

Greenwashing before the ban: the pricing and demand effects of vague versus specific environmental claims on Airbnb

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Article

Keywords: greenwashing, green rhetoric, hedonic pricing, signalling, short-term rentals, consumer protection regulation

Posted Date: July 15th, 2026

DOI: <https://doi.org/10.21203/rs.3.rs-10158113/v1>

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Additional Declarations: No competing interests reported.

Abstract

Listing descriptions on short-term rental platforms increasingly carry environmental or green rhetoric, yet the market consequences of such language remain largely untested. This study asks whether green rhetoric in Airbnb listings is rewarded with higher prices and stronger demand, and whether vague slogans and specific verifiable claims function differently. Drawing on public Inside Airbnb data covering roughly 420,000 listings across 37 cities in 12 European countries, collected between September 2025 and May 2026, the analysis separates vague green claims such as "eco-friendly" from specific, verifiable claims such as references to solar panels, and links both to price and to demand, the latter proxied by the monthly review rate. Vague green slogans command a price premium of 16.6 per cent but are associated with 6.9 per cent lower demand, a pricing-demand divergence, whereas specific verifiable claims trade at a discount of 5.2 per cent. The premium is robust to neighbourhood fixed effects, Oster bounds, a 200-specification curve, and out-of-sample replication across newly added cities. A review-side validation provides the central contribution: guests at listings carrying green rhetoric mention environmental themes 9.2 times more often than guests elsewhere, and overwhelmingly positively, indicating that green rhetoric attracts a genuine but narrow green-minded segment rather than the average traveller. Cross-city heterogeneity is substantial and is not explained by signal scarcity. These patterns are consistent with green rhetoric operating as a narrow but effective niche signal that raises price among a committed minority while shrinking aggregate demand. Because the data immediately precede the application of the European Union's Empowering Consumers for the Green Transition Directive, which restricts generic environmental claims from September 2026, the findings establish a pre-enforcement baseline of direct relevance to greenwashing regulation and to Sustainable Development Goal 12.

1. Introduction

The platform economy has reorganised how accommodation is supplied and consumed. Peer-to-peer markets, collectively termed the sharing economy, have emerged as alternative suppliers of goods and services traditionally provided by long-established industries (Zervas et al. 2017). Within tourism and hospitality, Airbnb is the dominant short-term rental platform, and its growth has measurably reshaped incumbent markets. Zervas et al. (2017) estimate that each ten per cent increase in Airbnb supply reduces monthly hotel room revenue by roughly 0.35 per cent, an effect that accumulates to between eight and ten per cent of revenue in Austin, where supply is highest. The platform's footprint extends beyond hotels: quasi-experimental work on Barcelona shows that Airbnb raised rents by about 1.9 per cent, transaction prices by 4.6 per cent and posted prices by 3.7 per cent in the average neighbourhood, with increases of as much as seven, seventeen and fourteen per cent respectively in the most exposed neighbourhoods (Garcia-López et al. 2020), and comparable housing-market effects appear in Los Angeles (Koster et al. 2021). This scale has motivated a large empirical literature on what drives listing prices, grounded in Lancaster's (1966) characteristics theory of demand and Rosen's (1974) hedonic price framework. Studies consistently find that location, capacity, property type, host status and review volume explain much of the variation in nightly rates (Wang and Nicolau 2017; Chen and Xie 2017; Gibbs et al. 2018; Falk et al. 2019).

A feature that distinguishes peer-to-peer accommodation from hotels is that the host-authored listing description is a primary instrument of seller self-presentation. Because guests cannot inspect the property

before booking, the text helps to resolve information asymmetry and functions as a market signal (Akerlof 1970; Spence 1973; Connelly et al. 2011; Mavlanova et al. 2012). Recent work shows that the unstructured listing description, and not only structured attributes, shapes booking demand and listing performance (Chung and Sarnikar 2021). Yet the marketing content of these descriptions, and the environmental language they increasingly carry, remains comparatively understudied relative to structured attributes such as bedrooms or distance to the centre.

In parallel, sustainable consumption has moved from a niche concern to a mainstream market force. A persistent attitude-behaviour gap means that stated environmental preferences do not always translate into purchases (ElHaffar et al. 2020), but a willingness to pay for greener offerings is now well documented in hospitality. A systematic review of twenty-two studies across thirteen countries concludes that consumers willing to stay at a green hotel would accept a premium of around five per cent (Damigos 2023), and survey and certification evidence points in the same direction (Kang et al. 2012; Nelson et al. 2021). On the supply side, hosts increasingly foreground environmental credentials in their text. This makes hospitality a natural setting in which to study how environmental language is priced and rewarded by demand.

The same demand has produced a pervasive problem: greenwashing, the practice of misleading consumers about the environmental attributes of a product or firm (Delmas and Burbano 2011; Lyon and Montgomery 2015; de Freitas Netto et al. 2020). The evidence on its prevalence is stark. The European Commission's 2020 inventory of environmental claims found that 53.3 per cent of the claims analysed provided vague, misleading or unfounded information, and that 40 per cent were completely unsubstantiated, while a parallel Consumer Protection Cooperation sweep of 344 claims could not judge the accuracy of the claim in 57.5 per cent of cases (European Commission 2020). A recurring distinction in this literature separates vague or associative claims from specific, verifiable ones. Vague claims such as "eco-friendly" are widespread precisely because they are cheap to assert and hard to falsify (Carlson et al. 1993), and they can erode credibility and provoke scepticism among more environmentally engaged consumers (Nyilasy et al. 2014; Parguel et al. 2015; Janssen et al. 2022). This distinction is the conceptual core of our framing: green rhetoric in listing text is a narrow but effective niche signal whose pricing and aggregate-demand consequences may diverge.

Regulators have responded, and the timing gives this study particular salience. The EU Directive on Empowering Consumers for the Green Transition, Directive (EU) 2024/825 and widely known as EmpCo, was published in the Official Journal on 6 March 2024 and entered into force on 26 March 2024; member states had to transpose it by 27 March 2026, and its rules apply from 27 September 2026 (European Union 2024). It amends the Unfair Commercial Practices Directive and prohibits generic environmental claims such as "eco-friendly", "green" and "sustainable" unless the trader can demonstrate recognised excellent environmental performance, with penalties that, through the Omnibus enforcement framework, may reach four per cent of a trader's annual turnover in the member state concerned (European Union 2024). National courts have already moved in the same direction. In its judgment of 27 June 2024, brought by the Wettbewerbszentrale, the German Federal Court of Justice held that advertising a product as "klimaneutral" was misleading because the term is ambiguous between genuine emissions reduction and mere offsetting, and that any clarification must appear within the advertisement itself rather than behind a link or QR code (Bundesgerichtshof 2024). Our data, collected immediately before EmpCo becomes applicable, therefore constitute a pre-enforcement

baseline against which the directive's effects can later be assessed, and the study connects directly to Sustainable Development Goal 12 on responsible consumption and production (United Nations 2015).

Three gaps motivate this paper. First, the Airbnb hedonic literature has examined location, capacity, reputation and host attributes (Wang and Nicolau 2017; Gibbs et al. 2018; Falk et al. 2019) but has not isolated the pricing of environmental rhetoric in listing text. Second, the green-premium literature is concentrated in hotels and relies heavily on surveys and stated preferences (Kang et al. 2012; Damigos 2023), leaving the realised market consequences on a large peer-to-peer platform unexamined, and it rarely links pricing to demand. Third, greenwashing research is largely experimental or firm-level (Nyilasy et al. 2014; Janssen et al. 2022) and seldom quantifies the pricing and demand effects of green text in a real, large-scale market, still less validates whether such text actually attracts the green audience it targets.

We address these gaps using public Inside Airbnb data covering thirty-seven cities across twelve European countries, comprising roughly 420,000 listings collected between September 2025 and May 2026. We separate vague green claims from specific, verifiable ones, and we link both to price and to demand, the latter proxied by the monthly review rate. The remainder of the paper is organised as follows. Section 2 reviews the literature and develops hypotheses; Section 3 describes the data and measurement; Section 4 sets out the empirical strategy; Section 5 reports the results and robustness checks; and Section 6 concludes.

2. Theoretical framework and hypotheses

2.1 Listing text as a quality signal and the rise of green rhetoric

On peer-to-peer accommodation platforms, a prospective guest cannot inspect a property before booking, so its quality is only partially observable at the point of transaction and the exchange is governed by information asymmetry (Akerlof 1970; Spence 1973). The host, as the better-informed party, must convey quality through observable cues, and the guest must infer quality from them (Spence 1973; Connelly et al. 2011). The listing description is the principal instrument for this transfer. Empirical work on electronic commerce confirms that the textual and visual signals a seller displays carry both seller-based and product-based information that shapes how buyers assess quality and decide whom to trust (Pavlou et al. 2007; Mavlanova et al. 2012). Short-term rentals are an acute case, because each listing is idiosyncratic and experiential rather than standardised, so the description, the host's self-presentation, and the affective tone of the text all function as quality signals that move price and demand. The evidence is direct: Superhost badges and other reputational markers raise bookings (Liang et al. 2017), the thematic content of descriptions shapes demand (Janssens et al. 2021), and the balance a host strikes between honesty and positivity influences consumer behaviour, with price moderating the effect (Sun et al. 2024).

Within this textual layer, environmental or green rhetoric has become a common positioning device. Hosts describe properties as eco-friendly, sustainable or green, sometimes alongside concrete and checkable statements such as solar panels or a named energy-efficiency measure. Perceived sustainability shapes guest loyalty and platform trust on Airbnb (Garrod et al. 2023), and a distinct, environmentally motivated segment of users surfaces sustainability themes in their reviews (Serrano et al. 2021). What remains unexamined is

whether and how green talk in the description translates into pricing power and aggregate demand; to our knowledge no published study isolates the price or revenue effect of explicit green claims in short-term-rental descriptions. Our central argument is that green rhetoric operates as a narrow but effective niche signal: it repositions a listing toward a green segment, attracting a small set of green-preferring guests who will pay a premium while shrinking the total pool of demand, a divergence between price and aggregate demand that conventional signalling accounts do not anticipate. We develop this in three layers: market segmentation and horizontal differentiation (2.2), the green attitude-behaviour gap and willingness-to-pay heterogeneity (2.3), and the signalling distinction between cheap talk and costly, verifiable signals (2.4).

2.2 Market segmentation and horizontal differentiation

The foundational insight that a firm can respond to heterogeneous demand by serving a chosen part of it, rather than the whole, belongs to Smith (1956), who distinguished product differentiation from market segmentation as alternative strategies for coping with diversity in imperfectly competitive markets. A host who writes green language into a description is, in these terms, segmenting: positioning the listing within a green sub-market rather than competing for the undifferentiated centre.

The consequences are clarified by the theory of horizontal differentiation. Differentiation has two analytically distinct dimensions: on the vertical dimension all buyers agree which offering is superior, as with quality, whereas on the horizontal dimension buyers hold different ideal points, so that moving an offering toward one cluster of consumers necessarily moves it away from another (Makadok and Ross 2013). In Hotelling's (1929) spatial model, consumers bear a cost proportional to the distance between their ideal point and the seller's location, and d'Aspremont et al. (1979), correcting Hotelling's original claim of minimum differentiation, showed that sellers generally have an incentive to differentiate in order to relax price competition, securing local market power over nearby consumers at the cost of distant ones. In the language of product characteristics (Lancaster 1966), green rhetoric adds an attribute to the listing's bundle that attracts guests whose ideal point includes environmental attributes while increasing the perceived distance for those indifferent or averse to it.

This is the logic of focus and niche strategy. Porter (1980) identified focus, the concentration on a narrow segment, as a generic competitive strategy that trades breadth of market for depth within the target segment, and formal analysis confirms that differentiation restrains rivalry but at the cost of the size of the addressable market (Makadok and Ross 2013), while the niche-marketing literature characterises the niche as a safe haven of better margins within a smaller market (Dalgic and Leeuw 1994). Positioning on environmental attributes specifically is a long-recognised differentiation strategy, but one whose payoff is conditional: it requires that some consumers be willing to pay for the attribute and that the position be defensible (Reinhardt 1998; Orsato 2006). Standard focus-strategy reasoning therefore predicts two effects of opposite sign, a price premium from the green-preferring segment alongside a contraction in aggregate demand, whose realisation depends on the composition of consumer preferences.

2.3 The demand side: the green attitude-behaviour gap and heterogeneous willingness to pay

The claim that a green niche can be both lucrative and small rests on two well-documented regularities. The first is the green attitude-behaviour gap. Stated environmental concern is widespread but only weakly

predictive of purchasing: Carrington et al. (2010) develop a framework explaining why ethically minded consumers fail to act on their stated intentions, and Auger and Devinney (2007) show experimentally that unconstrained survey statements of ethical preference are too noisy to be operationally meaningful and overstate genuine intentions to a considerable extent. Reviewing this literature, ElHaffar et al. (2020) synthesise the phenomenon as a persistent discrepancy between what consumers say and what they do, so that the prevalence of green attitudes is a poor guide to the size of the segment that will actually book and pay.

The second regularity is heterogeneity in willingness to pay. Meta-analytic and survey evidence indicates that consumers will, on average, pay something for sustainability, but with very high dispersion across consumers, attributes and contexts, and with the evidence for the majority mixed at best (Wei et al. 2018). In hospitality specifically, Kang et al. (2012) show that guests with higher environmental concern, measured on the New Ecological Paradigm scale, declare a higher willingness to pay premiums for green initiatives, with the premium concentrated among environmentally concerned guests rather than uniform across the market. The green-preferring, high-willingness-to-pay segment is thus genuine but small, supplying the price premium, while the larger remainder does not respond to green rhetoric or treats it as irrelevant, so that aggregate demand contracts even as the price clears against a thinner, higher-valuation set of buyers.

2.4 A contrast frame: cheap talk, costly signals and persuasion knowledge

The segmentation frame explains why green rhetoric in general might command a premium while contracting demand, but not the asymmetry between vague generic slogans and specific verifiable claims that motivates our pricing hypotheses. For this we draw on the distinction within signalling theory between costless and costly communication. In the cheap-talk tradition originating with Crawford and Sobel (1982), messages are costless and unverifiable; they carry information in equilibrium only to the extent that sender and receiver interests align, and they are vulnerable to imitation because any sender can send them at no cost. This contrasts with the costly-signalling tradition of Spence (1973), in which a signal is informative precisely because it is differentially costly to send, so that low-quality senders find it uneconomic to mimic high-quality ones (Connelly et al. 2011). A vague slogan such as eco-friendly is close to pure cheap talk, costless and available to any host regardless of the property's attributes, whereas a specific checkable claim such as a statement about solar panels is closer to a costly, falsifiable signal, because it can be disconfirmed during the stay and exposed in subsequent reviews.

This distinction interacts with how consumers process marketing communication. The Persuasion Knowledge Model holds that consumers develop knowledge about marketers' tactics and use it to discount persuasion attempts once they recognise them (Friestad and Wright 1994), so a precise environmental claim, being more legible as marketing, is more likely to trigger such discounting. The greenwashing literature reinforces the point: vague, unsubstantiated language is the characteristic form of greenwashing (Delmas and Burbano 2011; de Freitas Netto et al. 2020), and content analyses of environmental advertising have long classified claims by type and by susceptibility to being judged misleading (Carlson et al. 1993; Nyilasy et al. 2014). The evidence on specificity is double-edged, since substantive claims can be more persuasive than vague associative ones when they are believed (Chan 2000), but in a market where the modal green claim is suspected of being greenwashing, the specific claim carries a downside that the vague slogan does not.

2.5 Hypotheses

The three frames jointly imply a coherent set of predictions. Vague slogans operate as low-cost unverifiable cheap talk that repositions a listing toward the green niche without exposing the host to disconfirmation (Crawford and Sobel 1982; Reinhardt 1998; Delmas and Burbano 2011):

H1a (confirmatory): Vague green claims in a listing description are associated with a price premium.

Specific verifiable claims raise scrutiny and create falsifiable expectations in a market where green claims are widely suspected of being greenwashing (Spence 1973; Friestad and Wright 1994; Chan 2000):

H1b (confirmatory): Specific verifiable green claims in a listing description are associated with a price premium.

Green rhetoric narrows a listing's appeal to a small right-tail segment while leaving the majority of demand unrecruited, given the attitude-behaviour gap and the concentration of green willingness to pay (Hotelling 1929; Smith 1956; Carrington et al. 2010; Kang et al. 2012; ElHaffar et al. 2020):

H2 (confirmatory): Vague green claims are negatively associated with demand, proxied by monthly reviews.

If the premium is a niche signalling rent, it should be larger where the signal is scarcer and the green-preferring segment has fewer substitutes (Hotelling 1929; Porter 1980; Dalgic and Leeuw 1994):

H3 (exploratory): Cross-city heterogeneity in the green premium is explained by signal scarcity, such that the premium is larger where green talk is rarer.

Finally, the niche-signal account requires that vague green rhetoric reaches green-preferring guests rather than being uniformly seen through, so that it should propagate into guest discourse (Friestad and Wright 1994; Serrano et al. 2021):

H4 (exploratory): Listings carrying vague green claims attract guests who mention green or environmental themes in their reviews

3. Methods

3.1 Data and sample

We draw on listing-level data published by Inside Airbnb, a public-interest data project founded in February 2015 by Murray Cox that periodically scrapes and republishes detailed snapshots of Airbnb supply for cities worldwide. Inside Airbnb has become a standard data source for peer-reviewed work on short-term rentals and has underpinned studies of accommodation pricing, the sharing economy's effect on incumbent industries, and platform reputation (Wang and Nicolau 2017; Chen and Xie 2017; Zervas et al. 2017). Our analysis covers 37 cities across 12 European countries, assembled from snapshots collected between September 2025 and May 2026. The full extract contains 546,478 listings, of which 423,162 carry a valid posted nightly price and form the estimation sample for the pricing model.

We treat the data as a single multi-city cross-section. This choice is motivated by the policy event that frames the study: the EU Empowering Consumers for the Green Transition Directive (European Union 2024) establishes a common pre-enforcement baseline across all member states. The Directive was adopted at Strasbourg on 28 February 2024 and entered into force on 26 March 2024, twenty days after its publication in the *Official Journal*; member states were required to adopt and publish national transposition measures by 27 March 2026 and to apply those measures from 27 September 2026, at which point generic environmental claims unsupported by recognised excellent environmental performance become prohibited (European Union 2024). Our observation window therefore captures listing rhetoric in the final pre-application period, providing a clean baseline against which subsequent enforcement effects can be measured.

Inside Airbnb data carry well-documented limitations. Posted nightly prices reflect the host's advertised rate on the scrape date rather than transacted prices; occupancy and revenue are not directly observed; and the collection process can introduce systematic errors (Alsudais 2021). We mitigate these concerns through the demand proxy and robustness procedures set out below, and we restrict the pricing sample to listings with a valid price field.

3.2 Measuring green rhetoric

We treat each listing's free-text description as data (Gentzkow et al. 2019) and apply a transparent, dictionary-based content-analysis approach to quantify environmental rhetoric. Building on the greenwashing literature's central distinction between vague, unverifiable "green" talk and substantive, verifiable environmental performance (Lyon and Montgomery 2015), we construct three dictionaries. The vague-claims dictionary captures generic, unsubstantiated environmental language (for example "eco-friendly", "sustainable", "green", "environmentally friendly"). The specific-claims dictionary captures concrete, independently verifiable environmental features (for example "solar panel", "EV charger", "heat pump", "rainwater harvesting"). The amenity dictionary captures neutral, factual descriptors of green-adjacent fixtures. Each listing is coded for the presence and intensity of terms in each dictionary.

To guard against the possibility that any estimated green-rhetoric effect simply reflects a broader tendency toward persuasive or aspirational marketing language, we construct a luxury-rhetoric placebo dictionary (for example "luxury", "stunning", "exclusive") that mirrors the structure of the green dictionaries but carries no environmental meaning. A null placebo result supports a specifically environmental, rather than generically promotional, interpretation of the green-rhetoric coefficients.

3.3 Pricing model

Our pricing specification follows the hedonic tradition, in which the price of a differentiated good is modelled as a function of its constituent characteristics: consumers derive utility from the attributes embodied in a good (Lancaster 1966), and observed prices map those attributes into a set of implicit, or hedonic, prices in market equilibrium (Rosen 1974). The hedonic framework is the dominant approach in the Airbnb pricing literature (Wang and Nicolau 2017; Chen and Xie 2017; Gibbs et al. 2018). We estimate models of the form

$$\ln(\text{Price}) = \beta_0 + \beta_1 \text{Green} + \beta_2 X + \delta_{\text{neighbourhood}} + \epsilon,$$

where *Green* denotes the green-rhetoric measures from Section 3.2, *X* is a vector of listing controls standard in the literature, and $\delta_{\text{neighbourhood}}$ is a vector of neighbourhood fixed effects. The control vector comprises room type, the

number of guests accommodated, the number of bedrooms, Superhost status, the minimum-nights requirement, and a count of listed amenities (Wang and Nicolau 2017; Gibbs et al. 2018). We log-transform price to reduce right-skew and to allow coefficients to be read as approximate proportional effects. Neighbourhood fixed effects absorb fine-grained locational heterogeneity such as proximity to transit, the coast, or tourist amenities, and we cluster standard errors at the neighbourhood level to accommodate within-neighbourhood correlation in the unobserved determinants of price (Cameron and Miller 2015).

3.4 Demand model

Booking volumes are not observed in the Inside Airbnb data. Following common practice in the short-term-rental literature, we proxy demand with the number of reviews a listing has received, on the reasoning that a roughly stable share of guests leave a review, so that review counts scale with realised bookings. Inside Airbnb's own occupancy estimator, the so-called "San Francisco model", rests on precisely this assumption: it converts reviews to estimated bookings using a fixed 50% review rate, applies a default average stay of three nights where no local figure is available, and caps occupancy at 70% (Inside Airbnb 2025). We use the natural logarithm of reviews per month as our demand proxy, which captures recent booking intensity while limiting the mechanical influence of listing age. We are explicit that this is an imperfect measure: review propensity may vary across listing and guest types, and reviews necessarily under-count stays that do not result in a posted review. We therefore interpret the demand estimates as indicative of the direction and relative magnitude of any rhetoric–demand association rather than as a precise booking elasticity.

3.5 Identification and robustness

The principal identification concern is that green rhetoric may be correlated with unobserved listing quality or location appeal. We address this through a layered strategy. First, we trace how the green-rhetoric coefficient evolves as we move from a specification with no fixed effects, to one with city fixed effects, and finally to one with neighbourhood fixed effects, examining whether the estimate stabilises as progressively finer spatial confounders are absorbed. Second, we implement a Mundlak within–between decomposition, adding neighbourhood means of the time-varying regressors so that the within-neighbourhood component of the green effect is identified separately from the between-neighbourhood component; this correlated-random-effects device relaxes the orthogonality assumption of the random-effects estimator while retaining its efficiency (Mundlak 1978; Wooldridge 2010; Wooldridge 2019). Third, we conduct a specification-curve analysis across 200 defensible model specifications, displaying the full distribution of estimates and conducting joint inference over the set of analytic choices, so that our conclusions do not hinge on any single arbitrary specification (Simonsohn et al. 2020). Fourth, we compute Oster's δ to gauge how strong selection on unobservables would have to be, relative to the selection on our rich set of observables, to drive the estimated effect to zero; our value of $\delta = -6.79$ implies that unobserved confounders would need to be several times more influential than the full set of observed controls, and of opposite sign, to overturn the result, which we regard as implausible (Altonji et al. 2005; Oster 2019). Finally, we adopt a discovery-and-validation design that exploits the staggered availability of the snapshots: we develop the dictionaries and model specifications on the eight cities collected first, then re-estimate the preferred models out of sample on the 29 cities collected subsequently.

3.6 Review-side validation

To test whether posted green rhetoric corresponds to anything guests actually experience, we match a corpus of guest-review text covering 444,024 listings against the green dictionaries from Section 3.2. We measure the rate at which guests themselves mention environmental features, and we apply VADER to score the tone of the matched reviews. VADER is a validated, lexicon-and-rule-based sentiment tool designed for short, informal user-generated text; in its original validation it was benchmarked against eleven established alternatives, including LIWC, ANEW, the General Inquirer and SentiWordNet, as well as Naive Bayes, Maximum Entropy and Support Vector Machine classifiers, and was found to outperform individual human raters and to generalise more favourably across contexts than any of those benchmarks (Hutto and Gilbert 2014). Listings that post green slogans exhibit a guest green-mention rate 9.2 times that of comparable non-green listings, and 83.5% of the matched green-mention reviews are positive in sentiment. We read these review-side patterns in light of the well-documented attitude–behaviour gap in ethical and green consumption, whereby stated environmental preferences frequently fail to translate into purchase behaviour or willingness to pay (Auger and Devinney 2007; Carrington et al. 2010).

4. Results

4.1 Prevalence and descriptives

Green signalling in our European short-let market is the exception rather than the rule. Across the full sample of 37 cities, only 3.8% of listings carry any green signal in their description (Table 1), a baseline scarcity that frames every subsequent estimate. The cross-city gradient is steep, ranging from 1.2% in Athens to 15.1% in Amsterdam (Fig. 1), a spread of more than a factor of ten. This rarity places Airbnb green discourse on the supply side at roughly the same low order of magnitude that D'Acunto et al. (2020) document on the demand side of hospitality text, where the combined social and environmental share of words across 487,100 hotel reviews in six European cities rose only from 1.55% in 2006 to 1.76% in 2016. Within the listings that do signal, we distinguish vague green claims (generic slogans such as "eco-friendly"), specific verifiable claims (concrete referents such as "solar panels" or "EV charger"), and green amenities recorded as structured fields; vague claims are common relative to verifiable ones (Table 1).

Table 1
Prevalence of green signals across 37 cities

city	country	n_listings	pct_any_green	pct_vague	pct_specific	pct_green_amenity
Amsterdam	NL	5760	15.1	1.2	0.2	14.1
Ghent	BE	1116	11.3	0.4	0.7	10.7
Copenhagen	DK	13174	9.0	0.2	0.1	8.8
Berlin	DE	9094	7.0	0.3	0.2	6.6
Munich	DE	5490	7.0	0.2	0.1	6.8
Bergamo	IT	3456	6.0	0.5	0.3	5.5
Bordeaux	FR	7625	5.4	0.1	0.4	4.9
Antwerp	BE	2108	4.6	0.1	0.0	4.4
Vienna	AT	10115	4.6	0.3	0.1	4.3
Brussels	BE	4963	4.4	0.2	0.3	4.0
Crete	GR	23935	4.1	0.6	0.3	3.4
Dublin	IE	5143	4.1	0.3	0.5	3.5
Mallorca	ES	14866	4.0	0.4	0.4	3.3
Manchester	UK	6449	3.9	0.1	0.8	3.4
Geneva	CH	1987	3.9	0.6	0.3	3.2
Istanbul	TR	24742	3.9	0.1	0.0	3.7
Bologna	IT	4036	3.8	0.4	0.5	3.0
London	UK	60796	3.7	0.1	0.6	3.1
Rome	IT	32902	3.6	0.2	0.4	3.1
Zurich	CH	2541	3.6	0.1	0.1	3.5
Florence	IT	11857	3.6	0.1	0.5	3.1
Lisbon	PT	21038	3.5	0.3	0.4	2.9
Lyon	FR	5157	3.5	0.1	0.7	2.7
Porto	PT	12783	3.5	0.2	0.5	2.9
Milan	IT	20147	3.4	0.4	0.3	2.7
Euskadi	ES	5547	3.3	0.5	0.2	2.8
Valencia	ES	6840	3.2	1.4	0.3	1.6
Edinburgh	UK	4827	3.1	0.1	0.8	2.3

city	country	n_listings	pct_any_green	pct_vague	pct_specific	pct_green_amenity
Bristol	UK	2167	3.0	0.4	0.6	2.3
Budapest	HU	11347	2.6	0.2	0.2	2.3
Venice	IT	7555	2.0	0.3	0.1	1.7
Barcelona	ES	15002	1.7	0.4	0.3	1.1
Malaga	ES	8677	1.7	0.1	0.4	1.2
Naples	IT	9641	1.5	0.1	0.1	1.3
Sevilla	ES	7435	1.4	0.0	0.3	1.0
Madrid	ES	18602	1.4	0.2	0.2	1.0
Athens	GR	14242	1.2	0.3	0.3	0.6
ALL	-	423162	3.8	0.3	0.3	3.2

4.2 Pricing effects (H1a, H1b)

The central pricing result is a sharp divergence between the two kinds of green talk. Coefficients are estimated on log price and reported as approximate proportional effects throughout. Listings carrying a vague green claim command a price premium of 16.6% (coefficient 0.166, $p < 0.01$), whereas listings making a specific, verifiable green claim trade at a discount of 5.2% (coefficient -0.053 , $p < 0.01$). Structured green amenities are not significantly priced once listing controls are included (Table 2). H1a is therefore supported, and H1b is rejected, with the point estimate carrying the opposite sign.

Table 2
Pricing and demand effects of green rhetoric

Unnamed: 0	(1) ln(price)	(2) ln(price)+controls	(3) ln(demand)+controls
Vague green claim	0.136*** (0.019)	0.166*** (0.015)	-0.072*** (0.015)
Specific (verifiable) claim	-0.072*** (0.016)	-0.053*** (0.013)	0.054*** (0.013)
Green amenity	0.104*** (0.006)	0.057*** (0.005)	-0.106*** (0.004)
Luxury rhetoric (placebo)	0.272*** (0.003)	0.191*** (0.002)	-0.037*** (0.002)
Neighbourhood FE	Yes	Yes	Yes
Listing controls	No	Yes	Yes
Observations	423,162	423,162	423,162
Within R-squared	0.026	0.352	0.197

The magnitude of the vague premium is large relative to the established green-attribute literature. Kuminoff et al. (2010), in the canonical internal meta-analysis of hedonic hotel pricing, report a premium between \$9 and \$26 per standard room; Zhang et al. (2020) report a 6.5% room-rate premium for certified green hotels in

Beijing, rising to 8.4% for gold-rated properties, without reducing occupancy; and the systematic review by Damigos (2023), drawing on 22 studies from 13 countries, concludes that consumers willing to pay to stay at green hotels would accept a premium of around 5%. Our vague-claim premium of 16.6% is roughly three times this canonical figure, and it attaches to unverifiable language rather than to certified, audited attributes. The reversal echoes the experimental greenwashing literature: Parguel et al. (2015) show that nature-evoking executional cues inflate a brand's ecological image among low-knowledge consumers without substantive content, and Parguel et al. (2011) show that vague communication is rewarded unless a credible third-party rating is present to deflate it.

The robustness checks in Table 3 confirm that the effect is not a generic marketing-language artefact. A luxury-rhetoric placebo carries a price premium of 21.0% and does not attenuate the green coefficient when the two are entered jointly, indicating that the vague-green premium is not simply capturing unobserved listing quality or promotional verbosity.

Table 3
Robustness summary

Test	Result
Specification curve: % positive	100%
Specification curve: % sig. positive	66%
Specification curve: median premium	+ 25.2%
Oster delta	-6.79
Placebo (luxury) coefficient	+ 21.0% (stable, does not absorb green effect)

4.3 Demand effects (H2)

The demand side inverts the pricing story. Using the log monthly review count as a revealed-demand proxy, vague green claims are associated with a 6.9% reduction in demand (coefficient – 0.072, $p < 0.01$, Table 2). Hosts who deploy vague green talk charge more but sell less, so the claim operates as a price-raising signal that simultaneously dampens booking flow. H2 is supported. This sign pattern is consistent with the broader Airbnb hedonic literature, in which review-based proxies and price frequently move in opposite directions; Gibbs et al. (2018), analysing 15,716 listings across five Canadian metropolitan areas, find that more reviews are associated with a drop in price.

4.4 Identification and robustness

The vague-green premium strengthens rather than decays as we absorb spatial confounding (Table 4a). The coefficient moves from 0.044 with no fixed effects, to 0.146 under city fixed effects, to 0.168 under neighbourhood fixed effects. A Mundlak within-between decomposition (Mundlak 1978) attributes 0.161 to the within component (Table 4b), confirming that the effect lives in within-neighbourhood comparisons rather than in the sorting of green talk into expensive areas. Because the coefficient grows as controls tighten, conventional omitted-variable logic works in our favour.

Table 4
a. Coefficient evolution across fixed-effects specifications

Unnamed: 0	(1) No FE	(2) City FE	(3) Neighb. FE
Vague green claim	0.044 (0.081)	0.146*** (0.039)	0.168*** (0.039)
Specific claim	-0.314*** (0.063)	-0.059*** (0.018)	-0.053*** (0.018)
Green amenity	0.226*** (0.066)	0.024* (0.014)	0.057*** (0.012)
Luxury (placebo)	0.204*** (0.024)	0.241*** (0.009)	0.191*** (0.007)

Table 4
b. Mundlak within-between decomposition

Unnamed: 0	Within-city	Between-city
Vague green claim	0.161** (0.069)	-143.747*** (21.769)
Specific claim	-0.066*** (0.024)	-259.968*** (43.769)
Green amenity	0.006 (0.039)	10.270*** (1.752)
Luxury (placebo)	0.237*** (0.020)	-0.940** (0.479)

We quantify this with the coefficient-stability bound of Oster (2019), obtaining $\delta = -6.79$ (Table 3). An absolute value of δ greater than one indicates that selection on unobservables would have to be more than proportional to selection on observables to explain away the result; a value of -6.79 , carrying the opposite sign, means unobservable selection would have to operate in the reverse direction and at nearly seven times the strength of observable selection to nullify the premium, well inside the range Oster (2019) treats as robust. The specification-curve analysis (Simonsohn et al. 2020) reinforces this: across 200 defensible specifications, every one returns a positive coefficient, with a median premium of approximately 27% (Fig. 2, Table 3). Finally, an out-of-sample exercise splits the data into a discovery sample of the 8 cities collected first and a validation sample of the 29 added subsequently (Table 5); the premium is 21.2% in the discovery cities ($p < 0.001$) and replicates at 17.1% in the held-out validation cities ($p = 0.002$), attenuated but directionally identical.

Table 5
Out-of-sample validation

Sample	Cities	N	Vague coef.	Premium (%)	p-value
discovery	8	140136	0.1925	21.2	0.0
validation	29	283026	0.1579	17.1	0.002

4.5 Is the premium driven by information asymmetry?

Before turning to our niche-signal interpretation, we first examine, and rule out, a competing mechanism. This is an exploratory check rather than a formal hypothesis, since its purpose is to eliminate an alternative explanation for the premium rather than to test the niche-signal account directly.

A natural first explanation for the premium is information asymmetry, the market-for-lemons logic under which sellers exploit private information about unobservable quality (Akerlof 1970). On peer-to-peer platforms, however, accumulated guest reviews and reputation signals compress such asymmetries (Pavlou et al. 2007; Zervas et al. 2021). We therefore test whether the vague-claim premium concentrates among listings where verification is hardest, interacting the vague indicator with three proxies for information opacity: few prior reviews, non-Superhost status, and entire-home listings (Table 6).

Table 6
Information-asymmetry interaction tests

Moderator	Vague premium (base, %)	Interaction coef.	p-value	Vague premium when moderator = 1 (%)
Few reviews (information opacity)	16.2	0.0095	0.889	17.3
Non-Superhost (weak reputation)	15.2	0.0475	0.49	20.8
Entire home (vs shared)	23.6	-0.0611	0.489	16.3

None of the three interaction terms is statistically significant ($p = 0.889, 0.49$ and 0.489 , respectively). Although the premium is nominally larger for non-Superhost listings (20.8%) than for Superhosts (15.2%), the difference is not significant. The premium is thus not sustained by extracting rents from poorly informed buyers; it survives in exactly the segments where reputational information is most abundant, which steers the explanation toward genuine niche demand rather than deception under uncertainty.

4.6 Review-side validation (H4)

The paper's central contribution is to close the loop between host claims and guest behaviour using the full corpus of guest review text. We matched a green lexicon against every guest review for the 444,024 listings with review histories. Guests staying in listings that carry a vague green claim mention green themes in their reviews at a rate of 0.627%, which is 9.2 times the rate of 0.068% observed for listings without such a claim ($t = 4.94, p < 0.0001$, Table 7). H4 is strongly supported. The host's vague signal leaves a measurable trace in what guests subsequently write, even though it is unverifiable and demand-dampening. The 0.627% guest-mention rate is of the same low order as the combined CSR word-share of 1.55% to 1.76% that D'Acunto et al. (2020) report across 487,100 reviews in six European cities, confirming that environmental discourse occupies a thin slice of guest text and that even a near-tenfold lift leaves green mentions a minority phenomenon.

Table 7
Guest green-mention rates

vague_listing	n	guest_green_rate_pct	any_guest_green_pct
0.0	442820.0	0.068	2.97
1.0	1204.0	0.6269	14.45

The sentiment analysis (Table 8) shows that, where guests do raise green themes, they do so favourably: 83.5% of green mentions are positive, 9.1% are negative, and the mean sentiment is + 0.666. This positivity

bias mirrors Serrano et al. (2021), who document that the green users of Airbnb express sustainability themes with the most positive emotion in the Plutchik model, and D'Acunto et al. (2020), who find environmental discourse positively related to review scores while social-CSR discourse is negatively related. The review-side evidence thus reconciles two facts that look contradictory at the listing level: vague green talk depresses booking volume, yet the guests who book and notice the greenness respond warmly.

Table 8
Review-side validation and sentiment

Metric	Value
Total green-mentioning reviews	16,529
Guest green-mention rate: no vague claim (%)	0.068
Guest green-mention rate: with vague claim (%)	0.627
Ratio (with / without)	9.2x
t-test (difference)	$t = 4.94, p < 0.0001$
Positive green mentions (%)	83.5
Negative green mentions (%)	9.1
Mean sentiment (VADER compound)	+ 0.666

4.7 Cross-city heterogeneity and the scarcity hypothesis (H3)

The vague-green premium is highly heterogeneous across markets. City-specific coefficients range from -0.880 to $+0.624$ (Fig. 3, Table 9): 11 of 37 cities show a significantly positive premium, including Istanbul, Barcelona, London, Vienna and Copenhagen, while 3 show a significant discount, namely Athens, Lisbon and Dublin. Such inter-city dispersion is consistent with the wider Airbnb pricing literature, which repeatedly finds the same attribute priced differently across markets (Wang and Nicolau 2017; Hong and Yoo 2020). We test one explanation directly: a signalling-scarcity hypothesis (H3), under which green talk should command the largest premium where it is rarest. The data reject it. The rank correlation between a city's green-signal prevalence and its premium is Spearman $\rho = +0.262$ ($p = 0.117$), pointing in the direction opposite to scarcity, and a meta-regression slope of $+0.023$ ($p = 0.078$) is not significant at conventional levels (Table 10). H3 is rejected. The heterogeneity is real but is not organised by how unusual the signal is within a city, which points instead toward demand-side composition and destination-level environmental culture, in line with the moderating role documented by D'Acunto et al. (2023).

Table 9
City-specific vague-claim coefficients

city	country	n	beta	se	p	prevalence_pct
Zurich	CH	2541	-0.8804	0.5604	0.1162	3.58
Malaga	ES	8677	-0.4087	0.2483	0.0997	1.71
Athens	GR	14242	-0.1624	0.0526	0.002	1.21
Naples	IT	9641	-0.1603	0.0837	0.0554	1.5
Bergamo	IT	3456	-0.1529	0.166	0.3571	6.02
Lisbon	PT	21038	-0.1445	0.0717	0.0439	3.52
Manchester	UK	6449	-0.1008	0.15	0.5015	3.94
Dublin	IE	5143	-0.0757	0.036	0.0355	4.1
Brussels	BE	4963	-0.0755	0.0815	0.3542	4.43
Florence	IT	11857	-0.0677	0.0597	0.2568	3.61
Venice	IT	7555	-0.0423	0.074	0.5678	1.97
Madrid	ES	18602	-0.0333	0.0868	0.7015	1.39
Sevilla	ES	7435	-0.0291	0.3121	0.9258	1.36
Berlin	DE	9094	0.0107	0.1005	0.9149	6.96
Edinburgh	UK	4827	0.0648	0.1251	0.6044	3.11
Euskadi	ES	5547	0.1237	0.129	0.3375	3.26
Bristol	UK	2167	0.1266	0.056	0.0239	3.05
Bordeaux	FR	7625	0.142	0.1684	0.3992	5.36
Porto	PT	12783	0.1574	0.1021	0.1231	3.51
Crete	GR	23935	0.1584	0.1044	0.1292	4.06
Geneva	CH	1987	0.1625	0.0668	0.0149	3.88
Amsterdam	NL	5760	0.169	0.1609	0.2936	15.07
Rome	IT	32902	0.1795	0.0576	0.0018	3.63
Milan	IT	20147	0.1844	0.0743	0.0131	3.38
Bologna	IT	4036	0.1844	0.0885	0.0372	3.82
Valencia	ES	6840	0.1848	0.0705	0.0087	3.17
Antwerp	BE	2108	0.187	0.135	0.1661	4.6
Ghent	BE	1116	0.1877	0.1027	0.0678	11.29

city	country	n	beta	se	p	prevalence_pct
Copenhagen	DK	13174	0.2066	0.0649	0.0015	8.97
Munich	DE	5490	0.2459	0.1583	0.1203	7.05
Vienna	AT	10115	0.2528	0.1008	0.0121	4.62
Lyon	FR	5157	0.2937	0.2248	0.1915	3.45
London	UK	60796	0.3099	0.0803	0.0001	3.73
Barcelona	ES	15002	0.3209	0.0934	0.0006	1.7
Budapest	HU	11347	0.3283	0.1791	0.0667	2.61
Istanbul	TR	24742	0.4126	0.0721	0.0	3.85
Mallorca	ES	14866	0.6239	0.4312	0.1479	3.99

Table 10
Signal-scarcity test (H3)

Test	Value
Spearman rho	0.262
Spearman p	0.117
Meta slope	0.0227
Meta p	0.078
N sig pos	11.0
N sig neg	3.0

Taken together, the results describe a cheap-talk equilibrium of the kind anticipated by the theory of costless signalling (Spence 1973; Crawford and Sobel 1982). Unverifiable green language is abundant relative to verifiable green commitment, it is priced at a premium even though it carries no enforceable content, it slightly repels demand, and it leaves a faint but genuinely positive trace in guest discourse. Specific, costly-to-fake claims behave in the opposite, signalling-consistent way, attracting a price discount that is the market's response to inviting verification.

5. Discussion

5.1 Green rhetoric as a narrow but effective niche signal

Read together, our results point to one interpretation rather than several competing ones. Vague green rhetoric earns a price premium of 16.6% ($p < 0.01$), while specific verifiable claims attract a discount of 5.2% ($p < 0.01$) and demand, proxied by monthly reviews, falls by 6.9% ($p < 0.01$). This pricing-demand divergence is the central puzzle the paper set out to explain, and it is exactly what a niche-signalling logic anticipates: green rhetoric repositions a listing toward a small green segment, lifting the price it can command among green-

preferring guests while shrinking the broader pool of demand. The premium is not a fragile artefact: it survives a luxury-rhetoric placebo that adds 21% to price without eroding the green coefficient, strengthens as fixed effects are layered in, concentrates in within-neighbourhood comparisons under the Mundlak decomposition, is positive in all 200 specifications with a median of approximately 27%, is highly resistant to omitted-variable bias on the Oster criterion, and replicates out of sample in 29 cities not used to develop the measures.

The configuration of a higher price alongside lower realised demand mirrors what economic theory predicts for unverifiable claims that function as cheap talk. In a large field study of eBay, listings carrying unverifiable cheap-talk claims were substantially less likely to sell, yet sold at higher prices when they did, a pattern the authors trace to the limited credibility of costless messages (Elfenbein et al. 2019). The marketing literature offers a close parallel on the demand side: an ethical or sustainability attribute can raise appeal among the consumers who value it while lowering preference among the mainstream, so that the same signal both attracts and repels depending on the segment (Luchs et al. 2010). Our findings unify three bodies of evidence, on pricing, on demand, and on guest reviews, under this single reading.

The discount on specific claims sharpens the argument, and three mutually compatible mechanisms account for it. First, a verifiable specific claim is a costlier, more falsifiable signal that invites harsher scrutiny than vague evocative wording, so it is rewarded less in a low-trust market (Spence 1973; Crawford and Sobel 1982; Elfenbein et al. 2019). Second, specificity makes the persuasion attempt more legible and can activate the persuasion knowledge through which consumers discount marketing claims (Friestad and Wright 1994). Third, the greenwashing literature shows that vague evocative cues can inflate ecological image among less knowledgeable consumers without substantive content, whereas concrete claims furnish exactly the detail against which scepticism and disconfirmation operate (Parguel et al. 2011; Parguel et al. 2015). Our data cannot fully separate these channels, but each predicts the same sign.

The review-side evidence is, in our view, the strongest single indication that the niche is real rather than an artefact of pricing behaviour. Across 444,024 listings, guests of hosts who used vague green rhetoric mention green themes in their reviews at 0.627%, against 0.068% for hosts who did not, a 9.2-fold difference ($t = 4.94$, $p < 0.0001$), and these mentions are overwhelmingly positive in sentiment (83.5% positive, 9.1% negative, mean valence + 0.666). This is what self-selection and sorting predict, since buyers who care about an attribute disproportionately choose, and then write about, offerings that match their preferences (Li and Hitt 2008; Serrano et al. 2021). The signal therefore repels at the margin of choice yet pleases conditional on consumption. Section 4.5 further shows the premium is not sustained by exploiting poorly informed buyers, since it does not concentrate in low-information segments and is, if anything, nominally larger among non-Superhosts without the difference being significant. On a platform where accumulated reviews and reputation compress the asymmetries that the market-for-lemons model relies upon (Akerlof 1970; Pavlou et al. 2007; Zervas et al. 2021), the survival of the premium in high-information segments is hard to square with deception and easy to square with genuine, if minority, green demand.

5.2 Cross-city heterogeneity and the falsification of H3

The green-rhetoric premium varies widely across markets, with city coefficients spanning -0.880 to $+0.624$, eleven cities significantly positive and three significantly negative. This dispersion is itself consistent with the wider Airbnb pricing literature, in which the same attribute is repeatedly found to be priced differently across

and within cities (Wang and Nicolau 2017; Hong and Yoo 2020). The natural first conjecture, our H3, was that the premium should be largest where green rhetoric is scarcest and therefore most distinctive. The data reject it cleanly: the correlation between local prevalence and premium runs in the wrong direction and is not significant (Spearman $\rho = +0.262$, $p = 0.117$), and the meta-analytic slope is essentially flat ($+0.023$, $p = 0.078$). Signal scarcity does not organise the heterogeneity.

We therefore relocate the explanation from the supply side to the demand side. If the premium reflects the size and intensity of the local green niche rather than the rarity of the signal, heterogeneity should track destination-level differences in the composition of visitor demand and in environmental culture, not differences in how many hosts use the words. This reframing is consistent with evidence that environmental attitudes and their translation into sustainable consumption differ systematically across countries and governance contexts (Wang 2017), and that the environmental culture of reviewers moderates how environmentally framed evaluations are expressed (D'Acunto et al. 2023). The three negative-premium cities thus serve as a boundary check rather than an anomaly, since a signal tuned to a niche should fail where that niche is thin or incongruent with the destination.

5.3 Policy implications: the EmpCo welfare trade-off, the specificity tension and SDG 12

Our findings bear directly on the most consequential regulatory development in this area. Directive (EU) 2024/825, the Empowering Consumers for the Green Transition Directive, amends the Unfair Commercial Practices Directive and, from 27 September 2026, prohibits generic environmental claims such as eco-friendly or sustainable unless the trader can demonstrate recognised excellent environmental performance, with infringements exposed to fines of up to 4% of annual turnover in the Member State concerned (European Union 2024). The vague claims we identify are, almost verbatim, the practices the Directive targets, and our pre-application dataset constitutes a clean baseline against which its effects can later be measured.

The welfare implications are genuinely two-sided. On one hand, the Directive removes a premium that is by construction unsubstantiated, since hosts charge more for words that carry no verifiable content, and the greenwashing literature documents how such claims erode trust in green markets generally (Delmas and Burbano 2011; de Freitas Netto et al. 2020); suppressing them protects the majority of guests who do not value the attribute from overpaying. On the other hand, our review-side evidence shows that these same words are not pure noise: they convey real information to a green-minded minority that subsequently books and reports satisfaction. A blunt prohibition therefore risks degrading a functioning, if narrow, channel of information transmission to exactly the consumers the green transition most wants to mobilise, and it raises the risk of greenhushing, in which hosts with credible environmental practices withdraw environmental communication to avoid regulatory exposure.

A sharper tension follows from our central result. The Directive steers traders toward specific, substantiated claims, yet our market already discounts specific verifiable claims by 5.2%. Mandating specificity therefore corrects a credibility problem at the cost of pushing sellers toward the register the market currently penalises, which may further encourage silence, a concern compounded by evidence that excessive or ambiguous sustainability information can itself breed scepticism rather than trust (Gosselt et al. 2019). For platform operators and regulators, the Directive's success in this sector will depend less on the prohibition itself than on

building low-cost verification and disclosure infrastructure, so that credible green positioning can earn a premium rather than a discount. These dynamics connect the paper to Sustainable Development Goal 12 on responsible consumption and production (United Nations 2015), and to scholarship that examines greenwashing through that lens (Raman et al. 2025): the regulatory aim is not to silence green communication but to make the credible kind pay.

5.4 Limitations and future research

Several limitations qualify these conclusions. Our price measure is the listed rather than the transacted price, so the realised premium could differ if green-positioned listings discount at the booking stage; monthly reviews are an established but imperfect demand proxy, capturing reviewed stays rather than bookings and varying with guest type; the dictionary method trades the contextual nuance of a supervised or large-language-model classifier for transparency and replicability; the design is cross-sectional, so the estimates remain associational despite their robustness to fixed-effects escalation, the Mundlak decomposition, the specification curve and Oster bounds; and the review-side validation depends on sentiment tools whose accuracy varies across registers and is restricted to English-language text, limiting generalisation to non-Anglophone markets.

These limitations map onto a clear agenda. The application date of the Directive offers a natural experiment: a difference-in-differences design comparing treated vague-claim listings before and after enforcement would convert our pre-ban baseline into a causal estimate of the policy's effects. Extending the dictionary and sentiment pipeline to multiple languages would test whether the niche-signal pattern is an Anglophone artefact or a general feature of the platform. Richer measures of destination environmental culture would help explain the cross-city heterogeneity that the falsification of H3 leaves open. Finally, access to transaction-level data would allow the pricing-demand divergence to be measured on realised revenue and would sharpen the welfare accounting that Section 5.3 can only sketch.

6. Conclusion

This paper has examined how environmental rhetoric in Airbnb listing descriptions is priced and rewarded across thirty-seven European cities. The central result is a pricing-demand divergence. Vague green slogans, the kind of generic claim that EmpCo will restrict, command a price premium of 16.6 per cent but are associated with 6.9 per cent lower aggregate demand, whereas specific, verifiable claims trade at a discount of 5.2 per cent. This pattern is consistent with our framing of green rhetoric as a narrow but effective niche signal: it persuades and extracts a willingness to pay from a committed minority while leaving, or even deterring, the average traveller (Kang et al. 2012; ElHaffar et al. 2020; Janssen et al. 2022). The result survives Oster bounds, a 200-specification curve and out-of-sample replication, and the cross-city heterogeneity we document is large enough to falsify a simple signal-scarcity account.

The theoretical contribution is to show, in a large and unincentivised market, how a cheap textual signal can simultaneously raise price and depress quantity. This extends signalling and hedonic accounts of online markets (Akerlof 1970; Spence 1973; Rosen 1974; Connelly et al. 2011) and the green-advertising literature on vague versus specific claims (Carlson et al. 1993; Janssen et al. 2022). The review-side validation is our key innovation: guests at listings carrying green rhetoric raise environmental themes far more frequently and

overwhelmingly positively, demonstrating that the language reaches a genuine green audience rather than functioning as undifferentiated puffery.

The findings carry direct policy weight. Because our data predate the application of Directive (EU) 2024/825 on 27 September 2026 (European Union 2024), they establish a pre-enforcement baseline of exactly the generic claims the directive targets, and against which its market effects can later be measured. For platforms, the results suggest that surfacing verifiable environmental attributes, rather than generic slogans, would better serve consumers and align with the regulatory direction already signalled by national courts (Bundesgerichtshof 2024). For regulators, the evidence that vague claims earn a premium while specific claims do not clarifies why intervention is warranted, and connects the work to Sustainable Development Goal 12 on responsible consumption and production (United Nations 2015). For consumers, the divergence is a caution that the greenest-sounding listing is not the one the market as a whole rewards. Future research should track the same listings after EmpCo takes effect, to identify the causal impact of the prohibition on generic green claims and to test whether the price premium on vague rhetoric is competed away once it can no longer be lawfully asserted.

Declarations

Competing interests

The authors declare no competing interests.

Ethical approval

Ethical approval was not required as this study did not involve human participants. The study uses only publicly available, anonymised secondary data obtained from Inside Airbnb. This article does not contain any studies with human participants performed by any of the authors.

Informed consent

Informed consent was not required as this study did not involve human participants.

Author Contribution

H.Y. and J.G. conceived the study and designed the methodology. H.Y. curated the data, conducted the formal analysis, prepared the figures, and wrote the original draft. J.G. contributed to the analysis and to writing—review and editing, and is the corresponding author. T.Y.L. and T.Q.H. supervised the study and contributed to writing—review and editing. H.Y. and J.G. contributed equally to this work. All authors reviewed and approved the manuscript. Hongxuan Yang (first author); Junxi Gong (co-first author and corresponding author); Tek Yew Lew, A/P Dr. (Second author); and Ting Qian Hui, Dr. (Third author). Hongxuan Yang and Junxi Gong contributed equally to this work. The corresponding author is Junxi Gong

Acknowledgement

The authors received no specific funding for this work. An AI assistant was used for language editing. The authors thank Inside Airbnb for maintaining the open dataset that made this research possible.

Data Availability

The data analysed in this study are publicly available from Inside Airbnb (<http://insideairbnb.com/get-the-data/>), released under a Creative Commons CC0 1.0 Universal public domain dedication. The processed analysis dataset, the green-rhetoric dictionaries, and the replication code generated during this study are available in an Open Science Framework repository [https://osf.io/aqusr/overview?view_only=4feb971a3d314cf9998dfe299164e769]. Raw listing and review files are not redistributed but can be downloaded directly from Inside Airbnb at the address above.

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Figures

Figure 1. Prevalence of green signals across 37 European cities

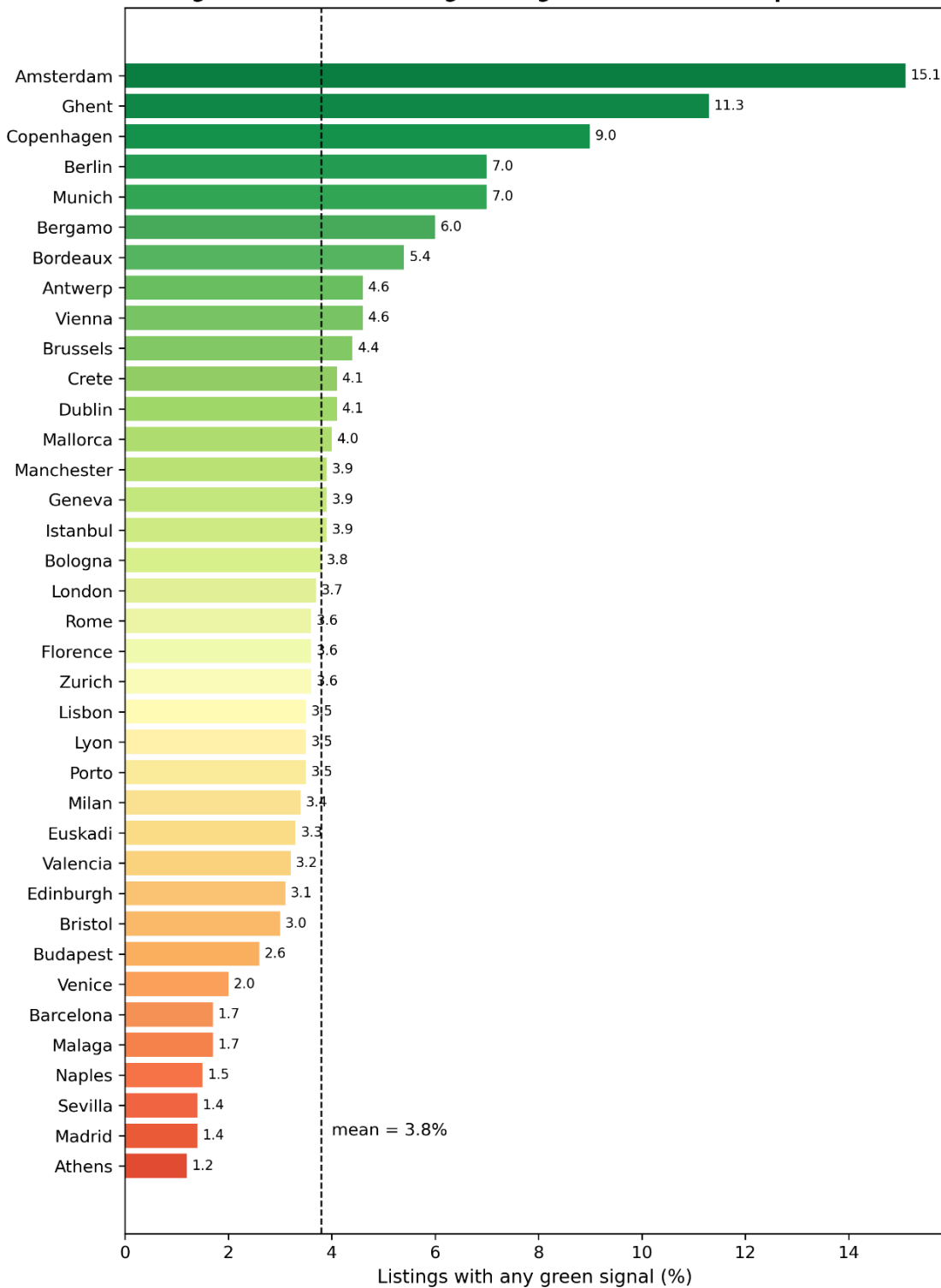


Figure 1

Prevalence of green signals across 37 European cities. Bars show the percentage of listings carrying any green signal in their description, by city, with the cross-city mean indicated by the dashed line.

Figure 2. Specification-curve analysis of the vague-claim premium (200 specifications)

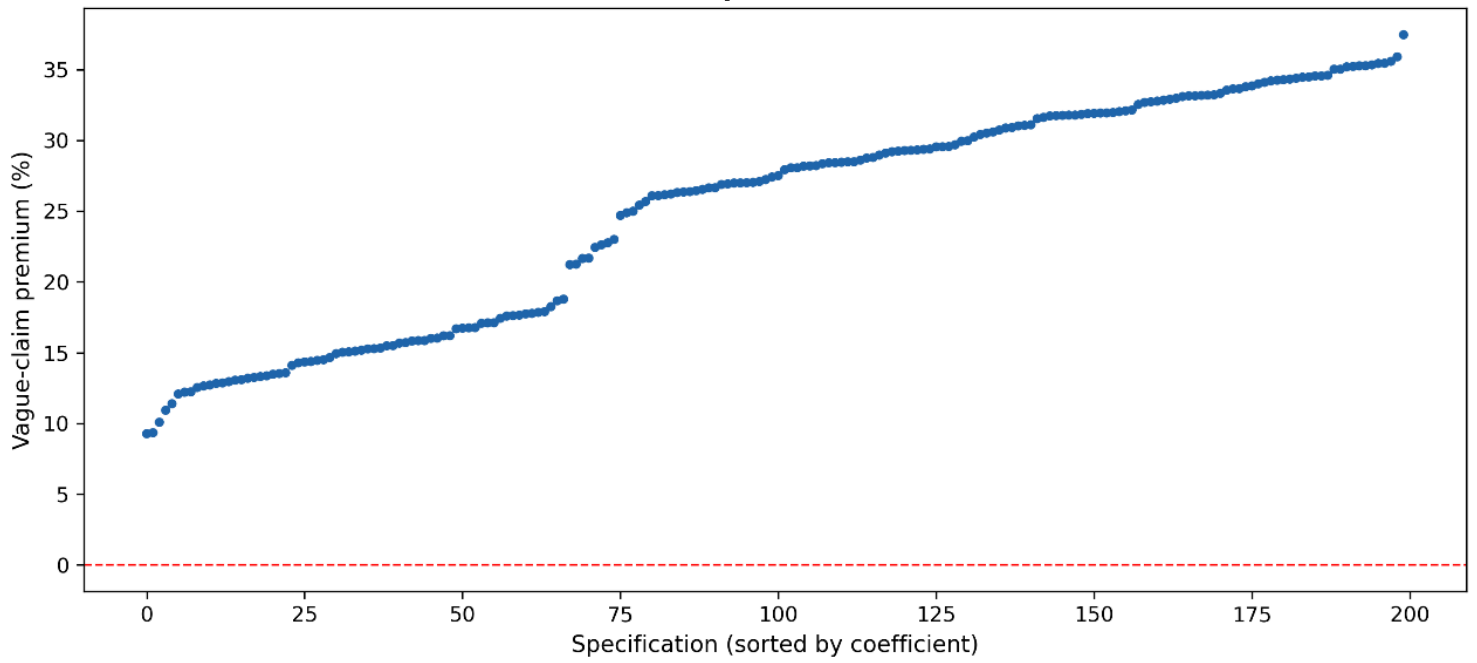


Figure 2

Specification-curve analysis of the vague-claim premium. Estimated vague-claim premium across 200 defensible model specifications, sorted by magnitude. All specifications return a positive coefficient.

Figure 3. Vague-claim premium varies across 37 cities
(blue = sig. positive, red = sig. negative, grey = n.s.)

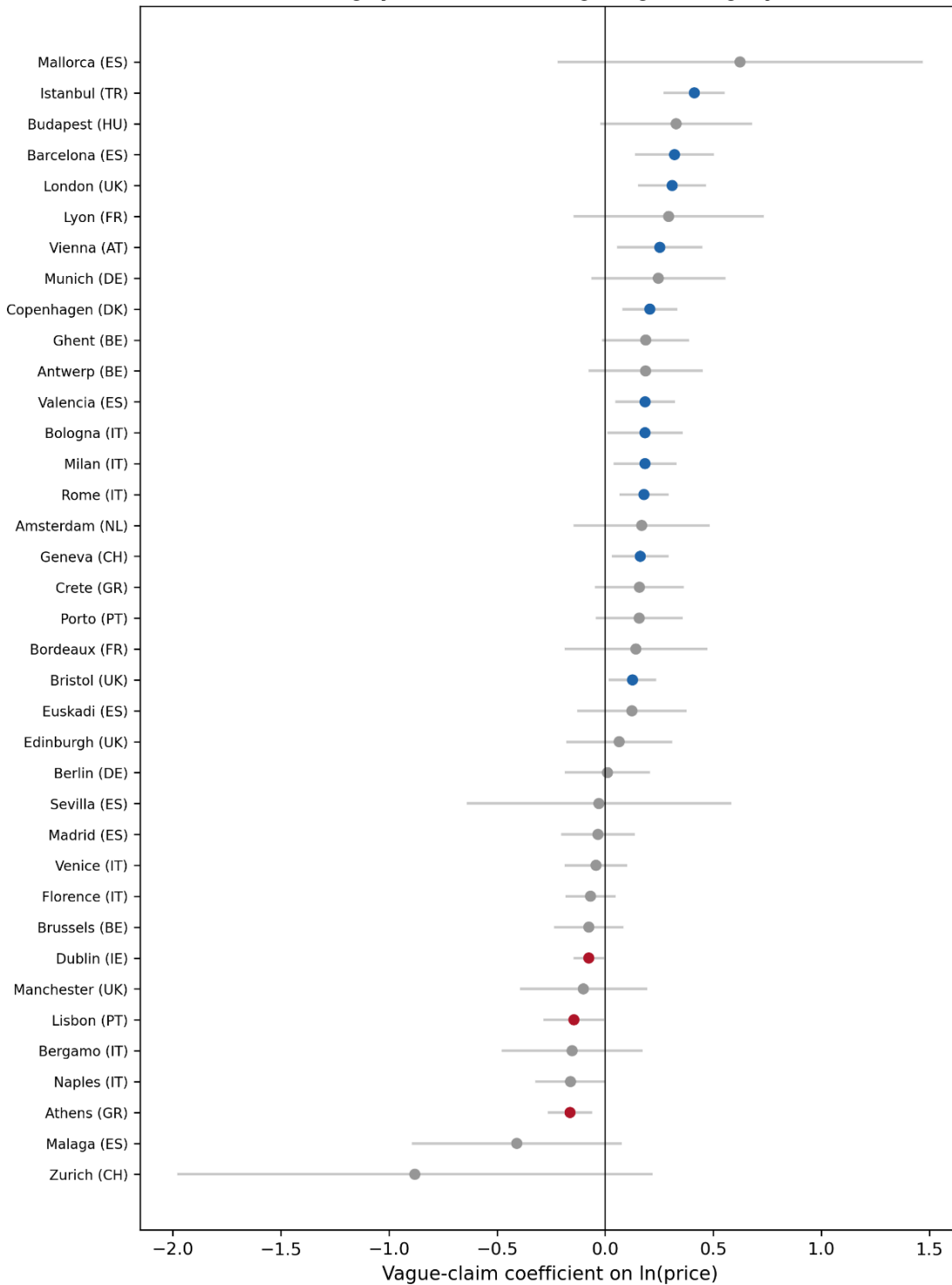


Figure 3

Vague-claim premium across 37 cities. City-specific coefficients of vague green claims on log price, with 95% confidence intervals. Blue denotes a significantly positive premium, red a significantly negative premium, and grey a coefficient not significant at conventional levels.