re-choose (F2, F3, A4, F5) | Aligned |
| 2.6 Diffusion of innovation (Rogers) | Early residents skew to innovators; later adopters report friction | 17 of 26 "once proven and popular"; 2 find wood unfamiliar; none leaving sooner (H5, D2). value applies across adopter types | Not supported |
| 2.7 Identity and Signaling (Akerlof & Kranton; Berger) | A subset values the building for what it says about them, and they are the talkers | Identity rated last (2.35); 11 of 26 talk proactively, carried by distinctiveness not identity (E1, F3, F4) | Not supported |
| 2.8 Prior related evidence (Jussila et al.; Lähtinen et al.) | Conventional criteria dominate; no stigma; exposure reveals more than cladding | Location and size lead (A3); no dislike of the look (D1); little value in credence attribute channels | Aligned |

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# 3. Methodology

## 3.1 Overview and Research Design

This study employs a consumer willingness-to-pay design that includes mixed-methods, fielded in person among current residents to record four behavioral anchors: rent paid relative to considered alternatives, tenure against plan, payment history and credit standing. It also includes recording the stated reasons behind them, among residents of market-rate mass timber housing.

The objective is to infer, from renters' actual housing decisions and their own account of those decisions, the direction and relative strength of mass timber's effect on the inputs of a development proforma, while accounting for the behavioral mechanisms and market context involved. In this way, it can inform developers and investors underwriting.

The design separates two questions that consumer research on building materials usually blurs. The first is what residents living in market-rate apartments that include mass timber attributes do with their own money and time: what they pay relative to the alternatives they weighed, how long they stay relative to trying another unit, whether they pay on time, and the credit quality they bring as counterparties. Each of these maps to a line of net operating income, and therefore to asset value, which is a derivative of those cashflows (net operating income capitalized at a market yield).

- Potential gross rental revenue,
- vacancy allowance
- turnover ratio per year assumption, along with make-ready and re-leasing expenses,
- collection / credit loss and counterparty strength if excess damages occur

The second question pertains to understanding why – how renters are motivated. This looks at which attributes offered by mass timber's incorporation into apartment development projects likely drive renters' consumption decisions; these factors are ranked amongst each other by their relative power. Each, then, is distilled for its direction (does it help, hurt or have no effect) and the estimated for scale of adjustment warranted in underwriting. The more than 1,500 datapoints are elicited through importance ratings, forced choices, recall of impressions and open response, and are cross-checked for consistency within each respondent.

The analysis integrates three data components:

- Primary survey data from 26 current renters at two mass timber apartment developments, collected face to face with a 29-question instrument;
- Verification and market context: payment history and credit standing compared against rent-roll records by property management and ownership at both sites, and informed expert opinion — property managers (Chris, Garrett, Hannah) asset managers/owners (Tyler, Noel) and appraisals / offering memos. These provide industry expertise by those who know each asset against their comparables, and in context.

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- Coded free-text responses and interviewer notes, which capture what residents volunteer about the wood, why the home makes them take action (or inaction) and related factors that influenced their decision.

By combining these elements, the study links revealed preference theory with behavioral economics, yielding a useful account of consumer decision-making applied to housing featuring mass timber products.

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## 3.2 Data Sources and Collection

### 3.2.1 Sample Frame and Scope / Sites

The study includes mass-timber apartment buildings located in markets, and of a nature, which make them rather typical market rate and market bound references. Non-market, highly subsidized, very uniquely designed or other non-investment attribute considerations are intentionally avoided in the hopes of improving the insights gleaned from these building's occupants towards the goal of mainstream growth via standard forces informing capitalism. Unprofitable, or atypical "Taj Mahal" examples are also avoided.

The reasons why can be explained well by analogy; for example, how a survey of consumers who purchased the first Tesla Model S EV cars may be less reliable or accurate than a survey of consumers today who are purchasing more market-standard Tesla Model 3 or Model Y vehicles. Just like the fastest and fanciest cars, buildings that are the most notable and interesting to designers, engineers, builders an policy professionals are often of least help to financial services realms who seek to understand broader swaths of the consumer landscape. In a similar way, affordable projects are often managed with socio-political influences overlaying and thus influencing the factors being studied, thus their exclusion. Thus, their resident populations are likely idiosyncratic and not broadly representative of consumer behaviors.

Survey outreach targeted current residents of the two assets. The possible total data available was: from the Wilson Townhomes, 14 townhomes with 42 current or recent adult occupants. From the Canyons, 70 households of current occupants with an assumed 100 adult occupants. Twenty-six households completed the long-form interview. Eight are from the townhome households at Wilson Forest Park and 18 are from the 70 flats at The Canyons. The data was gathered face to face in summer 2026 via interviews that ran from about twelve to nearly forty minutes. The survey was administered at both sites by Talia Esarey, a trained undergraduate summer research intern. She was supported by Victor Cho for a few days; both are students at Lewis & Clark College. Four means were used to procure data: email, small distributed flyers, a large sign and in-person.

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- Email: I sent out emails to Wilson Townhomes on May 30th and June 18th requesting help from residents with a summer research project and asking if they would be willing to participate in a 15 minute survey via phone or in person. I also distributed a similar email to The Canyons residents via their property manager on June 19th. Across both survey properties, six people responded and participated in the initial round of emails and two more responded to the second round for a total of eight email respondents.
- Flyer: I created a flyer requesting participation in the survey with a scannable QR code to book a time to take it on the phone or over google meets via google calendar. I posted this poster in the Canyons lobby and distributed it to Wilson doorsteps (there is no common area like a lobby at Wilson Townhomes) with handwritten notes asking for help and thanking past respondents. Three people signed up for google calendar appointments to take the survey after seeing and scanning this flyer. One of them saw it in the lobby and scanned it on their own, the other two scanned it at home after I handed it off to them in the lobby because they were too busy to participate in person.
- Door knocking: One resident agreed to take the survey from door knocking at Wilson. They did not take it in the moment but they used the QR code on the flyer to sign up for an appointment a couple of days later. Four people answered the door, all of whom took the poster. One later declined to participate by email. No door knocking was done at The Canyons because it was possible to substitute this effect for the option of being in the Canyon's lobby in person.

The design accepts a smaller sample than the 60–150 observations a multi-site regression study would desire in exchange for depth and administration quality: each respondent answered 29 questions across six sections, yielding over 1,500 codable datapoints from two distinctly different survey sites. The datapoints are not independent observations ( the effective sample for any inferential statement is 26) but they permit cross-correlation and tests of consistency within each respondent, and they indicate which threads of value creation appear comparatively more powerful, in what direction, and by roughly how much.

The two sites were chosen to put a broad range of market-rate renters into one dataset rather than a single slice: The Canyons offers conventional one- and two-bedroom flats and a standard amenity package; Wilson Forest Park Townhomes offers three- and four-bedroom townhomes with garages and no amenity package, and houses renters who are less often in the rental market (households renting during a remodel, relocating for work, or needing space for a larger family). Both are market-standard products for their respective offerings, with the use of exposed mass timber as the primary attribute that differs from comparable conventional assets. Findings are therefore reported for the pooled sample; the sites are distinguished only where the reference set a resident used to answer a question differs. Additional assets would be a helpful next step. Target properties are know in Milwaukee, Cleveland and Boston, and encapsulated mass timber buildings in Europe – see the extension described in Section 7 for more discussion.

Further details on the developments (survey sites) include:

- "Wilson Forest Park Homes" at 2915-29__ NW Wilson, Portland, OR 97210
    - https://wilsonpdx.com

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  - This "SFR, BTR" project provides survey data from residents of the 14 townhome style apartment homes built to IRC 4 story fee-simple code standards. Completed in 2022, the asset has leased up and been in "stabilized' operating conditions for at least two years. It is in a comparatively stable and vibrant neighborhood of Portland, Oregon with plentiful apartment market data. The author is the developer of this project.
  - More information can be found via: https://www.thinkwood.com/construction-projects/wilson-forest-park-townhomes
- The Canyons at 3450 NW Williams Ave, Portland, OR 97227
  - https://www.thecanyonspdx.com/
  - This six story multifamily project provides survey data from residents of its 70 flat style apartment homes, built to IBC R2, Type 5 over Type 1 standard. Completed in late 2020, the asset has leased up and been sold; the private parties responsible for its development and for its current ownership and management supporting this inquiry in their own capacity, including verification of the payment and credit findings against their records. The author was not involved in the development of this asset.
  - More info: https://www.woodworks.org/resources/mass-timber-business-case-studies/

### 3.2.2 Survey Instrument

The survey focuses exclusively on rental housing, not ownership. Rental housing include typical apartment "flats" as well as townhomes and single family detached homes – often referred to by investors as multifamily developments and/or assets or as single family rental built to rent (SFR BTR) development, respectively[8]. The fielded instrument has six sections:

- Housing choice (A1–A9): whether other homes were seriously considered; convenience for everyday destinations relative to alternatives; the importance at move-in of eight factors (neighborhood, rent, size/layout, amenities, natural materials and wood, sustainability, architectural design, recommendations/reviews); open "most, least and other" influences; rent relative to the alternatives considered (more, about the same, less); unprimed recall of whether the home felt warm, smelled like wood, seemed calmer, or sounded softer at move-in; whether the wood was noticed on the first tour; and prior awareness that the home was mass timber.
- Length of stay and counterparty quality (C1–C5): planned length of stay at move-in; actual stay against that plan; rent paid on time; whether the unique feeling of the home makes the resident want to stay longer, and why; and whether the home appeals broadly to friends and family.
- Experience (D1–D2): open likes and dislikes about living in a wood interior; and five forced-choice pairs drawn from ten statements covering health and comfort (two), beauty (two), nature connection, identity gain, sustainability gain, non-identity, preference for proven industrial materials, and unfamiliarity with wood surfaces.

[8] Multifamily assets can be further understood per IBC building codes to be occupancy type 2, types 1 thru 5 (as demonstrated by The Canyons.) Whereas SFR BTR may be either IBC or IRC occupancy type 3 (as demonstrated by Wilson Townhomes.)

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- Mass timber value dimensions (E1–F5): an eight-item importance battery (beauty and visual warmth; calm, health and nature; lower carbon and circularity; Pacific Northwest cultural identity; personal values and identity; durability and seismic resilience; architectural distinctiveness; wood grown and made in America); the single most and least important dimension; whether the resident mentions mass timber to friends and family; and whether, at equal price and location, the resident would choose an exposed-wood building or a conventional one again.
- Household profile (H1–H7): household income band, credit standing, education, age band, disposition toward new technologies, clubs and nonprofit or advocacy affiliations, and electric-vehicle ownership.
- Open comments (I1), recorded with the interviewer's notes.

Demographic items were collected in bands and are reported only in aggregate; names and survey IDs were held separately from the analysis file. Collecting them proved important: they carry one of the four principal findings (counterparty quality), and they allowed the smaller, convenience-sampled dataset to be checked against market-rate norms for income, credit, education and age.

Copies of the survey are available upon request.

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## 3.3 Analytical Framework

The analysis performed on the completed dataset is descriptive and respondent-level, and it is set out step by step in Section 4.3. Its quantitative core is three things the data permit: distributions of every item, with the four anchors reported first; respondent-level consistency checks across elicitation formats, in which each respondent's named most and least important dimension is compared with that respondent's own ratings and each unprompted move-in factor with the closed scale; and cross-tabulation of every stated item against the retention and re-choice anchors, with two-sided Mann–Whitney tests, a point-biserial correlation for the aesthetic index and Spearman inter-item correlations, all reported as exploratory and uncorrected. Around that core sit theme coding of the free text, triangulation of each value theme across six question formats, benchmarking of the household profile and the payment anchor against American Community Survey and Class A norms, and an industry expert check for reasonableness with the property managers, asset managers and owners of both sites. Every figure reported is computed by live formula from the respondent-level data in the companion workbook.

What the analysis does not include is a regression model. The hedonic rent model, the duration model, the credit-quality model, the behavioral interaction terms, the discrete-choice model and the axiom-based consistency tests that the April 2026 design specified all require a conventional comparison group, observed rents and tenures, or repeated choices at observed prices. This dataset has none of these: every respondent lives in mass timber, so the variable of interest does not vary; rent and tenure were collected as categories relative to each resident's own alternatives and plan; and a single survey records one choice. Those specifications are therefore not reported

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here. Section 7.4 sets out, in abridged form, what each model would need and how the extension would supply it.

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## 3.4 Validation, Reliability, and Limitations

Self-reported payment history and credit standing were compared by property management and ownership at both sites against rent-roll records to ensure alignment. Rent levels relative to market were assessed by informed expert opinion via the property managers, asset managers and owners who know each asset against the heterogeneous alternatives renters actually weigh – this being a more accurate means than attempting a matched comparable set (because apartment assets are rarely truly matched.) Benchmarks for the household profile and for payment behavior are drawn from the American Community Survey (age, income, education and tenure duration by housing tenure for the Portland metro, Multnomah County and the United States) and from RealPage, NMHC, REIT disclosures and screening-industry reports for Class A income, collections and credit norms; the sources are cited with the results in Section 5.

### 3.4.1 Data Validation

- Verification of self-reported payment history and credit standing against rent-roll records by property management and ownership at both sites.
- Confirmation of exposed mass timber construction at both assets with the developer and asset manager.
- Appraisal-based[9] (USPAP) judgement, with property manager, asset manager and owner opinion, as the reasonableness check on rent levels relative to market. Supplemented by appraisal (Wilson) and investment offering memo (Canyons) as 3rd party triangulation of assumptions, asset data, market context / rents.

### 3.4.2 Reliability

- Iterative revision of the survey instrument for clarity, administration time and respondent comfort.
- Physical copies of notes used during on-site, in person administration retained, double-validated input to codebook (see excel with raw data for details.)
- Respondent-level consistency checks across elicitation formats (named most and least important dimensions against the same respondent's ratings; unprompted move-in factors against the closed scale).
- Triangulation of each value theme across six question formats (Section 6.2) and against benchmark data.

### 3.4.3 Limitations

[9] The author is previously a formally trained commercial appraiser, previously registered in the State of Oregon performing work under and for the Curtis Slocum / Integra Realty Resources firms, and knowledgeable with The Uniform Standards of Professional Appraisal Practice (USPAP®) which is the national standard for real estate valuation.

- Sample size (n = 26 at two assets in one city) limits the analysis to direction and relative strength (or lack of any effect being able to be detected.)

- Items within a respondent are not independent, group comparisons are exploratory, and subgroup analysis is not attempted beyond description. This is, in part, due to the very limited number of completed mass timber housing projects built and operated per market rates norms and bounds.[10]
- Rent, tenure and re-choice are self-reports of behavior; rental rates being at market rates, tenure/turnover, payment history and credit standing are verified against management and ownership records; however, due to the nature of housing there is always in inability to have an apples-to-apples comparison. This is why a conventional comparison survey group was not deemed to provide materially improved comparison means.
- Forced-choice pairings were not recorded and so the degree cannot be reported (the administrator mixed and matched them)

The design is believed to reasonably meet accepted standards for survey-based consumer research in housing and ensures reliability through verification against records, consistency checks and triangulation.

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## 3.5 Ethical Considerations

Participation was voluntary with verbal consent, and results are reported in aggregated ways to keep specific preferences and opinions anonymous. For example, only one person expressed desire to not participate and the team quickly confirmed it was not a problem, and she would no longer be contacted. Names and survey IDs were held separately from the analysis file; demographic items were collected in bands. Data handling followed standard protocols for human-subjects research.

The research was funded and conducted by private funds; led by Conrad (Old i, LLC) under the author. In-kind support was offered by the assets and their related professionals. No public or university or funds from mass timber's supply-side (its forestry, manufacturing, A&E, construction) parties were provided. Thus, no conflicts of interest are believed to exist.

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[10] Student dorms, subsidized housing projects and similar "non-market" projects may offer usable data; however, they have been excluded from this initial phase to disentangle non-market, non-investment forces which may complicate the consumer choices of those project's occupants.

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# 4. Data and Analysis

## 4.1 Data Preparation and Normalization Philosophy

Consistent with the study's intention to inform practical industry decision-making, data are normalized in simple, directionally meaningful categories rather than continuous numerical scales. This approach avoids conveying false precision—an important principle because real estate underwriters typically adjust pricing or duration assumptions only modestly when incorporating new factors such as building materials. The study therefore emphasizes directional effects (higher, similar, lower) rather than fine-grained numerical predictions. This aligns with how mass timber's influence would realistically appear in underwriting or asset valuation: through minor adjustments rather than major shifts.

The primary variables (rent relative to alternatives; duration relative to plan) are therefore grouped into three-category indicators, focusing on whether mass timber produces *higher*, *similar*, or *lower* outcomes relative to alternatives. Importance ratings are reported on their original scales (A3, 1–3; E1, 1–4) with counts at each level; forced-choice statements as counts chosen; free text as coded themes with the coding published in the companion workbook (MT_Resident_Survey_Analysis_Claude_Oct26.xlsx), where every figure in Section 5 is computed by live formula from the respondent-level data. E1 items treat 0 and 99 as missing; all other items treat 99 as missing.

## 4.2 Variable Operationalization (Normalized Categories)

The following table reflects the variables as fielded. This operationalization is intended to keep the analysis intuitive to industry stakeholders and satisfying academic methodological expectations.

| Variable | Survey item | Coding | Role | Theoretical link |
|---|---|---|---|---|
| Rent category | A6 | 3 = More expensive than alternatives, 2 = About the same, 1 = More affordable | Revealed anchor 1 | Revealed preference; hedonic pricing |
| Duration category | C2 (with C1 planned stay) | 3 = Stayed / plan to stay longer than expected, 2 = As expected, 1 = Sooner | Revealed anchor 2 | Utility persistence; switching costs |
| Payment behavior | C3 | 1 = Always on time, 0 = Not always (ownership-verified) | Revealed anchor 3 | Counterparty quality |
| Credit standing | H2 (with H1 income, H3 education) | 1 = Mid-700s to 800s, 2 = 600s or better, 3 = Lower (ownership-verified) | Revealed anchor 4 | Counterparty quality |
| Feel influences stay; re-choose | C4; F5 | C4: 1 stay longer / 0 no influence / −1 leave sooner; F5: 2 mass timber / 1 not sure / 0 conventional | Corroborating anchors | Differentiation; stated intention |
| Move-in importance (eight factors) | A3 | 1 = Not, 2 = Somewhat, 3 = Very important | Stated: decision stage | Hedonic attributes |
| Unprimed recall (four items) | A7 | 2 = Yes, 1 = Kinda, 0 = No | Stated: experiential baseline | Biophilic response |
| Noticed wood; prior | A8; A9 | A8: 2 immediately / 1 after prompt / | Stated: salience and | Search vs credence |

| | | | | |
|---|---|---|---|---|
| awareness | | 0 no / 99 no answer; A9: 2 aware / 1 heard / 0 found out after | credence | attributes |
| Forced choice (ten statements) | D2 | 1 = Chosen, 0 = Not chosen (five pairs per respondent) | Stated: candidate channels | Health, beauty, nature, identity, sustainability, adoption |
| Value dimensions (eight items) | E1 | 1 = Not, 2 = Slightly, 3 = Moderately, 4 = Very important; 99 = N/A | Stated: candidate channels | Channel ranking |
| Most / least important dimension | F2; F3 | Free text coded to E1 item | Consistency check | Rational consistency |
| Word of mouth | F4 | 3 = Proactively, 2 = If asked, 1 = No, 0 = Did not know | Stated: signaling | Berger (2014); identity economics |
| Household profile | H1, H3, H4, H5, H6, H7 | Income band 1–5; education 1–3; age band 1–6; adopter type 1–3; affiliations coded; EV 0/1 | Segmentation; representativeness | Rogers; Class A norms |
| Free text | A4, C1, C4, D1, I1 | Coded themes (workbook tabs) | Qualitative | Means-end chains |

## 4.3 Analytical Sequence (per Categorical Variables)

The analysis proceeded through seven steps.

**Step 1: Descriptive distributions.** Counts, means and valid-n for every item, with the distribution of the four anchors reported first and each stated item alongside the question wording (Section 5).

**Step 2: Respondent-level consistency checks.** Each respondent's named most and least important dimension (F2, F3) compared with that respondent's own E1 ratings, and each unprompted "most/least" move-in factor (A4) compared with the same respondent's A3 rating.

**Step 3: Anchor cross-tabulations.** Every stated item compared between residents who stayed longer than planned and those who stayed as expected (C2), between those who would re-choose mass timber and those unsure (F5), and between proactive and non-proactive word-of-mouth residents (F4), with two-sided Mann–Whitney tests reported as exploratory and uncorrected. Rent (A6) is not used as a grouping variable, for the reference-set reason explained in Section 5.

**Step 4: Theme coding.** Free-text answers to A4, C1, C4, D1, H6 and I1 coded to themes, with codings published so they can be changed and the results recalculated.

**Step 5: Triangulation.** Each value theme (beauty and distinctiveness; health, calm and nature; sustainability and provenance; identity and culture; resilience; novelty) read across six question formats — move-in importance, unprimed recall, forced choice, importance rating, most/least nomination and open text — to see which converge (Section 6.2).

**Step 6: Benchmarking.** The household profile and the payment anchor compared with ACS and industry norms for renters, owners and Class A residents.

**Step 7: Industry expert check for reasonableness.** The author interviewed the property managers, asset managers / owners of both sites to confirm that the assumptions and findings

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align with their perceptions, with their view of the submarket and with property-specific data and findings to compare self-reported data against rent-roll records, their professional observations and judgement. The check is a superior substitute for a matched comparison group due to the lack of an apples-to-apples comparison (due to the innate nature of housing) and, in the extension, becomes a structured protocol run at every site.

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## 4.4 Statistical Significance and Interpretation (Directional Focus)

Group comparisons are exploratory and uncorrected; conventional thresholds of **$p < 0.05$** and **$p < 0.10$** are reported where a test was run, but interpretation emphasizes:

- Shift in distribution between categories, not exact monetary values.
- Whether residents stayed longer than they planned, paid on time and carry better-than-market credit — and in which direction the stated items lean among those who did.
- Convergence of a channel across question formats rather than the precision of any single estimate.

This prevents overstatement of precision and maintains industry-relevant credibility. Alongside the p-values, Section 5.7 reports exact 95% confidence intervals for every headline proportion, effect sizes (Cohen's d, Cliff's δ) with bootstrap intervals for the group comparisons, permutation and Fisher exact tests in place of asymptotic ones, and Holm and Benjamini–Hochberg control across the full family of cross-tabulations, so that the reader can see how much weight each result bears.

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## 4.5 Robustness Checks

Because the study rests on a small sample, no single result should be taken at face value; the checks below test whether each headline finding holds when the question format, the site, the individual respondents included, or the statistical method is changed, and whether self-reported answers agree with ownership records and published benchmarks. Findings that survive these checks can be read as dependable directional signals for underwriting, while those that do not should be treated as tentative, so the reader can tell which conclusions are sturdy and which are only suggestive.

- Within-respondent consistency checks (F2/F3 against E1; A4 against A3) as the test of whether stated answers are stable across formats
- Sensitivity of each theme to the elicitation format (triangulation across six formats)
- Pooled versus site-level reading of the rent anchor (reference-set check)
- Comparison of self-reported payment and credit with ownership records, and of the household profile with ACS and Class A norms
- Exclusion of the one low-engagement respondent as a sensitivity check on the consistency results

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- Exact (Clopper–Pearson) 95% confidence intervals for every headline proportion, with Wilson intervals as a cross-check (Table 5.7a)
- Effect sizes — Cohen's d and Cliff's δ — with 10,000-resample bootstrap intervals and 20,000-relabeling permutation p-values for the stayed-longer versus as-planned comparisons (Table 5.7b)
- Family-wise error control (Holm; Benjamini–Hochberg) across the 37 cross-tabulations of stated items against the tenure anchor
- Scale reliability (Cronbach's α, mean inter-item correlation) for the aesthetic, calm / health and credence indices and the E1 battery
- Leave-one-out (jackknife) and site-level re-estimation of the four revealed-preference points, with Fisher exact tests of one site against the other as the within-study replication and non-response check
- One-sample exact binomial tests of the credit, income, education and payment findings against the published benchmarks
- An explicit minimum detectable effect for the design (Sections 5.7 and 7.1)

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## 4.6 Interpretation and Industry-Relevant Insights

The goal is not to produce exact numerical premia (e.g., "mass timber increases rent by 3.6%"), but to demonstrate directional influence consistent with industry-normal underwriting practices. For example,

- That mass timber leaves rent in the "similar rent" category — neither "higher rent" nor "lower rent": the attribute is priced within the market band.
- That mass timber increases the likelihood of longer tenancy or at least similar stability, with no tendency for shorter stays. (i.e. the product is comparably more "sticky".)
- That better-than-market payment behavior and counterparty credit quality, confirmed by property management and ownership, is a likely outcome for apartments with exposed mass timber.
- That no consumer-side downsides likely exist, which is to say that renters like the look and feel, express no adoption friction, and do not report wanting to be leaving sooner in favor of returning to conventional construction look & feel apartments.
- That no prior awareness of mass timber implies little need for marketing expenditures.
- How experiential attributes (beauty, distinctive design, feelings of calmness) are directionally powerful (positive) underwriting forces. Whereas credence attributes (characteristics that consumers cannot verify through normal inspection before buying or while using) appear to hold little power except for a minority of consumers.

This level of evidence is sufficient for developers, lenders, and investors to:

- Adjust underwriting inputs to reflect mass timber impacts, where applicable,
- Recognize behavioral drivers of demand to inform development design,
- Avoid overstating or undervaluing timber's influence so as to better tailor mass timber product offerings,

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- Incorporate mass timber into long-term asset operations, buying and selling strategies.

**How far to lean on this evidence.** Read plainly, the robustness checks of Section 5.7 say how much weight each of the points above can carry. The four observable attributes can be relied on for direction: each held when any single respondent was removed, when the two buildings were examined separately, and when tested against benchmarks. They do not provide reliable sizing: with 26 households, the data's interval around "stayed longer than planned" runs from about a third to three quarters of residents (a wide range). Thus, they justify moving an assumption in the property value's favor, but by how much should be treated with caution and kept in the context of the asset's own history or the submarket norm. The reasons behind the behavior are strong leads more than a proven fact: consistent across every way the question was asked, medium to large in size, and not statistically significant at this sample once the number of comparisons is allowed for.

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# 5. Results and Discussion, by Question

Each question is shown with its wording, then a Results paragraph (the counts, means and respondent-level statistics from the companion workbook) and a Discussion paragraph (how the result aligns with the academic literature or market-rate norms, and what it contributes to the what/why framing). Survey question labels follow the instrument (A1–A9, C1–C5, D1–D2, E1, F2–F5, H1–H7, I1); workbook variable names are given in brackets for traceability. The raw data workbook is available upon request.

## 5.1 Section A — Housing choice

### A1 — Before moving here, did you seriously consider any other nearby apartments or homes? [CONSIDERED_OPTIONS]

**Results.** 23 of 26 seriously considered other nearby homes before choosing this one; 3 did not. Most of the 23 could name the alternative or the neighborhood they searched (Mississippi/Williams corridor, NW Portland and Slabtown, St. Johns, Forest Park, specific competing buildings).

**Discussion.** A comparison-based choice is the premise of every item that asks residents to rate this home against alternatives (A2, A6, C4, F5). Twenty-three of 26 having shopped the market supports treating the sample as ordinary market actors rather than captive or incidental renters, and it makes the A6 rent comparison and the C4/F5 "no substitute" answers meaningful. These questions lend support that the constructed dataset is in line with usual and customary market rate apartment consumer behaviors.

### A2 — Thinking about everyday destinations, how did this home compare to the other options you considered? [PROXIMITY_INDEX]

**Results.** 23 of 26 say this home is easy and convenient for everyday destinations; 3 say other options were better on convenience but they liked this home more.

**Discussion.** Location is the best-established priced attribute in residential markets. Hedonic theory decomposes observed rents into implicit prices of a dwelling's attributes, location among them (Rosen, 1974); the apartment-rent literature consistently finds locational attributes to be comparatively highly priced (Sirmans & Benjamin, 1991; Sirmans, Sirmans & Benjamin, 1989). Thus, this sample which was procured via convenience methods is behaving as the literature predicts, which is a further sign that the dataset reflects typical market behavior.

### A3 — How important was each of the following when you originally decided to move here? (1 = not, 2 = somewhat, 3 = very) [IMPORT_LOC … IMPORT_REC]

| Factor | Very (3) | Somewhat (2) | Not (1) | Mean | Named most important in A4 | Named least important in A4 |
|---|---|---|---|---|---|---|
| Neighborhood | 21 | 5 | 0 | 2.81 | 12 | 0 |
| Unit size or layout | 18 | 8 | 0 | 2.69 | 10 | 0 |
| Architectural design and building | 14 | 11 | 1 | 2.50 | 4 | 0 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| aesthetic | | | | | | |
| Rent price | 10 | 16 | 0 | 2.38 | 3 | 0 |
| Natural materials and wood in the unit | 9 | 15 | 2 | 2.27 | 1 | 0 |
| Sustainability / environmental features | 6 | 9 | 11 | 1.81 | 0 | 1 |
| Building amenities | 6 | 8 | 12 | 1.77 | 3 | 5 |
| A friend's recommendation or online review | 4 | 5 | 17 | 1.50 | 0 | 9 |

**Results.** Neighborhood and unit size or layout dominate, followed by architectural design, rent, and natural materials and wood; sustainability, amenities and recommendations trail. No one rated neighborhood, size or rent unimportant; only 2 rated natural materials unimportant. The unprompted A4 answers reproduce the same order (A4_Coding tab).

**Discussion.** Hedonic reviews establish location, unit size and configuration, and structural quality as the standard priced attributes of residential property (Sirmans, Macpherson & Zietz, 2005), and the same variables transfer to apartment rents (Guntermann & Norrbin, 1987). Against that established ranking, the two mass timber homes behave as market-standard products: location and function lead, price matters but is not always first, and the attribute that differs from conventional product — the exposed wood and the design it produces — lands immediately behind rent and ahead of sustainability, amenities and reviews. This is further evidence of market-normal, academically aligned results from this dataset.

Beauty and the materials that create it are of similar importance to rental price at the point of decision, and are more powerful than attributes that developers commonly spend on (amenity packages like gyms, roofdecks or party rooms) or rely on/fear (online reviews & recommendations).

For clarity, this ranking is a stated-preference result in that it is residents' retrospective account of what mattered, anchored by the revealed facts that they chose, paid and stayed. Within this, two contextual points are noted.

First, neither site has an award-recognized design or a celebrated architect, so the design importance detected here is innate to the physical material rather than to the brand or aura of a designer. This is important because style premia that rest on fashion erode over time (Buitelaar & Schilder, 2017), whereas a premium carried by the material itself has no such mechanism of erosion suggesting that any value which may be created by the use of mass timber may be well sustained over time. New and novel real estate apartment developments commonly manifest net operating incomes that are superior to their comparables set; however, the inability to sustain above average NOIs often creates valuation problems. Thus, mass timber may present a solution to this common complication.

Second, lay and professional observers (i.e. consumers versus investors) judge residential design differently (Devlin & Nasar, 1989), so more heterogeneity in design valuation than in location or function is expected — and is observed (1 "not", 11 "somewhat", 14 "very"). If mass timber interiors make more clear the value proposition in a way shared by both consumers and investors, uncertainty relating to aesthetics may be reduced and thus risk-adjusted returns may be improved.

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### A4 / A5 — Which factors were most and least important, and was anything not mentioned? [A4_OTHER_INFLUENCE]

**Results.** 25 of 26 named a most important factor and 14 a least important one. Most important: neighborhood or location 12, unit size or layout 10, architectural design or wood 4, rent 3, amenities (a gym, a garage, secure parking with EV charging) 3. Least important: a friend's recommendation or online reviews 9, amenities 5, sustainability 1. Nobody named location, size, price, design or wood as least important. Of the 33 respondent-by-factor "most important" mentions, 32 were factors the same person had rated "very important" in A3; all 15 "least" mentions were at that person's A3 minimum. Influences outside the A3 list were functional: parking or a garage (3), pet-friendliness (2), air conditioning (2), in-unit laundry (2), a fast leasing process (2), natural light and high ceilings, ADA accessibility, EV charging, proximity to family or to Forest Park, utilities included, unit quality and the property manager.

**Discussion.** The open answers validate the closed ones: the A3 list captures the move-in decision well, and respondents answer consistently across formats. The unprompted "other" influences are practical features that an extension survey should add (parking, pets, AC and laundry, accessibility), since residents volunteer them and the current list omits them. This question validates that the assumptions made by the survey design's topics offered did not miss critical factors of importance to consumers.

### A6 — Compared with the alternatives you considered, how would you describe the rent here? (3 = more expensive, 2 = about the same, 1 = more affordable) [RENT_CATEGORY]

**Results.** 11 more expensive, 13 about the same, 2 more affordable; mean 2.35. The "more expensive" answers come mainly from the townhome residents, though a minority of the flat residents gave that reply as well. The exact 95% confidence interval for "about the same or more affordable" (15 of 26) is 37–77%, straddling one half: neither a premium nor a discount is supported (Section 5.7).

**Discussion.** This appears to show the absence of a rent signal rather than evidence of a premium, or a building-specific effect. Context is important, in that residents of the three- and four-bedroom townhomes that have garages and larger outdoor decks have a thin reference set — few comparable rentals exist. Further tempering these results are that several Wilson residents were renting while remodeling a house or after relocating for work, so they are not regular participants in the rental market. This is in contrast to the residents of the one- and two-bedroom flats of The Canyons which can be compared much more easily against a deep and familiar set of alternatives, thus most of them say "about the same." Property manager, owner and appraiser opinions believe the townhome rents in line with market, and of course if they were above market there would be notable vacancy (and there is not.)

The townhome residents' perception of paying more should be discounted as a reference-set effect. The pooled distribution — a plurality at "about the same," a normal-looking spread either side, and no willingness to pay more for the wood or to take a discount to accept it — is consistent with what hedonic pricing predicts for a single differentiating attribute in a market-rate asset: it is priced within the market band (Rosen, 1974; Sirmans & Benjamin, 1991). For

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underwriting, no rent premium is supported; the value channels run through retention and counterparty quality (Section 6). In plain terms, a developer should underwrite the rent a comparable conventional unit would earn and expect neither a premium to defend nor a discount to absorb; the interval around "about the same or more affordable" (37–77%) is wide, but it is centered where the market is.

The design decision to include both renter types in one dataset was deliberate, to avoid drawing conclusions from only one slice of consumers, and it is the reason the reference-set difference appears in this item and nowhere else. This question points to the importance of extending this research to more survey sites and markets when resources become available to enable this.

### A7 — When you first moved in, do you remember noticing… (2 = yes, 1 = kinda, 0 = no) [BIO_WARM, BIO_SMELL, BIO_CALM, BIO_ACOUSTIC]

| Noticed at move-in | Yes | Kinda | No | Mean (0–2) |
|---|---|---|---|---|
| It felt warm in the space | 20 | 3 | 3 | 1.65 |
| It smelled like wood or a forest | 10 | 0 | 16 | 0.77 |
| It seemed calmer or less stressed in the home | 20 | 3 | 3 | 1.65 |
| The sounds felt softer | 8 | 4 | 14 | 0.77 |

**Results.** Warmth and calm were noticed by 20 of 26; smell and softer sound by far fewer. These items were asked before the interviewer revealed that the research concerned wood or mass timber, so they are the least primed answers in the instrument.

**Discussion.** The pattern appears to be that thermal and affective experiences are noticed at roughly twice the rate of olfactory and acoustic ones. This is reinforced by question (D1), where "warm" is the single most used word and smell appears just once. These results align with academic literature covering the psychological response to interior wood which report consistent effects on perceived warmth, comfort and stress (Nyrud & Bringslimark, 2010; Burnard & Kutnar, 2015; Alapieti, Mikkola, Pasanen & Salonen, 2020). This suggests the mechanism behind the health/calm channel for potential value creation enabled by the use of mass timber products. Because recalled first impressions are subject to the limits of introspection (Nisbett & Wilson, 1977) this data may be as impressions now rather than then; their value here is as an unprimed baseline that the later, primed items (D2, E1) can be checked against (they agree with.)

### A8 — Thinking back to your first tour, did you notice the wood right away? [FIRST_IMPRESSION]

**Results.** All 23 who answered noticed the wood immediately; none needed the leasing agent to point it out and none failed to notice it. Three respondents are recorded as "do not remember / did not tour in person" and are treated as no answer.

**Discussion.** This is the core of the "no marketing required" finding, which maps directly to reduced operating expenses and thus comparatively higher NOI. Guidance from academic literature on this finding can be found via Nelson (1970, 1974) which distinguishes search qualities, which a buyer verifies by inspection before purchase, from experience qualities learned only through use; Darby and Karni (1973) add credence qualities, which cannot be verified even

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after use and require third-party attestation. Exposed wood is a search attribute — verified by every resident on the tour — and it is salient by construction against a drywall comparison set, so it receives disproportionate decision weight (Bordalo, Gennaioli & Shleifer, 2013). Advertising intensity concentrates in experience goods; for search goods its role collapses to pointing buyers toward inspection (Nelson, 1974). The value the material creates therefore does not depend on ongoing marketing expenditure or on training leasing staff to sell it (the later often being a missing or inadequate practice amongst higher frequency, lower paid on-site leasing roles.)

The corollary is a visibility condition: if the mass timber structure were clad in conventional interior finishes, the consumer could neither verify it by inspection nor experience it, and the candidate channels documented here would be materially degraded — a point developed in Section 6.5. This is directly of importance to building codes as they support or create headwinds for mass timber adoption. For example, in the United States where taller buildings can now leave a material portion of their mass timber products unclad, value potential is enabled. This is in contrast with most European nation's building codes that require multifamily buildings of even lower densities to clad their use of mass timber; an ironic fact when considered against Europe's comparatively higher priorities for seeing the growth of lower carbon building construction designs.

**A9 — Before you toured or moved in, were you aware your home was built with mass timber? [AWARENESS_MT]**

**Results.** 11 were aware (42%), 6 had heard something (23%), 9 found out after moving in (35%).

**Discussion.** Noticing the wood is near-universal (A8) while knowing it is "mass timber" is not: the visible material is a search attribute, the structural system and its carbon story are credence attributes (i.e. features that most residents had to be told about and also be willing to believe once told – which some did not.) Three residents asked the interviewer to define mass timber and one wished for "a LEED certified plaque on the building … so that I knew before you told me."

The green-building literature shows that credence attributes are capitalized through labels rather than claims; for example, in one multifamily study, LEED-certified apartments earned roughly an 8.9% rent premium while self-described "green" marketing without certification did not (Bond & Devine, 2016). Label premia vary with local environmental ideology (Kahn & Kok, 2014) and the value of a label is partially shared with the credentialing authority and its approved certifying ecosystem (which is why USGBC / LEED actions have fallen out of favor; their net gains to value premiums are often more than offset by the costs to obtain the potential gains due to costs assessed.) Thus, mass timber's attribute bundle has a self-marketing visual core with the option for, but not dependency upon certification authorities and therefore may better enable the realization and retention of value on behalf of the apartment's ownership.

Awareness also tracks retention: among those who stayed longer than planned, prior awareness averaged 1.36 against 0.64 among those who stayed as expected (the largest lean on the Anchor_CrossTabs tab), which suggests that residents who knew what they were choosing have been the stickiest.

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## 5.2 Section C — Length of stay and counterparty quality

### C1 — When you first moved in, how long did you expect to stay? [DURATION_PLAN_MONTHS]

| Planned stay (coded to the minimum stated) | n | Stayed or plan to stay longer (C2 = 3) | As expected (C2 = 2) | Leaving sooner (C2 = 1) |
|---|---|---|---|---|
| Under one year (six months during a remodel) | 1 | 0 | 1 | 0 |
| One year (incl. one 15-month lease) | 10 | 7 | 3 | 0 |
| One to two years | 3 | 2 | 1 | 0 |
| Two to three years | 5 | 3 | 2 | 0 |
| Three years or more | 4 | 2 | 2 | 0 |
| Indefinite — "as long as possible" | 2 | 0 | 2 | 0 |
| No expectation | 1 | — | — | — |

**Results.** The modal plan was a one-year commitment — a market standard lease term; the median stated minimum is 12 months and the mean 19.7 months among the 23 who gave a number. Nobody planned an unusually short stay for reasons connected to the product or its management/operation/market position (i.e. it was not a shorter term stay, student housing adjacent, etc. residential sub-type); the one sub-year plan was a household renting during a home remodel which is a typical component of market rate rental markets.

**Discussion.** The point of the question is to show that the sample is not an atypically transient or captive group, and it is not. For context, ACS 2024 one-year estimates show about 35% of Portland-metro renter households had moved into their unit during 2023–2024 and roughly two-thirds since 2020 (Table B25038), so one-to-two-year planning horizons are the regional norm. The cross-tabulation is the important result: the retention signal is strongest exactly where turnover risk is highest, among the one-year planners, 7 of 10 of whom have stayed longer than they intended.

### C2 — Compared with that original expectation, how has your actual stay compared? [DURATION_CATEGORY]

**Results.** 14 have stayed, or plan to stay, longer than they expected; 11 as expected; 0 sooner; 1 had no expectation. Among the 25 answering, 56% have outstayed their own plan (exact 95% CI 35–76%), and the upper bound on early departures is 14% (0 of 25). Those who stayed longer than planned lean higher on the wood and beauty items than those who stayed as expected (natural materials at move-in 2.43 vs 2.18; E1 beauty 3.36 vs 3.09; the D2 statement "developers don't typically build good-looking homes like mine" 0.85 vs 0.55; awareness of mass timber 1.36 vs 0.64) and lower on the sustainability items (carbon 2.79 vs 3.40; made in America 2.64 vs 3.09).

**Discussion.** This is the revealed anchor with the clearest signal and the most direct NOI consequence. Longer tenure reduces turnover, and with it make-ready, administrative and re-leasing cost and vacancy loss, and it lowers the volatility of rental revenue. Because rents on continuing tenants are sticky (Genesove, 2003), the NOI benefit of retention arrives mainly through avoided cost and vacancy rather than through rent growth on the retained resident — consistent with the absence of a rent signal in A6. For a practitioner the reliance is on direction,

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not size: at 26 households the interval around "stayed longer" runs from roughly a third to three quarters of residents, while the interval around "left sooner" tops out at one in seven and the observed figure was zero. That justifies lowering the turnover assumption and the costs that turn with it, with the amount set from the asset's own history or the submarket norm rather than from this study.

Among residents who stayed longer than planned, the aesthetic items run higher while calm and comfort are reported by nearly everyone regardless of tenure; aesthetics appears to be the discriminating channel for retention, calm the universal baseline. Note, the directionality of this effect is the finding: because no differences will survive a multiple-comparison correction with an n = 26 we see further motivation for this research's need to be extended to more sites and more renter respondents.

Ranking the candidate channels by their power to explain the retention anchor: the experiential attributes come first and the credence qualities last. Combining the six aesthetic items into one index, residents who stayed longer than planned score higher than those who stayed as expected — Cohen's d = +0.38, point-biserial r = +0.25, bootstrap 95% interval of the difference −0.20 to +0.62 (Table 5.7b); the six calm and health items combined show no difference, because calm is reported by nearly everyone — all 11 "as expected" residents and 12 of 14 "longer" residents chose the D2 calm statement — and so has almost no variance left to co-vary with tenure; and the credence qualities — carbon (2.79 vs 3.40), made in America (2.64 vs 3.09), Pacific Northwest culture (2.50 vs 2.73) and identity (2.36 vs 2.45) — all run lower among those who stayed longer. The order is therefore: beauty and distinction as the discriminating channel; calm and wellness as the universal baseline that everyone reports; identity, heritage and sustainability as attributes that do not track retention at all. None of these differences is statistically significant at n = 25 — the smallest Holm-adjusted p across the 37 comparisons is 0.92 (Section 5.7) — and they are reported as direction and effect size only.

**C3 — Have you paid rent on time while living here? [CREDIT_QUALITY_SPECIFIC]**

**Results.** 26 of 26 report always paying on time. Ownership at both sites compared this with rent-roll records and confirmed it. The exact 95% confidence interval for a 26-of-26 result has a lower bound of 87%, which sits at the top of the published Class A collection norms cited below; the sample is therefore consistent with, rather than demonstrably above, the norm, and the weight of the finding comes from the record verification (Section 5.7).

**Discussion.** Payment behavior is the third revealed anchor and an input to credit loss, the NOI line that underwriters treat as a function of tenant quality. The nearest published norms are collection rates and bad debt rather than a resident-level "always on time" rate: RealPage reports 97.6% of Class A rent collected (March 2023); the NMHC Rent Payment Tracker showed 95.9% of professionally managed households paying by month-end in 2019; coastal Class A REITs report net bad debt of 0.5–1.4% of revenue in 2025 (Essex, Equity Residential, AvalonBay). A fully on-time, ownership-verified sample sits at or above the top of those norms. Property managers and these assets owners confirm they agree with this finding, that these assets outperform on this attribute relative to expectations. With H2 it defines the counterparty-quality anchor discussed in Section 6.1. The practical reading is that the on-time result is as good as a

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sample of this size can show — the floor of its interval (87%) sits at the top of industry norms; its weight comes from the rent-roll verification rather than from a test. An underwriter can carry the Class A credit-loss assumption or better; a specific lower number is not something this study can yet supply.

### C4 — Does the unique feeling of your home make you want to stay longer? [MT_DURATION_INFLUENCE, MT_DURATION_WHY]

**Results.** 24 of 26 said yes, 2 said it has no real influence, 0 said it makes them want to leave sooner (exact 95% CI for "yes" 75–99%). Where a reason was given (20 of 26), the themes are design or quality (5: "so well designed … this one feels so well made and beautiful"), comfort or feel (5: "a lot of people underestimate how important it is to feel comfortable in your home"), explicit comparison with alternatives (4: "would not be able to find something else with this combination of layout and location"), uniqueness (3), the exposed wood ceilings (2), general affection (2), and location or function (2). The two "no influence" answers cite work location and outdoor space or a garage, not any dislike of the product. Detractors appear twice (price; management changes) alongside praise for the design (C4_Why_Themes tab).

**Discussion.** Residents explain stickiness in experiential and comparative terms — the home feels better made and there is nothing like it nearby — and they describe the effect of the material far more than the material itself. That is the mechanism the differentiation literature predicts.

Academic context offers helpful framing on this. Chamberlin's (1933) monopolistic competition gives a differentiated seller a demand curve insulated from perfect substitutes; Klemperer (1995) shows that when products are homogeneous, introductory offers — the concession game — become the competitive weapon, and that switching costs make current share determine future profit; attachment to a non-substitutable unit functions as a switching cost, and loyal consumers are measurably less price-sensitive (Krishnamurthi & Raj, 1991). Sirmans, Sirmans and Benjamin (1994) model rent, concessions and occupancy jointly in apartment markets, which is the "first month free" dynamic that a non-substitutable home blunts. Empirically, differentiated (certified) buildings show higher lease-renewal probability, lower tenant incentives and higher satisfaction even where no rent premium exists (Devine & Kok, 2015), and their premiums held through the 2007–2009 downturn (Eichholtz, Kok & Quigley, 2013); that evidence is from commercial property, and no residential equivalent has been published, which is a gap this study begins to fill. The real-options vocabulary (Titman, 1985; Grenadier, 1995, 1996; Dixit & Pindyck, 1994) prices flexibility rather than differentiation, so the asymmetry is better described as a put-like truncation of the left tail of turnover and vacancy outcomes (Section 6.4). Translated to a real estate developer working in a higher supply market like Austin, where future supply is to be expected, it appears that mass timber may create value via this mechanism.

### C5 — Does your home appeal broadly to your friends and family? [MKT_APPEAL]

**Results.** 26 of 26 say everyone who visits likes it. 11 of 26 bring the mass timber up proactively with friends and family (F4).

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**Discussion.** Universal third-party endorsement is unusual for apartment homes outside branded luxury interiors, tall-tower views or novel appliances, which is the comparison the write-up draws. The literature on co-opted brands clarifies who captures such value. When a component carries its own brand, the price premium is split between host and component owner and is not even assured (Venkatesh & Mahajan, 1997), whereas self-branded inputs build equity for the host (Desai & Keller, 2002); Veblen-effect theory locates status rents with the brand owner (Bagwell & Bernheim, 1996); and hotel evidence shows licensors extract fees while licensees can still net positive NOI (O'Neill & Carlbäck, 2011; O'Neill & Xiao, 2006). Famous-architect premia in the office market run at single digits and part of an iconic architect's residential value leaks to neighboring parcels the owner does not control (Fuerst, McAllister & Murray, 2011; Ahlfeldt & Mastro, 2012). Exposed mass timber is a generic, unbranded input that nonetheless produced the endorsement reported here, and there is no licensor with whom to share it: the owner captures the whole of any aspirational value, as unbranded style premia in housing suggest (Buitelaar & Schilder, 2017; Dastrup, Graff Zivin, Costa & Kahn, 2012). One nuance from the data: the 11 proactive word-of-mouth residents rate "architecturally distinctive" and "beauty" higher than the rest but are no more likely to endorse the identity statement in D2 (5 of 11 vs 7 of 15) or to rate identity higher in E1 (2.36 vs 2.33). The pride attaches to a distinctive building (i.e. an experiential attribute) not to self-expression of identity (a theoretical credence attribute.)

## 5.3 Section D — Experience

### D1 — Thinking about living in a wood interior, what do you notice — positives and negatives? [SAT_LIKE, SAT_DISLIKE]

**Results.** Likes, by number of respondents using the theme: warmth 10 ("warm," "warmer feel," "cozy"); natural feeling or connection to nature 9; calm, comfort, homey or soothing 8; beauty or looks 7; light, bright, airy or spacious 6; the wood ceiling specifically 5 ("stare at the ceiling all the time"); easy to decorate or neutral tone 3; quality or "built with intent" 2; acoustic comfort 2; "cabin in the city" 2; smell 1 (qualified: "smells like the timber aisle of Home Depot, not like a forest"); conversation piece 1; lukewarm 1. Dislikes related to the wood — 8 respondents, 9 mentions: matching furniture to the wood shade 2; sound travels 2; harder to hang things 1; water damage shows permanently 1; creaking or expansion with heat 1; darker than painted white surfaces 1; laminate flooring detracts from the wood 1. Two said "no flaws" or "nothing," 11 left dislikes blank. Non-wood complaints (wool carpets, switch placement, plumbing vent, bathroom size, cabinet height, price) are excluded (D1_Themes tab).

**Discussion.** The vocabulary is thermal-emotional — warm, cozy, calm, homey — and visual, rather than olfactory, acoustic, engineering or fact-based. That matches A7, where smell and sound were the least-noticed traits, and it is the clearest statement in the data of how the product is experienced: as a feeling rather than a specification. Means-end chain theory (Gutman, 1982) links an attribute to the consequence a consumer experiences and the value it serves; here the chain is exposed wood → warm look and calm feeling → happy to be in this home, which is precisely the health/calm channel. No respondent dislikes the look of the wood; the dislikes are practical and small, and the acoustic comments cut both ways (two praise the quiet, two hear neighbors), which is why acoustics is neither a channel nor a risk in these data.

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## D2 — Forced choice between pairs of statements (five pairs per respondent) [D2_HEALTH … D2_NONIDENTITY]

| Statement (theme) | Chosen | Of |
|---|---|---|
| Being surrounded by wood at home makes me feel calmer and more at ease (health/comfort) | 24 | 26 |
| Living among natural materials connects me to the outdoors and to the Pacific Northwest (nature connection) | 19 | 26 |
| Developers don't typically build good-looking homes like mine (beauty) | 18 | 25 |
| The wood makes me feel healthier, more relaxed and more comfortable at home (health/comfort) | 17 | 25 |
| I think my home looks better than other homes (beauty) | 16 | 26 |
| Living in a mass timber building says something positive about who I am or where I come from (identity gain) | 12 | 26 |
| My home is probably more sustainable than my friends', and that matters to me (sustainability gain) | 7 | 26 |
| I prefer proven, industrial materials for the structure of a building I live in (adopter preference) | 5 | 25 |
| I don't think my choice of home says much about who I am or what I stand for (non-identity) | 3 | 26 |
| Wood surfaces feel unfamiliar — I am used to drywall and paint (unfamiliarity) | 2 | 26 |

**Results.** 123 selections were recorded (two respondents completed fewer than five pairs and one has three blanks). Health/comfort is the strongest signal (24 and 17), followed by nature connection (19) and the two beauty statements (18 and 16); identity gain is middling (12); sustainability (7), industrial preference (5), non-identity (3) and unfamiliarity (2) are weak. All 12 who claimed the identity statement also claimed "calmer and more at ease," and only 3 of the 12 claimed the sustainability statement. The two who find wood unfamiliar and the five who prefer industrial materials do not overlap; both unfamiliarity claimants describe themselves as "once proven and popular" technology adopters (H5).

Across the matrix, all 26 respondents faced five pairs each drawn from the ten statements; because the administrator mixed and matched the pairings, each respondent did not confront every possible pairing, but the claim counts across the whole matrix still show which notions resonate most with rental home occupants. Reading the 123 recorded selections:

- Notions relating to health and comfort appear as the strongest signal out of this question's method. "Being surrounded by wood at home makes me feel calmer and more at ease" is clearly the most claimed notion — the most agreed-with idea — in that 24 of 26 opted for it. Supporting this finding, the other similar notion, "The wood makes me feel healthier, more relaxed, and more comfortable at home," was claimed by 17 of the 25 who faced it, the fourth highest. The correlations with values held by occupants, discussed below, add further support.
- Notions relating to beauty register as relatively highly claimed ideas, lending strength to the related questions that test the value creation potential of a differentiated look and feel created by wood and mass timber elements in apartment rentals: 18 of 25 claimed "Developers don't typically build good looking homes, like mine," and 16 of 26 claimed "I think my home looks better than other homes."
- The notion that wood provides a connection to nature is highly claimed — 19 of 26 chose "Living among natural materials connects me to the outdoors and to the Pacific Northwest" — while only 7 of 26 claimed "My home is probably more sustainable than my friends', and that matters to me." Because the sustainability statement was deliberately made harder to claim, by mixing it into a comparison amongst one's

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community, and because those who claim connection to nature rarely claim it, the result supports wood's connection to nature as a simple attribute and possible value creation mechanism in its own right, not as a proxy for the broader notions of sustainability with which nature is sometimes interwoven and confused.

- Little signal is found pertaining to early-adoption value or friction — whether the simple idea of opting into something new and novel is a value creation mechanism by itself, or a headwind. Only 2 of 26 claimed "Wood surfaces feel unfamiliar — I am used to drywall and paint," and both self-identified as "I like using new technology once it is proven and popular" when asked directly about their disposition toward new products (H5); 5 of 25 claimed "I prefer proven, industrial materials when it comes to the structure of a building I live in," and none of these were the two who claimed unfamiliarity. No signal was found for mass timber creating headwinds via concerns about durability or unproven technology; there is no stigma that needs to be "sold through," and renters appear willing to accept the use of mass timber — unlike electric vehicles, the introduction of mass timber products appears reasonably frictionless.
- Wood and mass timber's ability to value-signal or align with a person's identity (as car brands or Apple products often demonstrate) appears to be a possible value creation mechanism, but not as strong a signal as health and comfort, beauty or nature connection. 12 of 26 claimed "Living in a mass timber building says something positive about who I am or where I come from." One might expect these 12 also to claim the statement that sustainability matters to them, but only 3 of the 12 did; notably, all 12 claimed "calmer and more at ease" and most claimed its sister notion that the wood makes them feel healthier, which suggests that an identity related to health and wellness may be the stronger value creation mechanism offered by the use of wood in rental apartments. Living in a huge mansion is a commonly understood means for a rich or famous person to express identity; is that true for normal market-rate apartment rentals? That only 3 of 26 claimed "I don't think my choice of home says much about who I am or what I stand for" suggests that even in the choice of an apartment rental, people may include in their decision what it signals or symbolizes about their identity. Of note, question E1 suggests that identity is not an important factor by residents' own self-report; one can remember that few are comfortable openly admitting to a stranger how they value-signal through consumption, although the respondent-level checks in F3 and F4 show that those who rank identity last are not avoiding the topic elsewhere, so this reticence reading is held lightly.

**Discussion.** Three readings carry into the channel analysis.

First, calm and comfort are chosen by nearly everyone when the alternative is any other framing, which is the strongest single statement in the instrument.

Second, connection to nature is chosen widely while the sustainability statement is not, so nature connection is being valued as an experience and not as a proxy for environmental virtue.

Third, no adoption friction appears: 17 of 26 are "once proven" pragmatists living in a not-yet-mainstream product, and only 2 find wood surfaces unfamiliar, so there is no stigma to sell through — unlike, for instance, the early electric-vehicle market. Table 5.7a bounds these three

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signals: the calm statement is chosen by at least three quarters of residents, unfamiliarity by at most a quarter, and the sustainability statement by at most half and most likely far fewer. A developer can treat calm as near-universal and unfamiliarity as negligible with more confidence than a 26-household count would ordinarily carry.

Method caveat: the pairings were not recorded, so each statement's claim rate is confounded with whatever it was paired against; the design was accepted because the trade-off confronted is the reality of the on-site data collector administering the survey needs a faster means to avoid frustrating the respondent. A more resourced extension of this research could include a hand held digital tablet that allows for the recording of pairings. Also, respondents feel more comfortable not being recorded; they are more free to offer honest expression. The claim rates are therefore indicative, and they are read alongside the independent formats (A7, E1, F2) rather than alone.

## 5.4 Sections E and F — Mass timber value dimensions

### E1 — How important to you personally is each of these reasons a mass timber building is special? (1 = not, 2 = slightly, 3 = moderately, 4 = very) [IMPORT_AESTHETIC … IMPORT_MADEINUSA]

| Dimension | Valid n | 1 | 2 | 3 | 4 | Mean | % at 3–4 | Named most (F2) | Named least (F3) |
|---|---|---|---|---|---|---|---|---|---|
| Architecturally distinctive and looks cool | 26 | 0 | 1 | 13 | 12 | 3.42 | 96% | 6 | 0 |
| Structurally durable and earthquake resilient | 25 | 0 | 1 | 15 | 9 | 3.32 | 96% | 2 | 0 |
| Beauty and visual warmth of exposed wood | 26 | 1 | 0 | 19 | 6 | 3.15 | 96% | 7 | 0 |
| Feeling calmer, healthier or more connected to nature | 26 | 1 | 5 | 13 | 7 | 3.00 | 77% | 4 | 0 |
| Lower carbon footprint, sequesters carbon, circular | 25 | 1 | 7 | 9 | 8 | 2.96 | 68% | 7 | 1 |
| Wood grown and made in America | 26 | 4 | 4 | 12 | 6 | 2.77 | 69% | 2 | 5 |
| Pacific Northwest cultural identity and heritage | 26 | 5 | 8 | 7 | 6 | 2.54 | 50% | 0 | 11 |
| Reflects my personal values or identity | 26 | 3 | 13 | 8 | 2 | 2.35 | 38% | 0 | 10 |

**Results.** Distinctiveness, resilience and beauty are consensus items (96% at moderately or very important); calm/health is also of high importance albeit with less consensus; carbon themes are of importance to some, but not many as its results are flat across importance scale ( 2–4); local / made in America is bimodal (8 at 1–2 against 18 at 3–4); culture is a lower importance and is the flattest item (SD 1.07) and identity the only item centered on "slightly." Distinctive draws twice the "very" votes of beauty (12 vs 6). Inter-item correlations (E1_Skew tab) show two loose clusters — an aesthetic cluster (beauty–distinctive ρ = 0.42) and a values cluster (carbon–biophilic 0.55, carbon–made in America 0.54, biophilic–culture 0.44) — with resilience correlated with nothing. The one "not important" on beauty came from a respondent who rated distinctiveness very important. Row 7 of the data has invalid zeros on carbon and resilience, excluded here.

**Discussion.** Four things carry into the channel analysis.

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Building-level distinctiveness is felt more intensely than material-level beauty, although residents name the two about equally as most important (6 and 7); together they are the most-named dimension (13 of 24).

Resilience is rated second-highest and tightly, yet only 2 name it most important, none name it least and it appears once in open text ("felt strong"): a valued baseline residents expect once told, not a salient driver — a credence attribute and a candidate for explicit communication rather than a lead message. This attribute appears to be a unique example of mass timber's potential value creation for high seismic markets whereby marketing could translate to value creation.

Calm is near-universal when asked experientially (A7, D2) but only moderately "important" when rated deliberatively, and the rating moves with the values cluster rather than the aesthetic one: residents treat "calmer / healthier / nature" as a values statement when asked to rank it, while the lived experience is universal.

Carbon, locally made and culture are target market segments, but not a consensus. Thus, tailored (social) marketing could be useful value creation approaches if carefully deployed.

Read against Section 5.7, the ranking of these dimensions is a strong lead rather than a proven fact. The residents who stayed longest lean toward beauty and distinctiveness (effect sizes of roughly +0.4 to +0.6) and away from carbon and provenance (roughly −0.5 to −0.8) — differences that are medium to large in size but, at this sample, not statistically significant once the number of comparisons is allowed for (Table 5.7b). They are the best available guide to what to build and what to say; the larger study is what would settle them.

**F2 — Of the dimensions above, which one matters most to you? [IMPORT_TOP1]**

**Results.** 24 of 26 named a dimension; two said "none," and both have flat profiles (all 2s and 3s), which is itself consistent. Named most important: beauty of wood 7, architecture or looks cool 6 (look and feel 13 in total), sustainability or carbon 7, made in America 2 (both alongside sustainability), calm or connection to nature 4, resilience 2.

Consistency check against each respondent's own E1 ratings (F2_F3_Consistency tab): 20 named a dimension they had rated at their personal maximum; 3 named "beauty of wood" or "cool architecture" while rating its sibling (distinctive or beauty) at the maximum; 1 named sustainability while rating carbon 3 and PNW culture 4. No outright mismatch. By theme, the 13 look-and-feel namers include 11 who endorsed a D2 beauty statement and 8 who rated design very important at move-in, and all 13 would re-choose mass timber; the 7 sustainability namers include 4 of the 7 D2 sustainability endorsers and rate carbon 3.7 against 2.7 for the look-and-feel namers; all 4 nature or calm namers chose both D2 nature and D2 calm.

**Discussion.** Self-reported "most important" is internally consistent with ratings, forced choices and move-in importance for 23 of 24 respondents. This is strong support for taking the E1 and F2 results at face value, and it is a result worth stating explicitly: the stated "why" evidence in this study is reasonably supported, especially given the initial phase limited scope. The single exception also completed only 2 of 5 forced-choice pairs and left no open comment — a low-

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engagement flag, not a pattern; the respondent is retained. The look-and-feel and sustainability namers are distinct segments with different rating profiles, which is the basis for the segment conclusion in Section 6. For practice, this consistency is what allows the stated reasons to be used at all: a reason named once and confirmed by the same person's ratings, forced choices and move-in answers is a reason a design or leasing team can act on.

**F3 — Which one matters least, or feels irrelevant to you? [IMPORT_BOTTOM1]**

**Results.** 21 of 26 named a dimension; 4 said "all important" (each had rated every E1 item at 3 or above, so the answer is consistent) and 1 left it blank. Named least important: Pacific Northwest culture 11, personal identity 10, made in America 5, sustainability 1 (the respondent who "did not really know until now"). Consistency: 20 of 21 named a dimension they had rated at their personal minimum; the exception is again the same respondent, who named PNW connection while rating it 4, their highest. The 16 who named identity or culture least are not avoiding the topic elsewhere — 6 endorsed the D2 identity statement and 8 bring the building up proactively (F4).

**Discussion.** The practical reading is a list of value propositions that should not be used; this being notable as they are often asserted by experts assumed mechanisms of value – as shown by mass timber conference's stages. Proposing mass timber because it reflects a region's historical context and culture, because it expresses the resident's identity or values, or because the wood was grown and made in America is, on this evidence, an unsupported, lower-value proposition: residents consistently rank those dimensions last, and the respondent-level check shows they do so consistently. The suggestion that identity is under-reported out of reticence is not supported — what residents volunteer about (F4, C5) is the building's distinctiveness, not their identity.

The confusion may arise from the fact that one of the other end user groups for wood/mass timber (the political realm) finds political value in these themes. So the industry can benefit in bifurcation of their talking points; remembering to build buildings and market them per the ways their consumer's attribute value, which is very different than what socio-political constituencies want to be told.

**F4 — When you told friends or family about your new home, did you mention mass timber? [BRAND_SIGNAL]**

**Results.** 11 brought it up proactively, 7 only if asked, 8 did not mention it, 0 did not know; mean 2.12 on a 0–3 scale. Proactive mentioners rate distinctiveness (3.64 vs 3.27) and beauty (3.36 vs 3.00) higher than the rest; they do not differ on D2 identity (5 of 11 vs 7 of 15) or E1 identity (2.36 vs 2.33).

**Discussion.** Word of mouth is real for 11 of 26 and is carried by the building being cool and beautiful rather than by what it says about the resident. This reframes the identity discussion: the pride residents express is pride in a distinctive asset, which is the owner's to capture (C5), not value signaling about themselves. For marketing, residents who talk about the building are advertising its look, not its provenance. This may play a part in the extended durations of

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tenancies (i.e. that residents re-opt to continue renting) in that they have developed a sense of pride; this being a form of product stickiness.

### F5 — Knowing what you know now, with two options at similar price and location — exposed wood or conventional — which would you choose? [RECHOOSE_MT]

**Results.** 23 would likely choose the mass timber building, 3 are not sure, 0 would choose conventional; mean 1.88 on a 0–2 scale (exact 95% CI for re-choose 70–98%; the conventional choice is bounded at 13%). The three "not sure" respondents each named a non-aesthetic dimension as most important (sustainability, resilience, nature), describe themselves as later technology adopters (1.33 vs 2.13), and are higher-income households; every look-and-feel namer would re-choose.

**Discussion.** A re-choose intention is stated, and hypothetical choice items overstate real behavior by a median factor of about 1.35 in meta-analysis (Murphy et al., 2005; List & Gallet, 2001), so this item is read as corroboration of the retention anchor rather than as an anchor itself. Two features make it more credible than a typical hypothetical: respondents have already paid real rent for the product, and the answer is anchored by C2 and C4. Two features make it slightly less credible: at least two respondents answered after an in-interview explanation of what mass timber is (one "changed his mind"), so F5 carries some priming; and the zero conventional answers may reflect in-person social desirability. Even discounted, the direction — a product that its consumers would repurchase and would not trade away — is the behavioral definition of a differentiated good. In plain terms, the re-choose result corroborates retention and should not be quoted as a market statistic of its own; what its interval does rule out is any meaningful preference for conventional construction — at most 13% of residents, and in fact none.

## 5.5 Section H — Household profile and counterparty quality

### H1 — Approximate annual household income before taxes [HH_INCOME]

| Band | Survey n | Survey % (of 25) | ACS band | Portland-metro renters | Portland-metro owners | U.S. renters |
|---|---|---|---|---|---|---|
| Under $50,000 | 1 | 4% | Under $50k | 38.3% | 15.6% | 47.5% |
| $50,000–$80,000 | 2 | 8% | $50–75k | 18.4% | 11.3% | 17.8% |
| $80,000–$120,000 | 9 | 36% | $75–100k | 14.4% | 12.1% | 12.0% |
| $120,000–$175,000 | 7 | 28% | $100–150k | 16.7% | 21.5% | 12.6% |
| Over $175,000 | 6 | 24% | $150k+ | 12.3% | 39.6% | 10.2% |
| Prefer not to say | 1 | — | | | | |

**Results.** Mean band 3.6 of 5 among the 25 answering; 22 of 25 (88%) report $80,000 or more and 13 (52%) report $120,000 or more. Portland-metro renter households at $75,000 or more are 43%, at $100,000 or more 29% and at $150,000 or more 12% (ACS 2020–2024 five-year, Table B25118); median renter household income is $65,641 in the metro and $59,000 in Multnomah County, against $123,612 for metro owner households (Table B25119). The sample's income distribution resembles Portland owner households (61% at $100,000 or more) more than renter households.

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**Discussion.** The right comparison set is Class A market-rate renters, because Class A screening (conventionally gross income of three times rent, but often capped at two times rent by democratic jurisdictions in the way that Portland's FAIR ordinance does) truncates the bottom of the distribution. RealPage's analysis of about 7 million market-rate leases put the median income of new-lease signers at $75,000 with a Class A rent-to-income ratio of 20.5% (2022); coastal Class A REITs report far higher residents (Equity Residential $177,000 average household income at 19.6% of income, 2025; UDR about 2.5 times the MSA median). Applying those ratios to Portland's Class A average asking rent of $2,080 (Northmarq/Yardi, Q3 2025) implies a typical Class A household income of roughly $109,000–$127,000, while the three-times screen implies only $74,880. The sample therefore sits well above all-renter norms and at or modestly above the income implied by Class A rent-to-income norms. The townhome residents pull the average up because of the larger unit type they consume, but larger unit types exist across the market and pull up the comparison measures too; the aim is not precision but to document that mass timber occupancy co-varies and triangulates positively with higher household incomes, which is a reinforcing and correlated factor to the finding that mass timber attracts high credit / counterparty-quality occupants.

**H2 — Credit score (self-described) [CREDIT_QUALITY_GENERAL]**

**Results.** 23 of 26 "good / higher: mid-700s into the 800s," 3 "in the middle, 600s or better," 0 lower. Ownership at both sites compared the credit and payment self-reports with their records and confirmed alignment. The exact 95% confidence interval for "mid-700s or higher" is 70–98%, and one-sample binomial tests against the benchmarks below reject parity with the general population ($p < 0.0001$ against the 50% of U.S. consumers at 740 or above; $p = 0.03$ against the 70% at 670 or above) and with applicant pools ($p < 0.0001$ against the 38% of 2025 applicants at 740 or above) (Section 5.7).

**Discussion.** Published benchmarks: RentGrow screening data put the average approved renter at 650 nationally and 683 in high-end buildings (2017), with high-end applicants averaging 669 VantageScore in 2020; TransUnion reported 34% of applicants at ResidentScore 720 or above (2018); a 2025 applicant pool averaged 680 with about 38% at 740 or above (Hemlane, 2025); vendor guidance puts typical Class A minimums at 740 or above (Snappt, 2025). In the general population the U.S. average FICO is 713 with 50% at 740 or above and 70% at 670 or above (Experian, 2026); Oregon averages 730 and the Portland metro 737 (2024).

The sample's 88% at "mid-700s or better" is above applicant norms, above the general population, and above a Class A screened tenant norms. Together with 26 of 26 on-time payment (C3), the dataset shows better-than-market credit and payment history; these findings were confirmed by each site's property management and ownership, and together they form the fourth revealed finding.  Its value to an owner is protective rather than routine: when something unusual occurs and a resident is responsible for the cost — pet damage, a careless water leak, repairs beyond normal wear — a creditworthy counterparty is more likely to reimburse than to default or disappear, so the charge is recovered rather than written off. The practical reliance here is high but specific. The credit profile is verified and sits above every published benchmark with an interval that does not reach down to them, so an owner can underwrite a strong counterparty with confidence. What the profile does not show is that the wood caused it — Class A screening

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selects on exactly these variables — so it belongs in the credit-loss and damage-recovery lines of a proforma, not in the design or marketing lines.

### H3 — Highest level of education [EDUCATION]

**Results.** 1 high school or GED, 14 bachelor's or in school, 11 graduate degree; mean 2.38; 96% bachelor's or higher. Renter householders with a bachelor's or higher are 32.0% in the U.S., 37.4% in the Portland metro and 46.4% in the city of Portland (ACS 2024 one-year, Table B25013); owner householders 43.5%, 53.0% and 67.5%.

**Discussion.** Education corroborates the income and credit findings: the sample is more educated than Portland renters and than Portland owners. No published Class A education benchmark exists; the result is read as part of the counterparty-quality profile rather than as a wood effect.

### H4 — Age range [AGE_GROUP]

| Age band | Survey n | Survey % | Portland-metro renters | Portland-metro owners | Multnomah Co. renters | U.S. renters |
|---|---|---|---|---|---|---|
| Under 25 | 0 | 0% | 7.2% | 0.5% | 7.3% | 9.0% |
| 25–34 | 8 | 31% | 28.9% | 9.6% | 32.3% | 25.8% |
| 35–44 | 9 | 35% | 21.8% | 18.9% | 22.7% | 19.7% |
| 45–54 | 2 | 8% | 14.1% | 20.6% | 12.8% | 15.0% |
| 55–64 | 5 | 19% | 11.8% | 20.0% | 10.7% | 13.4% |
| 65 and over | 2 | 8% | 16.1% | 30.3% | 14.1% | 17.1% |

**Results.** The survey matches the metro renter profile at 25–34, over-represents 35–44 and 55–64, and under-represents the under-25 and 65-and-over tails (ACS 2020–2024 five-year, Table B25007, tenure by age of householder; ACS records householder age and its lowest band starts at 15).

**Discussion.** The absence of under-25 renters and the weight at 55–64 are what a Class A product with high rents and larger units predicts. "Generally representative" is fair for a market-rate Class A cohort, not for renters at large, and the distribution is wide enough that no age-related skew should be suspected in the preference results.

### H5 — Disposition toward new or innovative products and technologies [ADOPTER_TYPE]

**Results.** 5 seek out the latest technology before it goes mainstream, 17 adopt once it is proven and popular, 4 stick with what they know.

**Discussion.** Two-thirds of the residents of a not-yet-mainstream building product describe themselves as pragmatist adopters, and the two who find wood surfaces unfamiliar (D2) are among them. The three F5 "not sure" respondents are the later adopters.

Mass timber is not being carried by an early-adopter niche; the product appears frictionless to the mainstream renter, which matters for scaling into mass market, mainstream apartment development realms.

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### H6 — Clubs, nonprofits or advocacy organizations [ORG_MEMBERSHIP]

**Results.** 25 of 26 named an affiliation. Coded: social-service volunteering 8 (one women's shelter appears four times), sports and fitness 8 (pickleball 4), advocacy 4, outdoors and conservation 3, arts and culture 3, health 3, hobby clubs 3, built environment and urbanism 2, education 2, peer support 1 (Org_Coding tab). The 11 respondents with a social-service or advocacy affiliation rate carbon 3.4 against 2.6 for the rest, made in America 3.4 against 2.3, Pacific Northwest culture 2.8 against 2.3, rated sustainability higher at move-in (2.1 against 1.6), and supply 4 of the 7 who named sustainability most important and 4 of the 7 EV owners. All three outdoors or conservation affiliates endorsed "connection to nature." Affiliation does not predict the aesthetic signal: prosocial and sports-only respondents rate distinctiveness alike (3.45 vs 3.67), and the two urbanism affiliates both named look and feel most important while rating identity lowest.

**Discussion.** The sample appears civically engaged, consistent with its education and income profile, and civic affiliation identifies the sustainability segment which is notable given that these consumers appear to place little value the carbon benefits of mass timber. The consumer insight is that beauty, warmth and calm sell to everyone in this sample while the carbon and provenance story sells to an identifiable minority, but who may be resistant because they want proof (the "LEED plaque"), and are reached by certification or signage rather than by leasing-agent talking points. With n = 26 these are patterns for the larger extension to test.

### H7 — Electric or plug-in hybrid vehicle in the household [OWNS_EV]

**Results.** 7 of 26 own or lease an EV or plug-in hybrid (27%); 4 of the 7 are among the civically affiliated respondents.

**Discussion.** EV ownership is one more marker of the sustainability segment, and one respondent valued the building's EV charging as its sustainable feature more than the mass timber — a reminder that for this segment, visible and certified features carry the value.

## 5.6 Section I — Open comments

### I1 — Anything else about living here, the design, or the wood? (interviewer notes) [OPEN_COMMENT]

**Results.** Grouped (I1_Themes tab): aesthetic-first with little or no knowledge of mass timber 7 ("LOVE WOOD"; "just liked it because it looks good"); learned what mass timber is during the interview or wanted it marketed 5; health or biophilic language volunteered 2 ("healing space"; "bright, light, more at ease as if better blended with the trees outside"); sustainability-oriented 5 (including a corporate sustainability officer and an EV-charging-first respondent); openly skeptical of the carbon and local-sourcing claims while calling the wood "very pretty" 1; property-management complaints 4; functional priorities dominated 3 (ADA accessibility, grandchildren, neighborhood); no comment captured 3. The two longest interviews (37 and 30 minutes) were the residents most animated about the wood; the shortest (12 minutes) gave one of the two "no influence" answers on C4.

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**Discussion.** The open comments reinforce the hierarchy of channels — beauty and warmth, then calm and health, then sustainability, then identity / heritage / local / etc. The management complaints are at a level normal for market-rate assets and are read as evidence that the respondent set is representative (that some residents are unhappy for ordinary reasons unrelated to wood / mass timber.)

## 5.7 Robustness of the Headline Findings

The headline findings were re-examined with the checks that consumer-insights and small-sample survey work often apply, so that a reader can see how much weight each result bears: exact confidence intervals for every proportion; effect sizes with bootstrap intervals for the group comparisons, in place of p-values alone; exact and permutation tests in place of asymptotic ones; family-wise error control across the full set of cross-tabulations; scale reliability for the composite indices; one-sample tests against the published benchmarks; leave-one-out and site-level re-estimation; and an explicit statement of the smallest effect the design could have detected. Every figure is computed from the respondent-level data on the Robustness tab of the companion workbook, with resampling seeded so that the numbers reproduce.

### Table 5.7a — Headline findings with exact 95% confidence intervals and sensitivity checks

| Finding | Result | Exact 95% CI | Site agreement (Fisher p) | Leave-one-out | Reading |
|---|---|---|---|---|---|
| A6 rent about the same as, or more affordable than, the alternatives considered | 15 of 26 (58%) | 37–77% | Differs by site (p = 0.001): the reference-set effect | 56–60% | Interval straddles one half: neither a premium nor a discount is supported. The site difference is the reference-set effect of 5.1, not a building effect. |
| C2 stayed, or will stay, longer than planned | 14 of 25 (56%) | 35–76% | No site difference (p = 1.00) | 54–58% | A majority at both sites; no single respondent moves the estimate by more than two points. |
| C2 left, or leaving, sooner than planned | 0 of 25 (0%) | 0–14% | None at either site | 0% | Early departure is bounded at 14%; against a 20% early-departure rate the exact binomial p = 0.004. |
| C4 the feel of the home makes the resident want to stay | 24 of 26 (92%) | 75–99% | No site difference (p = 0.09) | 92–96% | Lower bound three quarters of the sample. |
| F5 would choose mass timber again; would choose conventional | 23 of 26 (88%); 0 of 26 | 70–98%; 0–13% | No site difference (p = 0.22) | 88–92% | Read as corroboration of C2 (hypothetical bias, 5.4); even so the conventional choice is bounded at 13%. |
| C3 rent always paid on time (ownership-verified) | 26 of 26 (100%) | 87–100% | All at both sites | 100% | The lower bound sits at the top of the published Class A collection norms (97.6%; NMHC 95.9%): consistent with, not demonstrably above, the norm (binomial p = 1.00 and 0.34). The weight of the finding is the record verification. |
| H2 credit in the mid-700s or higher (ownership-verified); below the 600s | 23 of 26 (88%); 0 of 26 | 70–98%; 0–13% | No site difference (p = 0.53) | 88–92% | Above every benchmark: p < 0.0001 against the 50% of U.S. consumers at 740 or above; p = 0.03 against the 70% at 670 or above; p < 0.0001 against the 38% of 2025 applicants at 740 or above. |

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| Finding | Result | Exact 95% CI | Site agreement (Fisher p) | Leave-one-out | Reading |
|---|---|---|---|---|---|
| H1 household income $80,000 or more | 22 of 25 (88%) | 69–98% | — | — | p < 0.0001 against the 43% of Portland-metro renter households at $75,000 or more (ACS B25118). |
| H3 bachelor's degree or higher | 25 of 26 (96%) | 80–100% | — | — | p < 0.0001 against the 37.4% of Portland-metro renter householders, and against the 53.0% of owner householders (ACS B25013). |
| A8 noticed the wood immediately on the tour | 23 of 23 (100%) | 85–100% | — | — | Search-attribute evidence; lower bound 85%. |
| A7 unprimed recall: felt warm; seemed calmer | 20 of 26 (77%) each | 56–91% | — | — | Lower bound above half the sample on an unprompted item. |
| D2 "calmer and more at ease"; "unfamiliar, used to drywall"; "more sustainable than my friends' homes" | 24, 2 and 7 of 26 | 75–99%; 1–25%; 12–48% | — | — | Calm is near-universal and unfamiliarity rare; the sustainability statement is a minority at any plausible value. |

Exact intervals are Clopper–Pearson; Wilson score intervals lie within two points on every row (workbook). Site agreement is a Fisher exact test of the two sites against each other; counts by site are withheld to protect respondent privacy at the smaller site. Leave-one-out is the range of the estimate when each respondent is dropped in turn.

### Table 5.7b — Stayed longer than planned (n = 14) versus as planned (n = 11): effect sizes, intervals and exact tests

| Measure | Means (longer / as planned) | Cohen's d | Cliff's δ | Bootstrap 95% CI of the difference | Permutation p | Mann–Whitney p |
|---|---|---|---|---|---|---|
| Aesthetic index (six items, z-scored; α = 0.63) | +0.13 / −0.08 | +0.38 | +0.22 | −0.20 to +0.62 | 0.36 | 0.37 |
| Calm / health index (six items; α = 0.40) | −0.03 / +0.03 | −0.11 | −0.03 | −0.41 to +0.30 | 0.78 | 0.91 |
| Credence index (six items; α = 0.59) | −0.09 / +0.25 | −0.73 | −0.36 | −0.69 to +0.02 | 0.08 | 0.13 |
| A9 prior awareness of mass timber (0–2) | 1.36 / 0.64 | +0.87 | +0.44 | +0.07 to +1.35 | 0.07 | 0.05 |
| E1 beauty / visual warmth of exposed wood (1–4) | 3.36 / 3.09 | +0.63 | +0.27 | −0.04 to +0.57 | 0.18 | 0.14 |
| A3 natural materials at move-in (1–3) | 2.43 / 2.18 | +0.45 | +0.21 | −0.17 to +0.68 | 0.30 | 0.32 |
| E1 lower carbon / sequestration (1–4) | 2.79 / 3.40 | −0.81 | −0.42 | −1.17 to −0.01 | 0.07 | 0.07 |
| E1 wood grown / made in America (1–4) | 2.64 / 3.09 | −0.48 | −0.30 | −1.15 to +0.29 | 0.29 | 0.19 |

Indices average the z-scores of their items. Aesthetic: A3 natural materials, A3 architectural design, E1 beauty, E1 distinctive, D2 "developers don't typically build good-looking homes like mine", D2 "looks better than other homes". Calm / health: A7 felt warm, A7 seemed calmer, E1 calm / health / nature, D2 healthier, D2 calmer, D2 nature. Credence: E1 carbon, E1 made in America, E1 regional culture, E1 identity, D2 sustainability, D2 identity. α is Cronbach's alpha on complete cases (n = 25). Bootstrap intervals are percentile intervals from 10,000 resamples; permutation p-values are from 20,000 relabelings. Fisher's exact test of prior awareness (aware before touring versus not) against staying longer gives an odds ratio of 2.7, p = 0.41.

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**Family-wise control.** Thirty-seven stated items were compared between the two tenure groups (every A3, A7, D2 and E1 item plus the household and adoption items). The smallest unadjusted p-value is 0.050 (prior awareness); after Holm correction the smallest is 0.92, the smallest Benjamini–Hochberg q-value is 0.84, and none of the 37 comparisons falls below 0.05 where 1.85 would be expected by chance alone. That is the formal statement of what Section 5.2 says in words: the mechanism rankings are evidence of direction and effect size — moderate for aesthetics (d = +0.38), large for prior awareness (+0.87) and for the credence items running lower among those who stayed (−0.73) — and not evidence of statistical significance. Dropping the one low-engagement respondent reduces the aesthetic effect from d = +0.38 to +0.24 without changing its sign.

**Reliability.** The aesthetic and credence indices hold together about as well as short attitude scales usually do (α = 0.63 and 0.59; mean inter-item correlations 0.22 and 0.18), and the eight-item E1 battery reaches α = 0.69. The calm / health index does not (α = 0.40), for the reason given in 5.2: calm is endorsed by nearly everyone, so the items have little variance to share. That is a ceiling, not noise, and it is why calm is read as the universal baseline rather than as a discriminating channel.

**Within-study replication and non-response.** The two sites had different participation rates — 8 of 14 households at Wilson (57%) and 18 of 70 at The Canyons (26%) — and different product types, so agreement between them is the nearest thing to replication the design allows and a check against non-response bias. Retention, payment and credit are the same at both sites (Fisher $p \geq 0.5$ on each); the only site-level difference is the rent item, which is the reference-set effect. The three respondent-level consistency checks of Section 4.3 carry exact intervals of 79–100% (23 of 24), 76–100% (20 of 21) and 84–100% (32 of 33).

**What the checks establish, and what they do not.** The four revealed-preference points are robust as descriptions of this population: the intervals exclude the values that would undo them (early departure at most 14%; a conventional re-choice at most 13%; credit above every published benchmark; on-time payment consistent with the top of the Class A norm and verified against records). The design can detect only large effects — a difference between the two tenure groups of about 1.2 standard deviations at 80% power, or a single proportion of 75% or more against a 50% benchmark — so the mechanism rankings rest on effect sizes and on the convergence of six question formats (Section 6.2), and the extension's larger sample is what would turn them into tests.

**In practitioner terms.** Four things can be "taken to the bank" in direction, but not in scale: residents pay market rent (not more or less); they stay longer than they planned and essentially nobody leaves early; they pay on time; and they are stronger-credit, higher-income households than the Class A norm (i.e., the investor's desired counterparty). These directional findings are robust in their statistical nature; for example, they hold up when any one respondent was removed, when the two buildings were read separately, and against the industry benchmarks. But, the findings' statistical intervals are wide, so the findings decide which way a proforma line moves and justify not penalizing the material, while the proforma adjustments require judgement per the asset's own history or the submarket norm. The reasons residents stay are a strong lead rather than a proven fact: consistent across six question formats, medium to large in effect, but

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not significant at this sample size. And three things should not be done with this work: quote it as proof that renters pay more for wood (it found no effect); cite it for precise proforma adjustments; or assume it transfers to a building where the wood is covered like in Europe.

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# 6. Synthesis: Mass Timber Renter's Actions, Motivations, and the Implications

Value impacts that materialize in ways important to investors who own asset that have incorporated mass timber into their market rate apartment developments are observable, and they are not what most mass timber advocates claim.

- Residents appear to pay market rents; no premiums or discounts are detectable
- Renters tend to stay longer than they planned (14 of 25, none sooner) with longer than typical for market rate apartment durations well demonstrated.
- Those in mass timber homes say they would choose mass timber again (23 of 26, none conventional) – if they can find that option.
- Mass timber reduces common collections issues, as its renters pay on time (26 of 26).
- Finally, if something unusual occurs and payment for damages is due, landlords can benefit from their counterparties being of unusually strong creditworthiness (23 of 26 report credit in the mid-700s or above and 22 of 25 report household income of $80,000 or more).

Each of these holds under the checks of Section 5.7 — when any one respondent is removed, when the two buildings are read separately, and against the industry benchmarks — each is reliable for the direction of a proforma adjustment, not for its size.

Value-creation mechanisms useful for developers looking to create comparatively more competitive new real assets also are identified. The consumer channels that motivate value-add behaviors appear to be experiential; attributes offering material look and feel. Specifically, they relate to beauty, distinct design and occupants feeling more calm. Thus "do not cover the mass timber," better design and health-focused consumers are the key takeaways for the AEC / Development community. For the ownership and management community, these attributes are also "search" attributes (via photos online or feelings while on tour) and so they can be used to contribute to their value creation potential.

Conversely, attributes that offer no experiential or search impact (i.e., credence attributes) appear to offer few consumer-behavior benefits. These traits include:

- Regional heritage and/or cultural connection; notions often used to justify an architect's response but which appear to not resonate with one of its end-users – the occupant.
- Carbon; notions often used to motivate sustainability or public policy goals, and which appear to need to be funded by those parties as occupants cannot be expected to pay for them.
- Provenance, be it locally made or supply-chain national security; these considerations appear to be of little consideration for mass timber residents.
- Identity, and value/virtue-signaling; notions which can be seen as being valued by an identifiable minority, but not by the broader market.

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Finally, no negative stigma is seen; no consumer-side downside impacts are detected. Thus, an option-like positive asymmetry exists to be claimed by investors. And because all value-add channels run through the wood being visible, building codes that require it to be clad are impediments to the growth of mass timber's use in mainstream market rate developments.

## 6.1 The four revealed value-creation attributes (investor's adjustments)

| Anchor | Result | Market-rate / Class A norm | Implications |
|---|---|---|---|
| Rental rates | 11 above / 13 same / 2 below; mean 2.35; "above" concentrated where the reference set is thin | Informed expert opinion via both property's property managers and owners confirm rents in line with comps / submarket | A willingness-to-pay premium is not detected, nor is a discount; the apartment is priced by normal market forces and asset attributes. |
| Retention / Duration | 14 of 25 stayed longer than planned, 0 left sooner; 7 of 10 one-year planners stayed longer; 24/26 want to stay because of the feel; 23/26 would re-choose, 0 prefer conventional | Better than market norms, where a third of Portland renter households move within ~2 years (ACS 2024, B25038) | Longer tenure produces lower turnover, make-ready, re-leasing and vacancy costs. Thus, improves NOI; more and lower volatility cashflows |
| Rent Payment | 26 of 26 always on time; affirmed by on-site managers who hold the experience of having to chase renters for payments. | Class A collections 97.6% (RealPage 2023); REIT bad debt 0.5–1.4% of revenue (2025) | Smooths NOI cashflows, avoids collection costs and management distractions |
| Creditworthiness | 23/26 mid-700s+; 22/25 income ≥ $80k; 25/26 bachelor's+; ownership-verified | Class A applicants ~683 avg (2017) / 740+ minimums (vendor guidance); Portland metro FICO 737 | Supports better protection from downside events; pet damages, resident-responsible repairs for damages, etc. |

Exact confidence intervals, site-level and leave-one-out sensitivity, and benchmark tests for each of the four attributes are reported in Section 5.7; none changes the reading of this table.

## 6.2 The value-creation mechanisms (tools for developers)

| Theme | A3 & A7 move-in importance or recall | D2 forced choice | E1 importance (1–4) | F2 most / F3 least | Open text (D1, C4, I1) |
|---|---|---|---|---|---|
| Beauty / design / distinctiveness | Design 2.50 (14 very); wood 2.27 (9 very) | Beauty statements 18/25 and 16/26 | Distinctive 3.42 (12 very); beauty 3.15 (6 very) | 13 / 0 | Warmth 10, beauty 7, ceiling 5; C4 design/quality 5; I1 aesthetic-first 7 |
| Health / calm / nature connection | Calmer 20/26; warm 20/26 | Calm 24/26; health 17/25; nature 19/26 | Biophilic 3.00 (7 very) | 4 / 0 | Natural 9, calm/comfort 8; "healing space" |
| Sustainability / carbon / made in America | Sustainability 1.81 (6 very) | Sustainable 7/26 | Carbon 2.96 (spread); made in USA 2.77 (bimodal) | 9 / 6 | 5 sustainability-oriented; 1 skeptic; 7 aesthetic-first with no interest |
| Identity / culture / signaling | (not asked) | Identity 12/26; non-identity 3/26 | Identity 2.35; culture 2.54 | 0 / 21 | F4: 11 proactive, carried by distinctiveness; C5: 26/26 everyone likes it |
| Resilience / durability | (not asked) | Prefer industrial 5/25 (reverse) | Resilience 3.32 (9 very) | 2 / 0 | "felt strong" (1) |
| Novelty / adoption friction | — | Industrial 5/25; unfamiliar 2/26 | — | 0 / 0 | H5: 5 early / 17 pragmatist / 4 late |

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Two channels converge across every method. The first is mass timber's beauty and architecture/distinction. Framed in finance terms, this is how mass timber creates beneficial asset differentiation. The second relates to health/calm/wellness; often associated with biophilic benefits. These attributes offer experiential as well as searchable benefits consumers appear to place value upon. They lean positive among residents who stayed longer than planned and account for every look-and-feel respondent's intention to choose mass timber again. Their ranking is supported by effect sizes and by the convergence across the six formats in the table, not by statistical significance (Table 5.7b): a strong lead for what to build and what to say, not a proven fact.

These findings help to explain why consumers act in the ways we have observed; to pay their market rate rent on time and to live in their home for a long time and to be good financial counterparties. In addition, we see earthquake resilience is valued but not salient. It deserves its own focused research and is deemed to be worthy of specific research but this work is not enough on its own to enable reliable opinions. We also see that nothing in the data indicates adoption friction. Thus a "free option" is made possible by mass timber to developers who may want to use it to offer its attributes as a means to unleash value channels to drive investor-desired consumer behaviors. See 6.4 below for further discussion.

## 6.3 What not to pitch

Sustainability, provenance and identity are not observed to be as powerful means for creation / driving value; their results appear flat, bimodal or lower ranked. On this evidence, arguments for using mass timber because it is regionally or culturally connected, because it is lower carbon in nature, because it is locally grown and made, or because it value-signals the resident's identity are probably not influential to consumer's behaviors; therefore, unless they realize value in the political or investor end-user realms, they should be demoted in attention paid.

This is because consumers do not respond to these credence attributes at their points of decision, nor rank them highly once living with the product. Notably, they name them as least important more than other attributes. Caveating this is that a minority does value the carbon and provenance (made locally) stories; this target market co-associates with civic affiliations and EV ownership. These respondents identify themselves via "I wish there was a LEED certified plaque" – but note that such demonstrations are needed to convert this credence attribute into a consumer valued virtue signal. With this said, the lead marketing themes should be on look and feel, not mass timber's theoretical, academic or intangible attributes.

The academic literature predicts this result. Credence attributes — qualities a consumer cannot verify even after use — create value only when a trusted third party attests to them, which is why they are capitalized through labels and not through claims (Darby & Karni, 1973; Nelson, 1974): LEED-certified apartments earn a rent premium while self-described "green" apartments earn none (Bond & Devine, 2016), and even where a low-carbon rent premium exists it arrives partly through lower utility bills and is strongest where local politics favor emissions reduction (Brändle et al., 2026; Kahn & Kok, 2014). The segment that does respond is the one identity economics predicts — residents for whom category membership carries utility (Akerlof & Kranton, 2000) — and it needs the attribute made visible in order to signal it, as the premium for

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conspicuously visible solar panels shows (Dastrup et al., 2012). Consumer studies of wood housing find the same ordering: ecological sustainability reduces prejudice against wood construction only in Finland, while aesthetics and natural surroundings do so in every Nordic country studied (Lähtinen et al., 2021), and Nordic residents did not choose their wooden buildings for the material (Jussila et al., 2024).

## 6.4 Option value: upside with no offsetting downside

The data contain almost no negative consumer response to exposed mass timber: 2 of 26 rated natural materials unimportant at move-in; wood-related dislikes are few, practical and never about the look; 5 of 26 prefer "proven industrial" structure and 2 find wood surfaces unfamiliar, yet none of them is leaving sooner or would choose a conventional building; 0 of 26 want to leave because of the interior. A developer or investor who uses the product therefore faces an asymmetric payoff: either value is created through the consumers who respond, as above, or there is no effect. There is no offsetting consumer-side risk in these data.

The literature that predicts this asymmetry is the economics of differentiation. A differentiated product gives its seller a demand curve insulated from perfect substitutes (Chamberlin, 1933); where products are homogeneous, concessions become the competitive weapon and switching costs make current share determine future profit (Klemperer, 1995; Sirmans, Sirmans & Benjamin, 1994); attached consumers are measurably less price-sensitive (Krishnamurthi & Raj, 1991); and because rents on continuing tenants are sticky, the value of retention arrives through avoided turnover, vacancy and concessions rather than through rent growth (Genesove, 2003). Willingness to stay is, in turn, a function of satisfaction with the dwelling itself (Leishman et al., 2026). A home residents will not trade away therefore truncates the left tail of turnover and vacancy outcomes in soft markets — a put-like protection for the owner — while costing nothing in rent when markets are firm. That is the asymmetry: upside through the residents who respond to the material, and no consumer-side downside from those who do not.

## 6.5 The visibility condition; problems for Europe's building code

Every channel documented here runs through the consumer seeing and experiencing wood: residents noticed it unprompted on the tour (A8), describe it in sensory and emotional terms (D1), and tie it to calm, warmth and beauty (A7, D2, E1) seen influencing their behavior. Those are search and experience attributes in Nelson's (1970, 1974) sense. If mass timber were used for the structure but covered by conventional cladding, the consumer could neither verify it by in person or online tour; thus, what remained are credence claims about what is behind the walls, which the evidence here and in the green-building literature says creates little consumer value.

Mass timber's value is in its experiential attributes, not its credence and/or theoretical attributes. Thus, the ability of the candidate channels to produce the value creation seen here would therefore be materially degraded if the mass timber is clad for protection as is the norm in Europe, or done to save costs (as has occurred in many American developments like Denver's Cirrus developed by UDR and Katerra). That is a consequential implication wherever code or practice requires the timber to be encapsulated. In America, this applies to taller construction types under the IBC's Type IV-A provisions.

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In most European jurisdictions that require cladding of timber structure in most buildings of scale, the consumer-side business case for mass timber is occluded. This aligns with the one prior study of residents of wooden multi-story housing by Jussila et al. (2024). Conducted in Finland and Sweden with a much smaller dataset of mostly owner-occupiers, and in buildings where regulation kept the timber largely covered, it could observe mainly credence attributes. Thus, it makes sense that it found conventional criteria dominant and no stigma, but nothing about where or how value is created. Read against the present results, the two studies bracket the visibility condition and point out how materially different the consequences of European and American building codes are for the business case of mass timber.

## 6.6 Proforma inputs a developer would adjust when using mass timber

| Proforma input | Direction | Baseline / benchmark |
|---|---|---|
| Market rent / rent growth | No adjustment | Underwrite market rent for the unit type per submarket comparables |
| Renewal probability / annual turnover rate | Lower, per their respective ratios | Underwriter's standard Class A turnover assumption, per submarket |
| Make-ready, Re-leasing payroll, Vacancy loss | Lower, per their respective ratios | Standard per-turn make-ready and days-vacant assumptions |
| Concessions in soft markets | Lower use to retain residents | Per submarket concession norms |
| Credit loss / bad debt | Better than the Class A baseline | Class A collections 97.6%; REIT bad debt 0.5–1.4% of revenue |
| CapEx / Reserves for Replacements | Higher expected recovery; fewer write-offs after unusual events from damages per tenant negligence | Standard deposit-forfeiture and damage-recovery assumptions. |
| Marketing expenses | No incremental for the visible wood; may offset / lower need. Focus on getting prospects to tour. No need to train leasing staff. | Relative to standard marketing budget spent on "search" or "retention" |
| Certification / signage | Optional, do it if the sustainability segment is targeted per submarket demos | Cost of certification vs. the segment's size |
| Downside risk adjustment for an unproven material | None warranted on consumer grounds; risk is in the denominator (the Total Development Cost) | Compare to concrete or steel norms |
| Visible-wood condition | Comply with code in ways that allows exposed wood structure | Compared to drywall cladding |

Magnitudes are deliberately not proposed from a 26-person sample; the direction, the evidence behind it, and the benchmark an underwriter would start from are what the data support. An underwriter should therefore move each line in the direction shown and take the amount from the asset's own history or the submarket norm; an extension survey, as discussed below, is the route to sizing the adjustments.

## 6.7 Contribution to Academic Knowledge, Industry, Policy and Practice

For industry, the contribution is a tested answer to a claim that has been made by assertion — renters do not pay more for wood — and a map of where the material's value actually sits: retention, payment and counterparty quality, with beauty, distinction and calm as the mechanisms and visibility as the condition. Set against the questions institutional investors ask (Johnson, 2026a), five of the seventeen economic questions are answered here in the units they

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asked for: how mass timber creates value and how those means rank (Q11); whether occupants behave differently in retention and credit quality (Q13 — yes, verified; lease velocity not measured); which sensory differences matter (Q14 — warmth, calm and the look of the wood; not smell or sound); whether reported rent premiums survive academically sound testing (Q16 — they do not); and what other effects on net operating income exist (Q18 — Section 6.6). Cost volatility, schedule value and capitalization rates are supply-side and capital-markets questions a resident survey cannot answer.

For academic work, the study extends revealed preference to a building material and shows where the preference lands; it shows that the information economics of search and credence attributes, salience and switching costs explain the pattern better than framing; it reports nulls for the identity-economics, sense-of-place and early-adopter predictions; and it supplies the first resident-level evidence on how mass timber is monetized in rental housing. For practice: keep the structure visible, lead with the look of the building and the feel of the home, underwrite market rent, adjust the retention and counterparty lines, and do not lead with the credence story unless the segment that wants proof is the target.

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# 7. Limitations and Extension

## 7.1 Data and Sample Limitations

This is a consumer willingness-to-pay study fielded at two sites, and its limits follow from that design.

First, the effective sample is 26 renters at two assets in one city — a reflection of how few unsubsidized, market-rate mass timber apartment developments have been completed in America. Items within a respondent are not independent, group comparisons are descriptive, and the revealed-preference points and value-creation mechanisms reported here are directional: they say where value is created and in which direction a proforma input moves, not by how much. Other product types (high-rise, modular, hybrid), markets and renter types are not represented. At this size the design can detect only large effects: a difference between the stayed-longer and as-planned groups of about 1.2 standard deviations at 80% power, or a single proportion of 75% or more against a 50% benchmark. Smaller differences are therefore reported as effect sizes with intervals (Section 5.7) rather than as tests.

Second, two of the four revealed-preference points — payment on time and creditworthiness — are verified against ownership records; the other two — rent relative to alternatives and tenure relative to plan — are residents' own reports, and the extension should take effective rent and tenure from rent rolls directly. Interviewer-administered surveys raise social-desirability pressure on identity and value-signaling items relative to self-administration (Tourangeau & Yan, 2007; Fisher, 1993), although face-to-face interviewing fares better than telephone on this score (Holbrook, Green & Krosnick, 2003); the unprimed items (A7, A8) and the verified points are the hedge.

Third, the forced-choice pairings were not recorded, so the claim rate for each statement is confounded with whatever it was paired against; the administrator did mix and match, but the degree cannot be measured. The trade-off was accepted so that the interview stayed fast and respondents stayed comfortable — people speak more freely when they are not being recorded — and the mechanism rankings therefore rest on the convergence of six question formats rather than on the forced-choice block alone. A tablet-based instrument removes the limitation at little cost.

Fourth, some re-choose answers followed an in-interview explanation of mass timber, so the intention to choose it again carries some priming and is read as corroboration of the tenure finding rather than as a finding in its own right.

Fifth, there is no conventional-building comparison group, by choice. In apartment real estate the matched pair does not exist — location, vintage, unit mix, operator, amenities, rent band and lease-up timing all move at once — so any "match" is a judgment a second reviewer can unpick. The substitute is the industry expert check for reasonableness (Section 4.3, Step 7): the property managers, asset managers and owners who know each asset against the alternatives renters actually weigh confirmed that the findings square with their experience of rent, retention, payment and resident profile. The findings are therefore descriptive of mass timber renters

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rather than causal estimates of the material's effect; the extension described below is the route to the latter.

## 7.3 External Validity and Generalizability

The market selected may be more receptive to sustainable design and innovative construction materials than others, so the findings could reflect early-adopter dynamics not yet present in broader or more price-sensitive markets — although the adopter profile of the sample (two-thirds "once proven and popular" pragmatists) argues against that reading. Market norms for timber acceptance may vary across countries, regulatory environments and cultural perceptions of wood construction. The results should therefore be interpreted as context-specific directional evidence, not universal forecasts.

## 7.4 The Extension

The recommended next step is a broader multi-site study.

- The fielded 29-question instrument could be used online or in hybrid form if resources can be found to enable that better non-analog form of administration so as to have forced-choice pairings recorded, more of the random volunteered items added (i.e. parking, pets, air conditioning and laundry, accessibility) and framing experiments kept out of the core.
- Six to ten assets and a sample of 150 or more are sized for the segment and moderation analyses — and for the models described below, which can be estimated once the mass timber variable varies.
  Note, for every site this would include the structured reasonableness interview with the property manager, asset manager/owner, including rent-roll verification of payment and credit wherever ownership will share it, as occurred at the Portland sites.
- A Midwest market such as Milwaukee, which has Timber Lofts and other mass timber apartments, Intro in Cleveland, and ideally a mass timber apartment building in Boston — chosen as market-standard products whose primary difference from their comparables is exposed mass timber. This buys geographic, climate, operator and renter-type diversity and tests whether the Portland hierarchy of channels is a regional taste or a product effect.
- Widened to Europe, to test the visibility condition**.** At least two or three residential mass timber buildings in Europe whose structure is encapsulated rather than exposed — as most European building codes require for multifamily buildings of even lower densities, unlike the U.S. IBC — surveyed with the same instrument and the same reasonableness protocol, with exposed European buildings as a within-region control where available. If the beauty/distinction and calm/wellness channels weaken or vanish where the wood cannot be seen or felt, the consumer-side business case is a case for exposed timber, with direct consequences for code advocacy, European market entry and Type IV-A design decisions in the United States.
- A rent-roll panel — observed tenure, renewal decisions, effective rent and concessions over repeated leasing cycles — would turn the reported anchors into more observed ones and permit the axiom-based consistency tests (Afriat, 1967) that a single survey cannot. Retained from the original design for later phases: pairing resident surveys with environmental and physiological measurements (indoor air quality, acoustics, biophilic

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response); studies of the revealed preferences of investors, lenders and policymakers in allocating capital toward timber construction; and controlled framing experiments, VR-based material comparisons or conjoint analyses to isolate how timber's experiential qualities shape housing choices.

Early visions of the research design included ideas about mechanical estimations that could becomes feasible with a specific addition of data, and together they are how a directional findings above would be carried to magnitude with higher certainty.

- **A hedonic rent model:** monthly rent on a mass timber indicator, unit size, location, amenities and resident characteristics, with needs observed rents and a conventional comparison group at each site. With six to ten mass timber assets and their conventional neighbors it tests directly whether the absence of a rent premium found here holds across markets, and it is the specification the supply side's premium claim would have to survive.
- **A duration model:** months of tenure, or days to lease-up, on the same variables, in an ordered-logit or hazard form. It would put a number on how much longer mass timber residents stay, which is the proforma input with the largest NOI consequence.
- **A counterparty-quality model:** credit standing and on-time payment as categorical outcomes on the same variables via needs screening data or verified self-reports at conventional comparison assets, so that the better-than-market profile found here can be separated from what Class A screening produces anywhere.
- **Behavioral interaction terms:** prior awareness, sustainability affiliation or adopter type interacted with the mass timber indicator to better sample via statistical power.
- **A discrete-choice model** of choosing a mass timber home over a conventional alternative needs prospects and non-leasers in the sample, not only residents; recording the forced-choice pairings on a tablet would also allow the applicable statements to be analyzed as a proper choice experiment.
- **Axiom-based consistency tests:** need repeated choices at observed prices. Per the rent-roll panel described above, looking at renewal decisions taken at renewal rents over re-leasing activity.

Collectively, these directions would build a comprehensive behavioral-economic understanding of mass timber across the full development ecosystem, and would carry the findings from direction to magnitude.

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# 8. Conclusion

This research advanced consumer willingness-to-pay insights at two market-rate mass timber apartment developments, tested the value-creation claims the industry commonly makes, and identified the mechanisms behind value channels. From this, the findings were translated to the technical terms capital providers use, both for investors and developers. In this way, demand-side insights into mass timber's business case are now more available for firms, investors and governments aiming to grow the mass timber industry.

The foundation created for this work is the 1,500+ codable data points collected from 26 renters. From this, four revealed-preference points emerge, each connectable to academic basis and industry proforma practice. The findings include that renters do not appear willing to pay more for mass timber apartments. But once living in them, they will likely stay longer than they planned and longer than market norms and would choose mass timber again if they can find it. This lowers turnover, make-ready, re-leasing and vacancy costs and the use of concessions in soft markets. Also assisting a property's net operating income prospects is that mass timber apartment renters are shown to pay on time (26 of 26); this smooths collections and avoids collection costs. They are also unusually creditworthy (23 of 26 in the mid-700s or above; 22 of 25 earning $80,000 or more), which protects the owner when something unusual occurs — pet damage, a careless water leak — and a resident must pay for what they caused.

The value-creation mechanisms detected are experiential: beauty, distinctive design and the feeling of calm being the headline insights for developers to understand. They are also search attributes, and thus helpful tools for investors via leasing operations. Contrary to common mass timber industry claims, credence attributes, like regional heritage and cultural connection, carbon, provenance, identity and value-signaling, appear to create little consumer value. Thus, developers should not build proforma performance assumptions based on their impacts, nor should leasing agents lead their sales pitch with such topics. The exception to this is when an identifiable minority exists; for example, when a submarket has a high concentration of virtue-signaling households.

No downside consumer impacts are detected. Thus mass timber carries a positive, option-like asymmetry (i.e., upside through the residents who respond to it and no offsetting consumer-side risk). And because every mechanism requires the wood to be visible, European building codes that require it to be clad are shown to be barriers to their own public policies that seek market-rate adoption of lower-carbon building approaches; ironically, the opposite is true for the American market.

Mapped to a development proforma (Section 6.6): no rent adjustment; lower turnover, vacancy, make-ready and concession assumptions; better-than-baseline credit loss and damage recovery; no incremental marketing; certification only where the sustainability segment is targeted; no stigma; and design and code compliance approaches to keep the structure exposed are the take-aways. The study is small, descriptive and single-city. Its findings are strong enough — under exact intervals, site-by-site and leave-one-out re-estimation and benchmark tests — to remove the "unproven material" discount from a mass timber proforma and to move the retention and credit lines in the owner's favor, and not strong enough to say by how much; assumption

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adjustment magnitudes await a multi-site extension. Nonetheless, this work establishes a partial mass timber business case and supports further study to broaden and deepen related insights.

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# Acknowledgements and Disclosure

The survey was administered at both sites by Talia Esarey, a trained undergraduate summer research intern, supported by Victor Cho; both are students at Lewis & Clark College in Portland, Oregon, where the author teaches behavioral finance courses as an Adjunct Professor and is a Pierce Faculty Fellow. The research was not paid for by, or conducted with the involvement of, the College. It was funded and conducted by private industry, led by Conrad (Old i, LLC) under the direction of the author, and its contents are owned by, and are the responsibility of, Noel Johnson.

The author is the developer of Wilson Forest Park Townhomes. The author was not the developer of The Canyons; the private parties responsible for its development and for its current ownership and management supported this research in their own capacity, including by comparing residents' self-reported payment history and credit standing against their records. Property and asset managers at both sites reviewed the findings for reasonableness against their experience of rent, retention, payment and resident profile.

The content is the responsibility of the author and was created via analog and digital tools including: paper and pen survey administrations and data recording, manual entry into Excel and Google Docs with those tools then serving as data compilation and calculation means as supplemented by Anthropic formula compilation. Microsoft and Google word processing tools were used. Google, Open AI and Anthropic search tools were used. Anthropic and Open AI tools were used by the author as part of the editing, to help verify citations and to obtain critique. The author originated all content, including hypothesized, specified, synthesized and translated to applied industry use content; the writing of the output created being the authors alone.

This Research Write-up is the complete record of the study. It contains the full results and discussion by question (Section 5), the synthesis (Section 6) and can be considered together with the companion workbook and copy of the survey. Shorter versions distilled from it for academic journals or industry publications are derivatives of this document and should be read against it.

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