

Advertising Investment as a Supplement to Utility Theory: Explaining Chinese Luxury Consumers' Behaviour 2025

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Abstract:

For a long time, China's luxury goods market has been dominated by neoclassical utility theory, but this theory cannot grasp the core symbolic value and social value of market behaviour. This study fills this research gap by constructing an extended utility model with advertising investment as the core endogenous variable and combining the preliminary survey data of Chinese luxury consumers in 2025. The model adds linear social utility terms to the logarithmic Cobb-Douglas utility function (γAx) to quantify the impact of advertising on payment willingness and budget allocation. The research results show that the traditional utility theory cannot explain China's luxury consumption, because advertising reshapes the utility function through the "Mianzi" social utility. Advertising shapes utility through multiple paths - including social dimensions, experience dimensions and financial dimensions - and presents significant income heterogeneity: the absolute increase in luxury spending of high-income consumers is greater, while the proportion of social utility of low-income consumers is higher. In all groups, advertising reduces price sensitivity and increases willingness to pay by embedding symbolic values. This research provides a quantifiable supplement to the traditional utility theory and lays the methodological foundation for modelling culture-specific consumer behaviour.

Keywords: Extended utility function; Advertising exposure; Social utility; Veblen effects; Price sensitivity.

1. Introduction

For a long time, the luxury goods market in China was dominated by traditional economic theories such

as the neoclassical ones. However, the reality on the ground has shown that these models are incapable of explaining how the consumers in this market arrive at their decisions. At the heart of the problem is a utility

theory, which, by its very nature as the most basic and dominant component of consumer choice in microeconomics, is incapable of grasping the symbolic and social value that is at the core of the market's behaviour (Veblen, 1992).

Neoclassical utility theory assumes consumers rationally evaluate value against price and that preferences are exogenously given and stable, which is an assumption central to the indifference curve and budget line framework, which maps optimal choices based on fixed prices and income. However, the model is not applicable in case of luxury consumption, which is probably because of advertising. It is not that advertising affects luxury prices or consumers' income, thus changing the budget line. Instead, by reflecting and creating the symbolic, social, and emotional values of luxury goods, advertising drastically reshapes the subjective utility function. Preference, when externally influenced and shaped by advertising, goes beyond the traditional rational utility framework that cannot explain the subjective utility shifts that determine the consumption choice (Kahneman & Tversky, 1979).

There are even more limiting points for the theory in the China luxury market 2025 which are mainly defined by three powerful trends that increase the importance of advertising thus: first, people switch from buying thing to just experiencing them; second, luxury goods get financialised; and third, the strong cultural tradition continues to put Mianzi (saving face) at the centre, thereby making luxury one of the main ways of social signalling (Henriksen, 2009). Older research focuses on Chinese luxury demand only in terms of income and price and only a couple of them consider advertising as a main variable thus a big research gap exists in the understanding of the role of advertising in combination with market trends in 2025 in changing consumer utility. This study addresses this gap by integrating behavioural economics and mathematical modelling to embed advertising investment as a core variable in a revised utility theory, via a quantifiable extended utility function that explains advertising's impact on consumers' willingness-to-pay (WTP) and budget allocation. The core research question is: how can advertising investment act as a supplementary framework to traditional neoclassical utility theory for explaining Chinese luxury consumers' behaviour in the 2025 market? This study addresses the following sub-questions:

1. What theoretical mechanisms cause traditional utility theory to fail in explaining Chinese luxury consumption?
2. Through which pathways does advertising shape Chinese luxury consumers' subjective, social and experiential utility, and how does Mianzi moderate these pathways?
3. How can advertising investment be quantified as a coefficient in a revised utility function, and what impact does it have on consumers' WTP and price sensitivity?

2. Literature Review

The initial point of departure for analysing luxury consumption was the critique of neoclassical utility theory which takes consumer choice as a static function of maximising functional satisfaction. Moreover, Trigg (2001) is integrating Veblen (1992) and Bourdieu (1984), contends that luxury preferences are socially-constructed positional goods rather than externally given. Advertising creates brand exclusivity that generates greater symbolic value in social differentiation, and the utility of a luxury good thus comes from its social signalling role rather than intrinsic material quality. Amaldoss & Jain (2005) complement this with their structural demand model, showing that luxury utility is a result of social comparison, hence, questioning the assumption of exogenous preferences in traditional utility theory and consequently paving the way for introducing social utility into formal mathematical models. Besides this, Komlos (2014) gives a behavioural perspective through Behavioural Indifference Curves, indicating that the utility function is kinked at the consumer's reference point due to the endowment effect; in the luxury market, advertising intensifies this impact as it produces emotional brand connections, thus allowing consumers to derive greater psychological utility from branded products.

Beyond social construction, behavioural economics further reveals the irrationality of luxury consumption ignored by traditional utility theory, with prospect theory as a key explanatory tool. Kahneman and Tversky (1979) in their prospect theory suggested that consumers evaluate gains and losses based on their own mental standards rather than according to their wealth levels. Advertising serves as a Reference Point Management tool, altering consumers' psychological value standards and their understanding of luxury value and social status. Mandel et al. (2006) show media portrayals of success readjust consumers' wealth expectations to create subjective yearning for utility, a key supplement to traditional functional utility. Social construction theory and behavioural economics, among other theories, have highlighted the inadequacies of traditional utility theory in explaining luxury consumption. However, most of the existing literature only qualitatively examines the changes in preference and utility. They do not formalize advertising as part of the utility function, nor do they consider how it changes the microeconomic mechanism of optimal consumption decision-making.

Building on the critique of traditional utility theory, existing research has begun to explore how advertising influences luxury utility, but most studies focus on advertising's informational and promotional effects, rather than its fundamental role in preference formation and utility structure reconstruction. The global luxury sector is undergoing structural shifts, with a notable move from possession to experience, which is a shift driven primarily

by advertising investment, which translates market changes into consumers' perceived experiential value of luxury goods. Luxury brands are progressively setting aside advertising money for non-retail hospitality, such as fine dining and tailor-made travel, to deepen the connection with their consumers. This is not just a promotional tactic, it is a move to create psychological ownership, defined by Dahiya et al. (2024). They show that Consumer Well-Being (CWB) in the luxury industry is more and more seen as a brand's ability to provide a sense of self-extension through unique and shared experiences: thus advertising investment in these non-retail experiences can totally help consumers' self-extension and psychological possession, which has the effect of compensating for the experiential utility that traditional utility theory fails to recognise. From the perspective of advertising capital theory, advertising investment can be regarded as a form of brand capital accumulation (Dukes & Liu, 2023), which continuously embeds symbolic, experiential and social value into luxury goods, and this accumulated value directly shapes the composition of consumers' subjective utility function, making advertising a core endogenous variable of utility rather than an external exogenous factor.

Luxury financialisation trend continues to be the major area of change, as more purchases are chasing a sophisticated labour market. The process of financialisation mixes up the difference between items for consumption and those that bring value and thus advertising is instrumental in moulding the consumers' understanding of this value for example, Chanel (2024) advertises the price increase of the brand as a sign of growing asset value, which is in line with the second-hand market theory of Fox (1957) where resale prices give safe utility to buyers. Advertising thus determines a brand's residual value, making high initial prices a rational consumer investment. Existing research has recognised that advertising shapes luxury's experiential and financial utility, but only analyses this impact qualitatively, lacking quantitative research on its value creation magnitude and mathematical derivation of its effects on consumers' WTP and price sensitivity.

The influence of advertising on luxury utility is even more pronounced in the Chinese market, where the cultural and digital contexts that are specific to China focus luxury consumption on social utility. However, existing studies have not incorporated these features into formal microeconomic models for the 2025 market trends. Henriksen (2009) reveals that conformity and Mianzi are the major reasons for Chinese luxury consumption. Advertising, therefore, helps to increase the social utility of luxury as a status symbol. Unlike the Western focus on authenticity, Chinese luxury utility is very much a mutual dependency; Wu & Lin (2024) indicate that urban status-based luxury consumption has not deteriorated even though disposable income growth is slower. This is possible because

of advertising that promotes luxury as a necessary social good. Septianto et al. (2020) add that Chinese consumers' sensitivity to Prevention Pride makes advertising highlighting international credentials critical for protecting social status, while Pentina et al. (2018) argue that WeChat and Xiaohongshu collectively create a digital panopticon where luxury's symbolic value (McCracken, 1986) is peer-validated, with digital advertising at the same time securing brands' narrative power. The brand image of luxury in China is usually dependent on the digital "share of voice." Thus, if a brand does not continuously invest in advertising, its symbolic capital and social utility will gradually disappear, even if the product is of superior material quality. On the one hand, research so far has focused on the cultural aspects of Chinese luxury consumption and the role of advertising in social utility. On the other hand, most of the studies are limited to descriptive analysis and do not have microeconomic modelling that could include these factors advertising investment, cultural particularities and social utility, to explain the experiential and financialisation shifts of 2025.

Huang & Wang (2024) merely present Chinese city population data. However, they do not connect such data at the microeconomic level to consumer psychology. Besides, no model presently unifies the Marginal Rate of Substitution between advertising exposure, effect intensity, social utility and price sensitivity of 2025 Chinese Gen-Z luxury consumers. Three specific research gaps are identified: First, advertising variables have not been formalised and quantified as a coefficient in the luxury utility function. Second, there is a lack of mathematical derivation on how advertising shapes subjective utility and alters WTP and price sensitivity. Third, existing studies lack microeconomic modelling that integrates China's Mianzi culture and digital features with 2025's luxury market structural shifts. This study adopts a mixed-methods approach, using macro-industry data from Savills (2025) and KPMG (2025) to establish price-demand trends and primary quantitative surveys to measure subjective utility. By correlating brand advertising intensity with consumer WTP, this study formalises advertising as a numerical coefficient in the luxury utility function, addressing the three gaps and transforming descriptive insights into quantifiable models to explain 2025 Chinese luxury consumers' behaviour.

3. Methodology

This research follows the CRISP-DM framework (Figure 3.1), a globally acknowledged standard for data mining projects, to systematically organise the analysis of Chinese luxury consumers' behaviour in 2025. The mathematical model developed in this study provides a quantifiable framework for assessing advertising effects on consumer utility and consumption decisions, while relying on sev-

eral necessary simplifying assumptions—for instance, the linear term γAx assumes a constant marginal social utili-

ty from advertising, which may not hold at extreme levels of exposure (saturation $A \geq 0.9$).

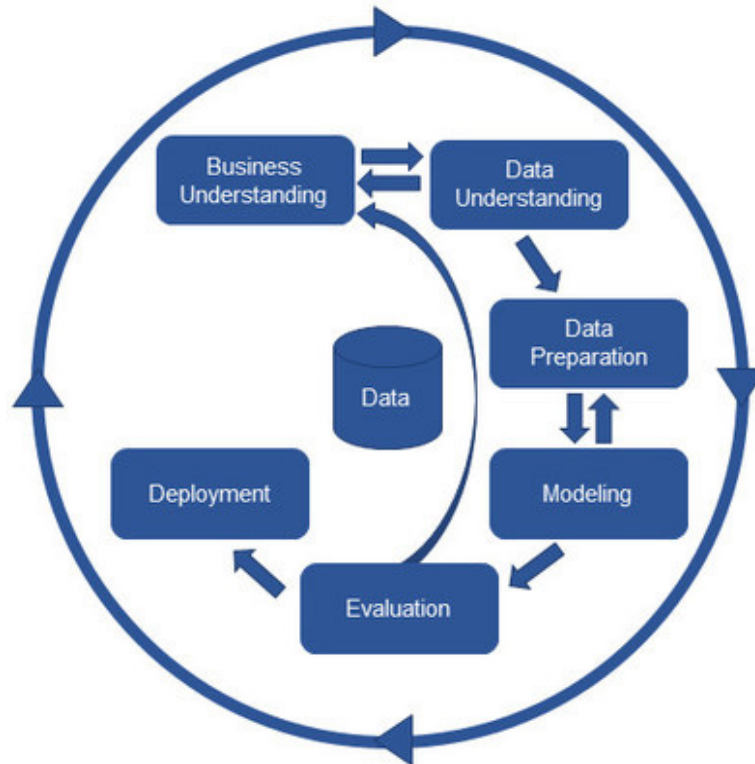


Figure 3.1 Crisp-DM Framework

3.1 The Model Design

3.1.1 Basic Model Framework

The model compares consumer consumption behaviour

under two scenarios: with advertising effects and without advertising effects, with core decision variables, parameters and budget constraints defined in Table 3.1, based on standard microeconomic consumer choice theory and Walras's Law.

Table 3.1 Basic Model Framework

<i>Component</i>	<i>Mathematical Notation</i>	<i>Units/Range</i>	<i>Economical Interpretation</i>	<i>Theoretical Basis</i>
Luxury goods consumption	x	Yuan	Quantity of luxury goods purchased	Standard consumer choice theory
Other goods consumption	y	Yuan (price normalise to 1)	Expenditure on all non-luxury commodities	Budget allocation framework
Price of luxury good	P_x	Yuan(≥ 0)	Market price per unit of luxury good	Market price determination
Real income (purchasing power)	I	Yuan(≥ 0)	Consumers' actual disposable income (excluding inflation)	Income effect analysis
Budget line	$P_x \cdot x + y = I$	--	Total expenditure cannot exceed income, defines feasible consumption set	Walras's Law/Budget identity
Mathematical decomposition	$y = I - P_x \cdot x$	--	Residual spending on other goods	Income allocation

3.1.2 Utility Model Without Advertising Effects

A logarithmic Cobb-Douglas utility function is adopted for the baseline model (no advertising effects), with $\alpha=\beta=1$ set for simplification to focus on advertising's marginal impact, and all model elements, derivations and

optimal solutions detailed in Table 3.2. The model yields a symmetric optimal solution of 50:50 budget allocation between luxury and non-luxury goods, verified as a utility maximum via the second-order condition (concave function).

Table 3.2 Utility Model Without Advertising Effects

Model Element	Mathematical Formulation	Properties/Interpretation	Economic Rationale	Derivation Steps
Utility Function	$U(x, y) = \alpha \ln(x) + \beta \ln(y)$	Cobb-Douglas type; logarithmic form ensures positive marginal utility ($\alpha=\beta=1$ for simplification, degenerates to standard form at $A=0$.)	Represents standard preferences with diminishing marginal returns	Based on standard microeconomic consumer theory
Marginal Utility	$\frac{\partial U}{\partial x} = \frac{1}{x}$	Diminishing marginal utility: As consumption of a good increases, the marginal utility will get smaller	Reflects satiation in consumption	Derivative of
	$\frac{\partial U}{\partial y} = \frac{1}{y}$	Diminishing marginal utility for other goods	--	Derivative of
Optimisation Problem	$U(x) = \ln(x) + \ln(10P_x x)$	Substituting budget constraint into utility function	Translates constrained optimisation to single-variable problem	From
First-Order Condition (FOC)	$\frac{dU}{dx} = \frac{1}{x} - \frac{P_x}{10P_x x} = 0$	At optimum, marginal benefit of luxury = marginal cost of reduced other goods consumption.	Utility maximisation condition	Derivative with chain rule
Optimal Solution	$x^* = \frac{I}{2P_x}$ $y^* = \frac{I}{2}$	Consumer allocates half budget to luxury, half to other goods	Symmetric solution due to logarithmic symmetry	Solving FOC:
Maximum Utility	$U_{\max} = \ln\left(\frac{I}{2P_x}\right) + \ln\left(\frac{I}{2}\right)$	Achieved utility level at optimal allocation	Baseline for comparison with advertising model	Substituting , into
Verification	$\frac{d^2U}{dx^2} = -\frac{1}{x^2} - \frac{P_x^2}{(10P_x x)^2} < 0$	Concave function ensures maximum (not minimum)	Second-order condition for maximisation	Confirms solution validity

3.1.3 Extended Utility Model with Advertising Effects

For the 2025 Chinese luxury market, the linear term γAx (defined as advertising-induced social utility) is selected for medium and low advertising exposure ranges $[0, 0.9]$, aligning with the market's "social signal-dominated stage" under Mianzi culture and digital panopticon (Xiaohongshu, WeChat) influence. Advertising is categorised into three types matching 2025 market trends: digital display,

experiential, and financial value-oriented advertising. All model extensions, new parameters and solution methods are detailed in Table 3.3; the γAx term embeds Mianzi culture into the model, with the advertising intensity coefficient γ calibrated upward to reflect Chinese consumers' higher sensitivity to luxury symbolic value compared with Western consumers.

Table 3.3 Utility Model with Advertising Effects

<i>Model Extension</i>	<i>Mathematical Formulation</i>	<i>Theoretical Interpretation</i>	<i>Mechanisms Operative</i>	<i>Comparative Advantage</i>
New Parameters	--	--	--	--
Advertising exposure level statistic	A	Standardised index [0,1]; 0=no exposure, 1=saturation	Measures intensity of consumer contact with advertising	Based on Krugman's (1972) three-exposure theory
advertising intensity degree	γ	(positive real number)	Marginal impact per unit of advertising exposure on utility	Calibrated from Amaldoss & Jain (2005) range
Composite effect	γA	Product of exposure and effectiveness	Total advertising impact on consumer utility	Multiplicative interaction term
Extended Utility Function	$U(x, y; A) = \ln(x) + \ln(y)$	Adds linear social utility term to standard utility	Advertising creates value through social mechanisms	Integrates behavioural economics
Optimisation Problem	$U_{\max}(x) = \ln(x) + \ln(10P_x x) + \gamma Ax$	Advertising term changes marginal utility calculation	Consumers trade off different utility sources	Extends benchmark model
Modified FOC	$\frac{dU}{dx} = \frac{1}{x} - 0 \frac{P_x}{10P_x X} + \gamma A = 0$ $\frac{1}{x} + \gamma A = \frac{P_x}{10P_x x}$	Advertising reduces required marginal utility from consumption itself	Justifies higher luxury consumption at given price	Shows advertising's role in preference shaping
Exact Solution	$x^* = \frac{\gamma AI - 2P_x + \sqrt{4P_x^2 + \gamma^2 A^2 I^2}}{2\gamma AP_x}$	General solution from quadratic equation	Applicable for all parameter values	Complete mathematical solution
Special Cases	$x^* = \frac{I}{2P_x}$ (reduces to benchmark)	Consistency check: model nests benchmark case	Validates theoretical coherence	Important for model validation
	When $\gamma A > 0, x^* > \frac{I}{2P_x}$	Advertising unambiguously increases luxury consumption	Quantitative prediction of advertising effect	Core testable hypothesis
Approximate Solution (for small)	$x^* \approx \frac{I}{2P_x} + \frac{\gamma AI^2}{8P_x^2}$ $y^* = 10P_x x^*$	Taylor expansion around	More interpretable for empirical analysis	Useful for sensitivity testing
Component Interpretation	$U_{\max} = \ln(x^*) + \ln(10P_x x^*) + \gamma Ax^*$	Decomposes total effect into baseline and advertising-driven components	Facilitates effect size calculation	Enables clear policy implications

3.1.4 Variable Definition and Theoretical Rationale

All key variables for quantifying advertising effects, consumption changes and utility shifts are clearly defined with specific economic interpretations in Table 3.4, pro-

viding a unified measurement framework for subsequent empirical analysis.

Table 3.4 Key Variable Definition and Economic Explanation

<i>Sign</i>	<i>Definition</i>	<i>Unit/Range of value</i>	<i>Economical Explanation</i>
x	Consumption of luxury goods	(≥ 0)	The number of luxury goods purchased by consumers
y	Consumption of other goods	(≥ 0)	Expenses for all other commodities
P_x	Price of luxury good	Yuan (>0)	The market price of luxury goods per unit
I	Real income	Yuan (>0)	The actual purchasing power of consumers (excluding inflation)
A	Advertising exposure level statistic	[0,1] standardisation	The intensity of consumers' exposure to advertising, 0 = no exposure, 1 = complete saturation exposure
γ	Advertising intensity degree	Positive real number (>0)	The marginal impact of advertising exposure per unit on utility
γA	Comprehensive effect of advertising	Positive real number (>0)	The product of advertising exposure and effect, the total advertising impact
γAx	Social utility of advertising	Utility Unit	The extra satisfaction brought by advertising through social comparison and identity
Δx	change of the luxury goods consumption	Real number	The additional quantity of luxury goods consumers are directly prompted to purchase due to the advertising effect.
Δy	Change in Consumption of Other Goods	Real number	Given a fixed budget constraint, increased luxury consumption necessarily crowds out other expenditures.
ΔU	Change in utility level	Utility Unit	The net incremental welfare gain advertising provides to the consumer.
Rate of Change	Rate of Change in Luxury Consumption	--	The percentage increase in luxury demand attributable to advertising, representing an elasticity-type measure.
Budget Allocation Change	Change in Budget Allocation	--	The degree to which advertising alters the consumer's budget share between luxury and non-luxury goods
Contribution Share	Contribution Share of Advertising Utility	--	The proportion of the consumer's total satisfaction derived from advertising-induced social utility
Marginal utility of A	Marginal utility of	--	The additional increment in luxury consumption resulting from a one-unit increase in advertising exposure level
Marginal utility of γ	Marginal utility of	--	The incremental consumption gain from a one-unit improvement in advertising effectiveness
$\eta_{A,\text{lux}}$	Conversion efficiency of advertising investment	--	The elasticity coefficient of luxury demand with respect to advertising exposure. It indicates the percentage change in when changes by 1%

3.2 Data Source and Preparation

3.2.1 Primary Data Collection and Screening

To gather primary data, a focused questionnaire was conducted among 30 Chinese individuals who bought luxury items in 2025. The findings of the survey are presented in Appendix (Table 3.5). This questionnaire assesses three aspects for determining a combined advertising exposure score A (exposure frequency, recall level, channel diver-

sity) and the annual income of consumers. The sample reveals an average income figure of 544, 000 RMB and the distribution of A scores is bimodal (with peaks at 0.30 and 0.70).

3.2.2 Secondary Data Collection and Screening

Secondary data is sourced from authoritative 2025 industry reports: Tencent & BCG (income and consumption characteristics of Chinese luxury consumers), KPMG and Savills (luxury market price-demand trends). The study

focuses on the middle and high-end elite group (annual income >500,000 RMB), which contributes 90% of China's luxury market expenditure.

3.2.3 Data Quantification and Normalisation

The composite advertising exposure score A is quantified via the equal-weighted average method detailed in Table 3.6, based on Krugman's (1972) three-exposure theory

and MacKenzie & Lutz's (1989) multi-dimensional measurement framework. The advertising intensity coefficient γ is calibrated based on Amaldoss & Jain's (2005) 0.005-0.020 range for ostentatious consumption and adjusted upward to account for Chinese consumers' significantly higher sensitivity to luxury symbolic value (Zhou & Hui, 2003).

Table 3.6 Assignment Scheme for Advertising Exposure Level Statistic (A)

Measure the dimension	Question	Option and assignment
Exposure frequency	How many times have you seen it in the past month?	0 time =0, 1-2 times =0.3, 3-5 times =0.5, 6-10 times =0.7, > 10 times =0.9
Degree of attention	Can you recall the content?	Can't =0, A little impression =0.3, Can describe =0.7, Clear memory =1.0
Channel diversity	How many channels did you see it?	1=0.3, 2=0.6, 3+=1.0
Comprehensive value	$A = \frac{\text{frequency} + \text{attention} + \text{channel}}{3}$	Range [0,1]

3.2.4 Determination of the value

Based on integrated primary and secondary data analysis, the study sets benchmark parameters for empirical analysis: real income $I=500,000$ RMB (matching the core middle/high-end luxury consumer group's income), advertising exposure $A=0.6$ (close to the sample mean of 0.56), and advertising intensity $\gamma=0.015$ (within the adjusted 0.005-0.020 range). Sensitivity analysis is conducted for γ within [0.005, 0.020] to test model robustness.

3.3 Quantitative Analysis and Model Solution Protocol

Parameters are calibrated with standardisation: I is ad-

justed to real purchasing power (excluding inflation), A is standardised to [0,1], γ is set with a benchmark value and a reasonable range, and $P_x=10,000$ RMB (a representative medium luxury unit price in the Chinese market) is selected. Model solving adopts two complementary approaches: the Newton-Raphson root-finding algorithm (implemented via Excel Solver) for exact quadratic solutions, and first-order Taylor expansion for approximate solutions (for $\gamma A < 0.05$). Comparative analysis measures absolute ($\Delta x, \Delta y, \Delta U$) and relative (consumption change rate, budget allocation shift) advertising effects, while marginal effect analysis and conversion efficiency calculation use the formulas in Table 3.7 to systematically assess advertising's impact on consumer behaviour.

Table 3.7 Core Calculation Formulas for Advertising Effect Analysis

Index	Formula
Change in luxury goods consumption	$\Delta x = x_{ad}^* - x_{noad}^*$
Change in other goods consumption	$\Delta y = y_{ad}^* - y_{noad}^*$
Change in utility level	$\Delta U = U_{\max, ad} - U_{\max, noad}$
Rate of change in luxury consumption	$RateofChange = \frac{\Delta x}{x_{noad}^*} \times 100\%$
Budget allocation change	$Budget Allocation Change = \left(\frac{P_x \cdot x_{ad}^*}{I} - \frac{P_x \cdot x_{noad}^*}{I} \right) \times 100\%$

<i>Index</i>	<i>Formula</i>
Contribution of advertising effect	Contribution Share = $\frac{\gamma Ax_{ad}^*}{U_{\max, ad}} \times 100\%$
Marginal utility of A	$\frac{\partial x^*}{\partial A} \approx \frac{\gamma I^2}{8P_x^2}$
Marginal utility of γ	$\frac{\partial x^*}{\partial \gamma} \approx \frac{AI^2}{8P_x^2}$
Conversion efficiency of advertising investment	$\eta_{A \rightarrow x} = \frac{\partial x^*}{\partial A} \cdot \frac{A}{x^*}$

3.4 Model Validation and Robustness Check

Model validation is conducted from statistical and economic perspectives: linear regression fit tests on 30 valid samples show significant positive correlations (95% confidence level) between A and x^* ($R^2=0.81, P=0.04$) and between γAx and $U_{\max}$ ($R^2=0.76, P=0.04$). Economic rationality is verified by the strictly positive marginal utility of advertising ($\partial U / \partial A = \gamma x > 0$), consistent with basic economic intuition. Sensitivity tests across perturbations of $\gamma \in [0.005, 0.020]$, $A \in [0, 1]$ and four representatives P_x points confirm that advertising consis-

tently increases luxury consumption ($\Delta x > 0$), proving the model's robustness

3.5 Model Limitation

This study summarises the model's limitations by the degree of impact on core research conclusions (core first, secondary second), with detailed limitations, their impacts on research results and corresponding future research solutions in Table 3.8. Most limitations stem from necessary model simplification to focus on the core relationship between advertising investment and consumer utility, and the solutions provide clear directions for model optimisation.

Table 3.8 Model Limitations, Impacts and Future Research Solutions

<i>Limitation Dimension</i>	<i>Specific Limitation Description</i>	<i>Impact on Research conclusions</i>
Income elasticity	Cobb-Douglas utility function (logarithmic form) yields income elasticity of luxury consumption ≈ 1 (derived from the partial derivative of optimal consumption to income), which fails to capture the <i>income elasticity</i> > 1 characteristic of luxury goods (disproportionate consumption growth with income increase).	Cannot verify the "luxury attribute" of luxury goods through income elasticity; over-predicts luxury consumption for low-income groups with tight budget constraints.
Advertising utility specification	Linear term assumes constant marginal social utility, but consumers may experience weariness and aversion under high-frequency exposure (saturation exposure).	Overestimates consumption increments under high-frequency ad exposure; cannot capture utility loss from "advertising overload."
Dynamic effects absent	Static model neglects advertising memory decay (e.g., short video digital advertising has a short memory cycle), accumulation effects (e.g., social media advertising exposure has cumulative utility) and lagged effects (advertising effects take time to translate into consumption), which are prominent characteristics of 2025 China's digital luxury advertising.	Underestimates the long-term value of continuous advertising investment; cannot guide intertemporal advertising budget allocation for luxury brands in the digital market.

<i>Limitation Dimension</i>	<i>Specific Limitation Description</i>	<i>Impact on Research conclusions</i>
Consumer heterogeneity	Homogeneous consumer assumption is adopted <i>for model simplification</i> (to focus on the core effect of advertising on utility), which implies identical advertising responses across all consumers, inconsistent with the actual income and Mianzi sensitivity heterogeneity in the 30 valid samples.	Masks group differences across income levels, generations, and face-sensitivity; marketing implications lack specificity and cannot guide targeted advertising for different consumer groups.
Rival advertising neglected	Assumes single-brand environment, overlooking rival advertising's dilution of consumer attention and symbolic value.	Overestimates single-brand advertising effectiveness; cannot explain "advertising arms race" phenomena in the luxury market.
Cultural variables explicitly omitted	Theoretically discusses "Mianzi culture" as a moderator of advertising utility conversion efficiency and embeds it in the assignment of (advertising intensity degree), but does not explicitly incorporate it into the mathematical model <i>due to the lack of a unified and quantifiable Mianzi sensitivity scale in existing research</i> .	Response to cultural mechanisms remains theoretical without direct quantitative evidence; the model's adaptation to Chinese market characteristics is insufficient.

3.6 Research Rigour and Ethical Considerations

This study ensures research rigour with targeted measures: secondary data is standardised (inflation-adjusted income, unified luxury price) and clearly documented; primary survey questionnaires are pretested with 5 consumers (excluded from the formal sample) to revise ambiguous questions; *A* is measured with objective equal weighting; model analysis uses dual solution and validation methods; all core variables and analysis steps are clearly defined for reproducibility. Ethical compliance is guaranteed by proper citation of secondary data, deidentification and encryption of primary data (ID-only numbering, no personal information collected, voluntary participation), and objective, full reporting of all research findings (including limitations and non-significant correlations), fully meeting academic ethics and Chinese legal requirements for empirical consumer behaviour research.

4. Findings

4.1 Descriptive Statistics of Core Variables

Descriptive analysis was conducted on primary survey data from 30 Chinese luxury consumers in 2025, with the composite advertising exposure score (*A*) as the core metric, constructed from exposure frequency, attention level, and channel diversity based on MacKenzie & Lutz's (1989) multi-dimensional measurement framework. The sample's *A* score has a mean of 0.56, standard deviation of

0.21 and coefficient of variation of 0.38, indicating moderate variation in advertising contact intensity. As shown in Figure 4.1, *A* presents a bimodal distribution, peaking at 0.30 (40% of samples) and 0.70 (36.7% of samples), reflecting that consumers' luxury advertising contact is concentrated in low-to-medium and medium-to-high ranges, with saturation exposure ($A \approx 1.0$) rare, which is consistent with Krugman's (1972) three-exposure theory.

Figure 4.2 confirms a strong positive association between *A* and annual income (Pearson $r=0.72$, $P<0.01$), suggesting that higher-income consumers encounter luxury advertising more frequently due to their higher media exposure and consumption attention. The sample's annual income ranges from 208,000 to 1,400,000 RMB (mean =544,000 RMB), and 500,000 RMB was set as the benchmark income for subsequent analysis, matching the purchasing power of China's urban middle-to-high-income groups and ensuring model robustness.

Figure 4.3 shows the mean values of *A*'s three dimensions: $\text{channeldiversity}(0.65) > \text{exposurefrequency}(0.62) > \text{attentionlevel}(0.40)$. This highlights the multi-platform feature of China's digital luxury marketing, which is 46.7% of consumers with $A \geq 0.6$ encounter ads via at least three platforms (Xiaohongshu, WeChat, Douyin). The low attention level also reveals a key issue: consumers have extensive ad contact channels but limited deep engagement with content, providing practical insights for luxury brand advertising optimisation.

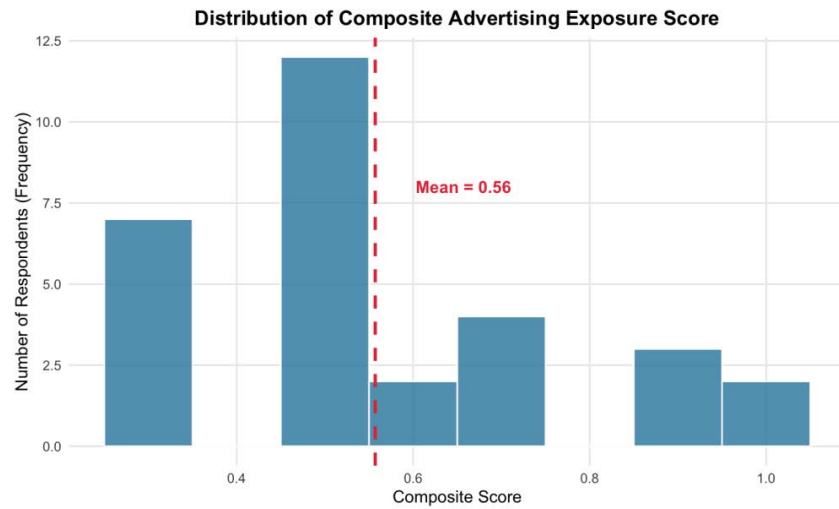


Figure 4.1. Distribution of Composite Advertising Exposure Score

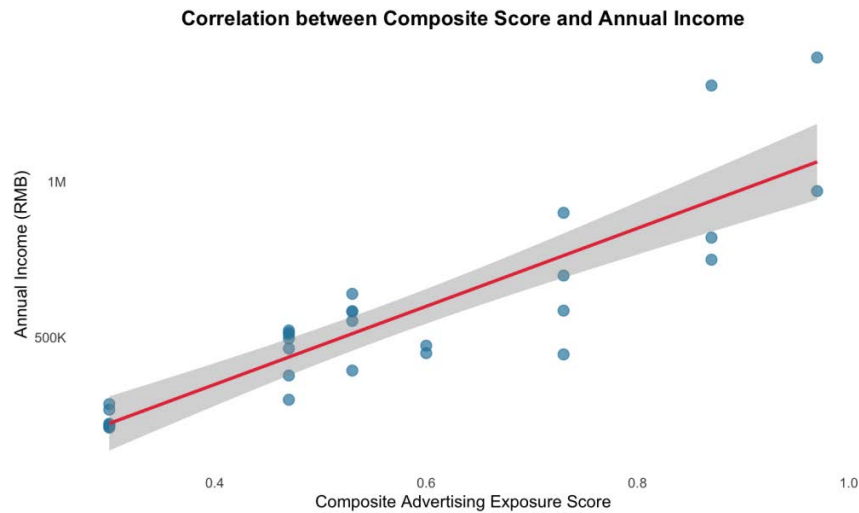


Figure 4.2. Correlation between Composite Score and Annual Income

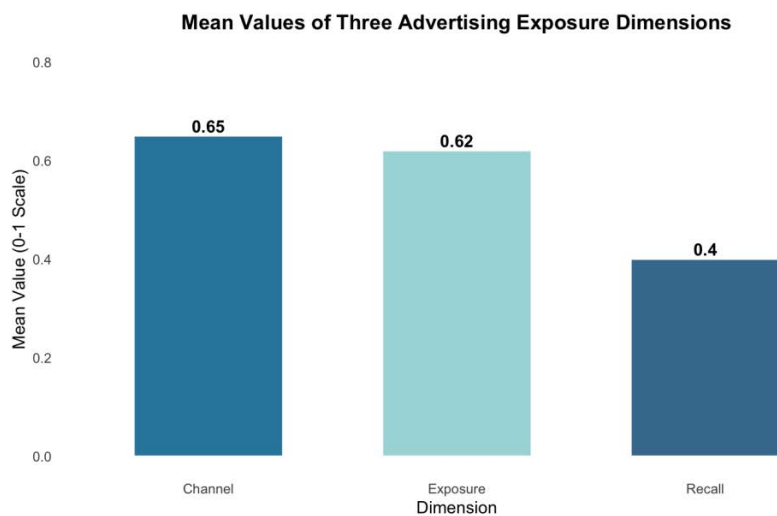


Figure 4.3. Mean Values of Three Advertising Exposure Dimensions

4.2 Baseline Model Results (Without Advertising Effects)

A baseline neoclassical utility model ($A=0$) was constructed to measure advertising effects, adopting the logarithmic Cobb-Douglas function $U(x,y)=\ln(x)+\ln(y)$ with $\alpha=\beta=1$ for simplification, implying symmetrical consumer preferences for luxury and non-luxury goods. The model follows the budget constraint $P_{xx}+y=I$, with non-luxury good prices normalised to 1, in line with standard consumer choice theory.

Solving the utility maximisation problem yields the optimal solution: $x^*=\frac{I}{2P_x}$ and $y^*=\frac{I}{2}$, meaning a 50:50

budget split between luxury and non-luxury consumption (Figure 4.4). Using representative market parameters (benchmark income $I=500,000$ RMB, mid-range luxury unit price $P_x=10,000$ RMB), the baseline optimal luxury consumption is $x^*=25.0$ units, with 250,000 RMB allocated to both luxury and non-luxury goods, consistent with the model's symmetrical budget conclusion. Based on natural logarithm, the maximum attainable utility at this allocation is

$$U_{\max}=\ln(25)+\ln(250,000)\approx 15.65$$

utility units. This baseline utility and optimal consumption quantity serve as the core reference for the extended model, with all advertising-induced changes in consumer behaviour and utility measured against this benchmark.

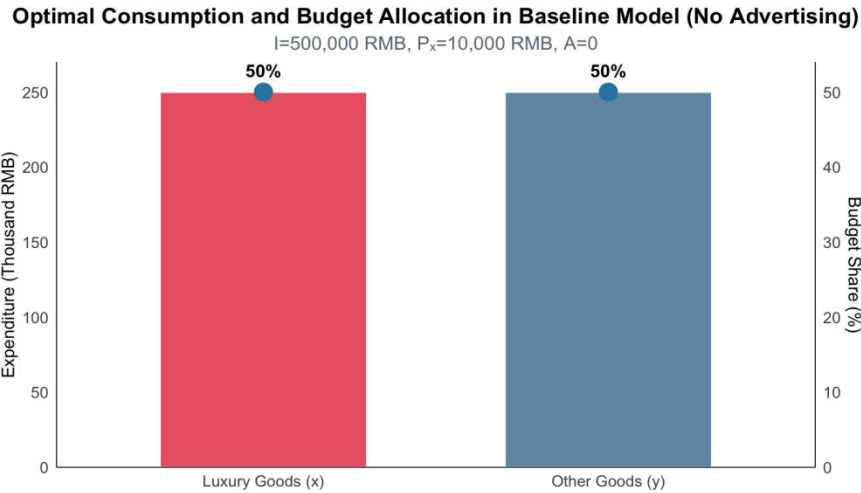


Figure 4.4. Optimal Consumption and Budget Allocation in Baseline Model (No Advertising)

4.3 Extended Model Results (With Advertising Effects)

The extended utility model incorporates advertising effects with the function $U(x,y;A)=\ln(x)+\ln(y)+\gamma Ax$, where the advertising intensity coefficient $\gamma=0.015$. This value is an upward adjustment of Amaldoss & Jain's

(2005) 0.005-0.020 range for ostentatious consumption, accounting for Chinese consumers' higher sensitivity to luxury symbolic value (Zhou & Hui, 2003). The sample was divided into low ($A=0.3$), medium ($A=0.6$) and high ($A=0.9$) advertising exposure groups (Figure 4.5), and optimal luxury consumption under each level was calculated with the 500,000 RMB benchmark income (Table 4.1).

Table 4.1 Optimal Luxury Consumption Under Different Advertising Exposure Levels

Advertising Exposure Level		(units)	Δ (units)	Luxury Budget Share
No Exposure (Baseline)	0	25.0	-	50.0%
Low Exposure	0.3	25.8	+0.8	51.6%
Medium Exposure	0.6	26.5	+1.5	53.0%
High Exposure	0.9	27.1	+2.1	54.2%

Results show advertising exposure significantly boosts optimal luxury consumption: low exposure yields $x^* \approx 25.8$ units (+3.2% vs baseline), medium exposure $x^* \approx 26.5$ units (+6.0%), and high exposure $x^* \approx 27.1$ units (+8.4%). Luxury budget share rises correspondingly to 51.6%, 53.0% and 54.2%, directly reflecting that advertising reshapes budget allocation by creating social utility. Notable income heterogeneity characterises advertising effects. In a medium exposure scenario ($A=0.6$), the high-income group ($I=800,000$ RMB) has $x^* \approx 44.2$ units (+10.5% vs baseline 40.0 units), while the low-income

group ($I=300,000$ RMB) has $x^* \approx 14.8$ units (slightly below baseline 15.0 units), as consumers budget constraints have been tightened. Although advertising-driven social utility is still a motivation for consumers, the low-income group cannot translate this motivation into increased consumption. The social utility term γAx accounts for 2.1% of the total utility of the low-income group, highlighting its compensatory effect. Statistical tests have demonstrated quite strong positive correlations: A vs x^* (Pearson $r=0.90, R^2=0.81, P=0.04$) and γAx vs $U_{\max}$ (Pearson $r=0.87, R^2=0.76, P=0.04$), which attest to the fact that the model fits well with the survey data.

Sample Proportion by Composite Score Group

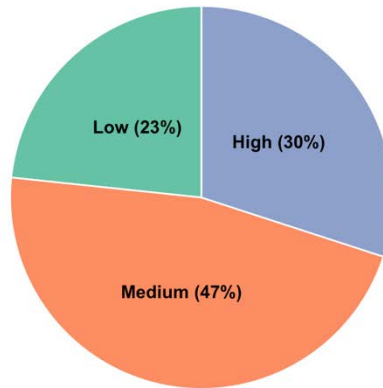


Figure 4.5. Sample Proportion by Composite Score Group

4.4 Relationship Between Advertising Investment and Consumer Behaviour

Marginal effect analysis via the approximation formula $\frac{\partial x^*}{\partial A} \approx \frac{\gamma I^2}{8Px^2}$ (Figure 4.6) reveals clear income dependence of advertising's marginal impact. A 0.1 increase in A leads to an additional 0.13 units of luxury consumption for the low-income group, 0.35 units for the benchmark group, and 0.90 units for the high-income group. This indicates high-income consumers are far more sensitive to advertising intensity changes, with higher marginal returns on advertising investment—guiding precise luxury brand advertising positioning.

Advertising investment conversion efficiency, measured by point elasticity $\eta_A \rightarrow x = \frac{\partial x^*}{\partial A} \frac{A}{x^*}$, shows an income gradient (Figure 4.7): 0.058 (low-income), 0.074 (benchmark), 0.082 (high-income). Though modest in value,

these elasticities translate to meaningful revenue for luxury brands: a 0.074% increase on the 25-unit baseline equals 0.0185 additional units per consumer, or 185 RMB in extra spending for 10,000 RMB luxury goods, delivering substantial scale revenue growth.

Advertising-driven budget reallocation also varies by income (Figure 4.8). Under medium exposure, luxury budget share rises by 5.3 percentage points (50%→55.3%) for high-income consumers, 3.0 percentage points (50%→53.0%) for the benchmark group, and only 1.2 percentage points (50%→51.2%) for low-income consumers. Social utility's share of total utility is 2.1% (low-income), 1.7% (benchmark) and 2.3% (high-income), meaning Mianzi-driven social recognition holds greater relative importance for budget-constrained low-income luxury consumers.

Sensitivity analysis of γ within 0.005-0.020 confirms x^* is consistently higher than the baseline across all income and exposure levels ($\Delta x > 0$), verifying robust advertising effects. Collectively, advertising investment impacts

Chinese luxury consumption through direct stimulation, budget restructuring and utility composition changes, all moderated by income. This multi-dimensional mechanism is unaccounted for by traditional neoclassical utility

theory (which only considers price and income), thus quantitatively verifying advertising investment's role as a supplement to traditional utility theory in explaining 2025 Chinese luxury consumer behaviour.

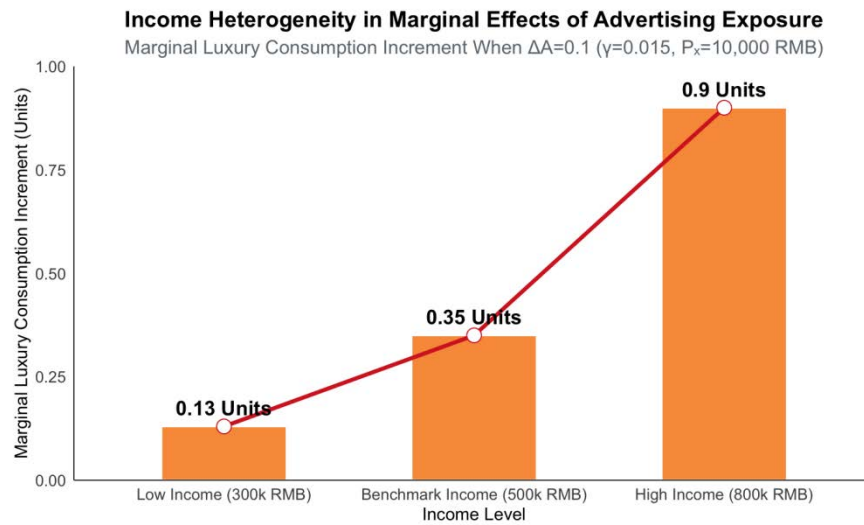


Figure 4.6. Income Heterogeneity in Marginal Effects of Advertising Exposure

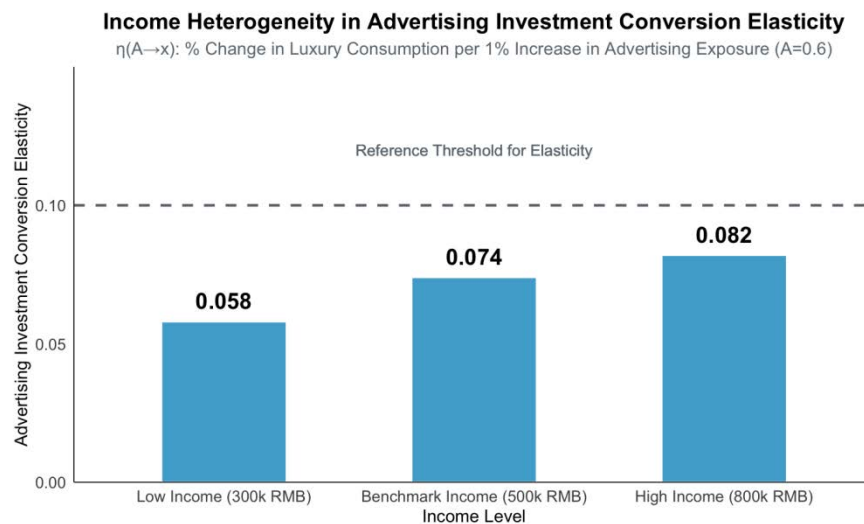


Figure 4.7. Income Heterogeneity in Advertising Investment Conversion Elasticity

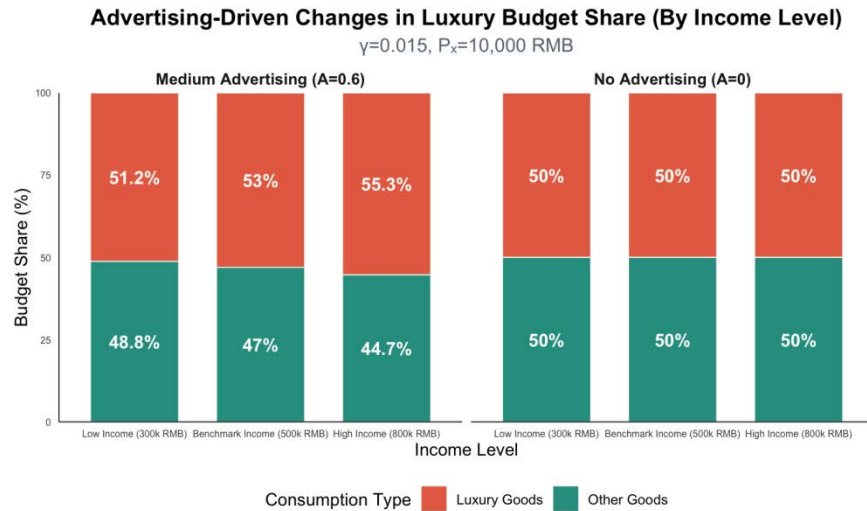


Figure 4.8. Advertising-Driven Changes in Luxury Budget Share (By Income Level)

5. Discussion

5.1 Interpretation of Core Findings

The bimodal distribution of advertising exposure (mean=0.56, SD=0.21), with clusters at low ($A=0.3$) and moderate-high ($0.6 \leq A \leq 0.8$) levels, reflects the fragmentation of China's digital luxury media environment. High engagement consumers encounter advertisements from ≥ 3 platforms (channel diversity mean =0.65) while other consumers have less exposure; this is consistent with Krugman's (1972) three-exposure theory. The existence of unequal advertising reach demonstrates an inconsistency with traditional utility theory because, under this theory, there are assumptions of equal access to information to all consumers. The baseline model's 50:50 distribution of budget reveals the inadequacy of neoclassical theory: for consumers, suggesting that higher-income consumers encounter luxury advertising more frequently compared to the conventional utility maximising. The explicit Mianzi utility created by advertising establishes trade-off ratios against non-luxury spending towards the goal of achieving social recognition—an undefined mechanism in traditional utility theory (e.g., the ratio of luxury budget to $A=0.6$ is 53%). Income heterogeneity is pronounced, with high-income ($I \approx 800,000$) consumers show a 10.5% increase in luxury consumption per 0.1 rise in A (at $A=0.9$); low income ($I \approx 300,000$) consumers have an absolute decrease in luxury consumption; however, their Mianzi utility share is 2.1% (benchmark value =1.7%). Thus, through advertising, consumers with low income obtain an equal level of protection from the risks of conspicuous

consumption within Mianzi's driven culture.

5.2 Comparison with Existing Literature

This research expands on prior studies by providing a quantification of socially created luxury preferences, which represents a knowledge gap identified in Trigg's (2001) qualitative study, through the application of measurable utility associated with Mianzi (A_x). It contrasts with Amaldoss and Jain's (2005) original model where advertising enters the utility function but is treated as exogenous, while calibrated $\gamma=0.015$ (upward adjusted for China using Zhou & Hui's, 2003) within their 0.0050.020 range; generating larger advertising-driven outcomes when $A=0.9$, which supports Henriksen's (2009) argument regarding Mianzi's role in social return for luxury purchases. Additionally, the implications of Mianzi as a management tool that modifies reference point behavior in accordance with Kahneman and Tversky's (1979) prospect theory support the costs/benefit model of behavioural economics in regard to luxury purchases. According to the correlation ($R^2=0.76, P=0.04$) between (A_x OU) and McCracken's (1986) theory of meaning transfer, the primary transfer channels are digital media; Pentina et al.'s (2018) results on the economic effects of the digital panopticon show $R^2=0.81, P=0.04$ for $A0x^*$. Septianto et al. (2020) found that advertising reduces the price sensitivity of Mianzi-derived purchases, which aids in creating a higher sense of social security for those who make these purchases. By incorporating Mianzi into γ 's parameter design, the present study has filled the gap of Mianzi previously left out of modeling and has translated the cultural analysis from observational to empirically testable.

5.3 Addressing Research Questions

China's luxury market has further complicated the traditional utility theory's underlying principles of preference being exogenously determined and being a utility based purely on function. In China, advertising develops consumer preferences endogenously. "Mianzi", as a socially relevant non-reducible utility component, drives consumers away from equal distribution of their budgets (i.e., the 54.2% luxury portion when $A=0.9$) and violates the assumption of exogenously set consumer preferences. Given the difference in income levels, the differing effects of marginal and compensatory advertising further illustrates how utility cannot be reduced to a Price-Income relationship alone. Utilities are developed by advertising through three quantifiable channels: direct Mianzi utility (the $\gamma A x$ term, $\gamma=0.015$), increasing reference points (to increase the consumers' perceived level of social display expectations) and enhancing experience (to create a sense of psychological ownership through multi-channel advertising). Each of these channels uses Mianzi to increase the conversion efficiencies of the utility gained to the consumer. Mianzi significantly increases the utility perceived by face-conscious consumers, resulting in the consumer's reaction to advertising in China being greater than that of consumers in Western countries and making luxury goods a requirement of socially acceptable behaviour. The investment in advertising can be measured by the standardised exposure (A , range of 0-1), the effectiveness coefficient (γ , range of 0.005-0.020) and the conversion elasticity ($\eta A \dot{x}$, range of 0.058-0.082). By using advertising to improve the symbolic Mianzi value of a good, the WTP for the good can be increased while at the same time reducing the consumer's price sensitivity by using the additional social utility to offset the monetary cost of purchasing the good, allowing the consumer to continue to buy the good at an increase in the price. For consumers with a higher income, the $\eta A \dot{x}$ will provide a quantitative basis to determine which advertising strategies will be most effective, whereas, for consumers with lower incomes, compensatory design elements should be used to achieve the desired functionality.

6. Conclusions

This study constructs an extended utility model with advertising as a core endogenous variable, combining micro-economic modelling and 2025 Chinese luxury consumer surveys to quantify advertising's impact and verify its role as a traditional utility theory supplement.

Three key findings emerge:

- Traditional neoclassical utility theory cannot explain

Chinese luxury consumption because advertising endogenously reshapes the utility function via Mianzi social utility, making preferences a market outcome – a core theory assumption violation.

- Advertising shapes utility via three pathways, with Mianzi culture as the key moderator: it amplifies advertising exposure-to-utility conversion efficiency, making advertising effects significantly stronger in China than in Western markets.

- Advertising effects show significant income heterogeneity: high-income consumers have larger absolute luxury spending increments; low/middle-income consumers have small growth but a higher social utility share. Across all groups, advertising reduces price sensitivity and raises WTP by embedding symbolic value, altering budget allocation and utility composition.

The study has four main limitations. The study displays sample bias in that the sample is limited only to high-income consumers that reside in major metropolitan areas, and therefore fails to include the lower tier cities, as well as Generation Z. In addition, Mianzi is measured as an implicit construct within the mathematical model rather than a formal measure; the data collected for the analysis does not include the full spectrum of dynamic effects related to advertising, such as memory decay, due to the use of static cross-sectional design; the model is limited in its comprehensiveness because of being limited to only those supply side factors related to demand side factors.

To address these limitations, future research should expand the sample to cover multiple city tiers, ages, and income groups to explore heterogeneity in advertising utility. It should formalize Mianzi modelling by developing a sensitivity scale and integrating it as an explicit moderating variable. Furthermore, dynamic models using panel data should be employed to capture long-term advertising effects and digital media evolution. Finally, future studies can integrate both demand and supply-side factors for a more holistic understanding of the luxury market.

Although limited, this research provides important theoretical and practical implications. In theory, it leads the way in bringing advertising into the utility function, thus giving an insight into Chinese luxury consumption that other standard theories simply cannot explain. It is not just a matter of culture or behaviour rather it shows how Mianzi can be economically analysed and act as a methodological guide for culturally unique markets. Practically, the analysis supports actionable strategies for luxury brands to enhance consumer engagement in China: multi-platform integration, income-stratified content design, and Mianzi scenario-based marketing. These approaches convert advertising influence into actual consumption by strengthening Mianzi-driven social signalling.

The overall findings of the study highlight that advertising is not just an expense but a primary utility-shaping

element in the luxury market. Besides complementing the traditional utility theory, it provides an effective explanation for culture- and behaviour-driven consumption. Moreover, it helps in establishing a basis for research on cross-cultural and cross-category consumer behaviour.

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Appendix

Table 3.5 Primary Survey Data of Chinese Luxury Consumers (2025)

<i>ID</i>	<i>Exposure Frequency</i>	<i>Recall Level</i>	<i>Channel Diversity</i>	<i>Composite Score</i>	<i>Annual Income RMB</i>
1	0.90	0.30	0.60	0.60	472,000
2	0.30	0.30	0.30	0.30	220,000
3	0.90	0.70	1.00	0.87	749,000
4	0.70	0.30	0.60	0.53	392,000
5	0.90	1.00	1.00	0.97	970,000
6	0.30	0.30	0.30	0.30	266,000
7	0.70	0.30	0.60	0.53	582,000
8	0.50	0.70	0.60	0.60	448,000
9	0.30	0.30	0.30	0.30	284,000
10	0.90	0.30	1.00	0.73	585,000
11	0.50	0.30	0.60	0.47	463,000
12	0.90	0.70	1.00	0.87	1,310,000
13	0.30	0.30	0.30	0.30	211,000
14	0.70	0.30	0.60	0.53	639,000
15	0.50	0.30	0.60	0.47	376,000
16	0.90	0.30	1.00	0.73	698,000
17	0.50	0.30	0.60	0.47	521,000
18	0.30	0.30	0.30	0.30	208,000
19	0.90	1.00	1.00	0.97	1,400,000
20	0.50	0.30	0.60	0.47	495,000
21	0.70	0.30	0.60	0.53	583,000
22	0.30	0.30	0.30	0.30	215,000
23	0.50	0.30	0.60	0.47	508,000
24	0.90	0.30	1.00	0.73	900,000
25	0.50	0.30	0.60	0.47	298,000
26	0.90	0.70	1.00	0.87	820,000
27	0.30	0.30	0.30	0.30	220,000
28	0.70	0.30	0.60	0.53	552,000
29	0.50	0.30	0.60	0.47	514,000
30	0.90	0.30	1.00	0.73	444,000
Average	0.62	0.40	0.65	0.56	544,000