

异质商品

简体中文版

基础概念 (Foundations) • The Valuation Engineer

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简体中文译本，由人工智能辅助翻译并经编辑部审校；英文版为权威版本。

形式定义。 异质商品 (heterogeneous good) 是指不可相互替换的商品：每一件商品都是买方分别赋予价值的特征的独特组合，而这些特征本身并不单独交易。

直观阐释。 同质商品 (homogeneous good) 是任何一件都可以的商品：一桶 WTI 原油、一蒲式耳二号黄玉米、电网上的一千瓦时电、某只股票的一股。这些商品背后的分级标准或规格的存在，正是为了使单件商品可以相互替换，从而使价格适用于类别而非特定的那一件。异质商品则是具体那一件很重要的商品——是这栋房子，而不是那栋房子；是这辆二手车，而不是旁边那一辆。

在技术意义上，两个特点使商品成为异质商品。第一，买方在意多个可区分的属性，而这些属性在市场上的各件商品之间存在差异。第二，这些属性因商品的生产技术而被捆绑在一起，无法单独购买。你不可能单独购买 200 平方英尺的建筑面积；你不可能脱离一宗土地而获得一个学区。特征成捆而来，市场为整个组合定价，而不是为特征本身定价。

房地产是异质商品的典型代表，并且异常鲜明地体现了这一属性。区位特征是完全不可复制的：任何两宗地块都不可能占据同一位置，因此每宗房地产至少拥有一项属性（其坐标）将它与市场上的所有其他房地产区分开来。物理、法律与环境属性又在此之上叠加了更多的变异维度，使得整体的特征向量对每宗房地产而言都是独一无二的。

估价师在何处遇到它。 市场比较法 (sales comparison approach) 中的每一项调整，都是对估价对象与可比案例乃异质商品这一事实的隐含承认。如果房地产是同质的，成交价格本身就可以直接比较，根本不需要比较网格。网格是一种通过对组合构成差异作出调整，来调和不同组合价格的尝试。值得注意的是网格不做什么：它从不将成交价格分解为各特征的价值贡献。传统网格没有价值贡献一栏——只有逐项直接估计的调整。

成本法通过从组成部分重建组合来应对异质性——基础、框架、装修、折旧——并对每一部分分别定价。收益法则通过将组合抽象为单一的现金流轮廓来应对异质性，由资本化率与收益率把组合层面的异质性吸收进一个源自市场的乘数。三种估价方法都是对“房地产是异质商品”这一根本事实的方法论回应。它们的区别在于如何应对这一事实，而不在于是否面对它。

估价师在非正式场合同样会遇到异质性：每当他们思考可比案例的选择、配对销售分析 (paired-sales analysis) 或“同类相比”的比较时。寻找在尽可能多的属性上相似的可比案例，这一直觉正是实务工作者对异质性的回应：将估价对象与可比案例之间的组合距离最小化，组合中未被观测的成分对成交价格差异的贡献便随之减小。

为何关乎可辩护性。 房地产的异质性正是估价方法论必须作为一门学科存在的原因。如果房地产可以相互替换，市场价值 (market value) 便可从挂牌价格直接观测，估价将沦为查表。正因为并非如此，价值必须从相关但不相同的房地产的价格中推断得出，而每一步推断都是一次需要说明理由的方法论选择。

正式承认异质性，可以厘清 USPAP 及各准则条款所关注的可辩护性所依赖的若干实务问题。可比案例的选择，是在特征空间中挑选与估价对象足够接近、以致从中还原的隐含价格可以推广的样本。一项调整是否合理，取决于其背后的隐含价格能否从市场证据中得到支持。各估价方法之间的最终调和，反映的是估价师对哪种方法最可信地应对了这宗房地产的异质性的判断。一旦“异质商品”被点明为深层条件，上述每一个可辩护性问题都会变得更加清晰。

估价实例演算。 加利福尼亚州帕西菲卡 (Pacifica, California) 同一社区最近的两笔成交：

属性	可比案例 A	可比案例 B
建筑面积 (平方英尺)	1,650	1,650
卧室 / 卫浴	3 / 2	3 / 2
地块 (平方英尺)	9,000	7,200
景观	有	无
成交价格	\$1,425,000	\$1,280,000

在同质商品的视角下，这是同一宗房地产：建筑面积相同、房间数相同、社区相同。在异质商品的视角下，它们是两个不同的组合，在买方分别赋予价值的两项特征（地块与景观）上存在差异。\$145,000 的价格差是这两项属性的联合贡献——两个隐含价格纠缠在同一个配对之中。

要将隐含价格逐一还原，需要更多的配对，最好是每次只改变一项属性。再有三四笔覆盖有景观/无景观、大地块/小地块各种组合的成交，两个隐含价格便开始可以分别识别。当足够多的可比案例提供了足够的变异时，特征价格回归 (hedonic regression) 便可正式完成这一解缠；而当变异有限时，估价师只能局限于区间化的配对销售推理，其可靠性明确取决于各组合在特征空间中彼此有多接近。

这个例子说明了为什么异质性是根本条件：即使是两栋“完全相同”的房子也并不相同，而估价的方法论工具之所以存在，正是为了处理它们之间的距离。

参考文献。

Lancaster, K. J. (1966). A New Approach to Consumer Theory. *Journal of Political Economy*, 74(2), 132–157.

Rosen, S. (1974). Hedonic Prices and Implicit Markets: Product Differentiation in Pure Competition. *Journal of Political Economy*, 82(1), 34–55.

交叉引用：特征空间 (*characteristics space*)；特征价格函数 (*hedonic price function*)；隐含价格 (*implicit price*)。

附录：Prolog 形式化

以下机器可读的配套文件 (001-heterogeneous-good.pl) 在本刊的 Prolog 知识库中对本条目进行了形式化。该文件同时作为可浏览的 Prolog 版本随本文一并发布。

```
%% 001-heterogeneous-good.pl
%%
%% Prolog companion to Foundations Vol. 1, Issue 1, Article 001
%% Title:   Heterogeneous Good
%% Author:  Bert Craytor
%% Concept: heterogeneous_good
%% Version: 0.1.0-draft
%%
%% This file is the Prolog galley for the article: it encodes the
%% article's main claims, worked example, and inference rules in a form
%% that other Prolog code in the journal can consult, query, and verify
%% against. Read alongside the entry.tex / entry.pdf prose.

% =====
% DICTIONARY IMPORT
% =====
```

```

%
% The journal-wide dictionary is the source of truth for term definitions
% and relation schemas. The use_module below pulls those facts in at
% runtime; the comments that follow reproduce the relevant entries so a
% reader skimming this file in isolation can see what's been imported.

:- use_module('.././.././../tools/dictionary/dictionary').
:- dictionary_release('dictionary-2026.1').

% --- From the dictionary (loaded via :- use_module above) -----
% term(heterogeneous_good, "Heterogeneous Good", economic_theory,
%     "Heterogeneous goods are goods that are not interchangeable
%     because each is a distinct bundle of characteristics that buyers
%     value separately, and whose characteristics are not separately
%     traded.", published, 'dictionary-2026.1').
%
% term(characteristics_space, "Characteristics Space", economic_theory,
%     "The characteristics space of a class of heterogeneous goods is
%     the vector space whose coordinates index the attributes that
%     buyers value, and in which each good is represented by the
%     vector of its attribute levels.", published, 'dictionary-2026.1').
%
% term(implicit_price, "Implicit Price", economic_theory,
%     "The implicit price of a characteristic is the partial derivative
%     of the hedonic price function with respect to that characteristic,
%     evaluated at a point in the characteristics space; it represents
%     the marginal market price of an incremental unit of the
%     characteristic, holding all other characteristics fixed.",
%     published, 'dictionary-2026.1').
%
% term(hedonic_price_function, ...).
%
% relation(depends_on, 2, "depends on", [foundations_concept, foundations_concept],
%     foundations_methodology, "...", accepted, 'dictionary-2026.1').
% relation(related, 2, ...).
%
% These facts are NOT declared in this file; the use_module above is
% what makes them available at runtime.
% -----

:- use_terms([ % Foundations concepts (terms/foundations.pl)
    heterogeneous_good, characteristics_space, implicit_price,
    hedonic_price_function,
    % Practice terms (terms/valuation-practice.pl)
    real_estate, homogeneous_good,
    sales_comparison_approach, cost_approach, income_approach,
    comp_selection, paired_sales_analysis, adjustment,
    reconciliation, uspap, standards_rule ]).
:- use_relations([related/2, depends_on/2]).

% =====
% ARTICLE SUBJECT
% =====

article_concept(heterogeneous_good).
article_issue(volume(1), number(1), year(2026)).
article_id('foundations.2026.001').

% =====

```

```

% ARTICLE-LOCAL VOCABULARY
% =====
%
% Terms the article needs that are NOT yet in the dictionary, and that
% the editor decided are too narrow to promote. These are field names
% for the worked-example property records — not concepts in the
% journal's ontology.

local_term(gla_sqft).
local_term(bedrooms).
local_term(baths).
local_term(lot_sqft).
local_term(view).

% =====
% FORMAL DEFINITION (restated as Prolog rule)
% =====
%
% From the formal definition: a good is heterogeneous IF buyers care
% about multiple distinguishable attributes that vary across items in
% the market, AND those attributes are bundled by production rather
% than separately traded.

%! heterogeneous(?Good) is nondet.
%
% True when Good satisfies both bundling criteria. The two predicates
% buyers_value_multiple_attributes/1 and attributes_bundled_by_production/1
% must be asserted for specific goods elsewhere; here they characterize
% the formal definition itself.

heterogeneous(Good) :-
    buyers_value_multiple_attributes(Good),
    attributes_bundled_by_production(Good).

% =====
% INTUITIVE FRAMING — CONTRASTS WITH HOMOGENEOUS GOODS
% =====

% Canonical examples of homogeneous goods cited in the article.
canonical_homogeneous_example(wti_crude).
canonical_homogeneous_example(no_2_yellow_corn).
canonical_homogeneous_example(kilowatt_hour).
canonical_homogeneous_example(common_stock_share).

% Their distinguishing feature: grading or specification standards make
% individual items interchangeable.
interchangeable_via_grading(wti_crude).
interchangeable_via_grading(no_2_yellow_corn).
interchangeable_via_specification(kilowatt_hour).
interchangeable_via_specification(common_stock_share).

% Canonical heterogeneous goods.
canonical_heterogeneous_example(real_estate).
canonical_heterogeneous_example(used_car).
canonical_heterogeneous_example(unique_machinery).

% Why real estate exhibits heterogeneity unusually strongly:
% locational characteristics are perfectly non-replicable.
buyers_value_multiple_attributes(real_estate).

```

```

attributes_bundled_by_production(real_estate).
non_replicable_attribute(real_estate, location).

% =====
% APPRAISER ENCOUNTERS
% =====
%
% The three classical valuation approaches are all methodological
% responses to heterogeneity. They differ in HOW they navigate the
% bundle, not in WHETHER they confront it.

valuation_approach(sales_comparison_approach).
valuation_approach(cost_approach).
valuation_approach(income_approach).

responds_to_heterogeneity(sales_comparison_approach,
    "Reconciles the prices of distinct bundles by adjusting for composition differences; the grid
    ↪ records only adjustments, estimated directly, and never decomposes a price into feature value
    ↪ contributions.").
responds_to_heterogeneity(cost_approach,
    "Reconstructs the bundle from priced components: foundation, framing, finishes, depreciation.")
    ↪ .
responds_to_heterogeneity(income_approach,
    "Abstracts the bundle into a single cash-flow profile; cap/yield rates absorb heterogeneity.").

% Practitioner-level encounters with heterogeneity.
practitioner_response_to_heterogeneity(comp_selection,
    "Minimize bundle distance between subject and comp in characteristics space.").
practitioner_response_to_heterogeneity(paired_sales_analysis,
    "Isolate an attribute's contribution by holding other attributes constant.").
practitioner_response_to_heterogeneity(adjustment,
    "Quantify the price impact of one differing attribute at a time.").

% =====
% DEFENSIBILITY
% =====
%
% Why naming "heterogeneous good" sharpens USPAP defensibility questions.

defensibility_consequence(comp_selection,
    "Comps must be close enough in characteristics space that recovered implicit prices generalize
    ↪ .").
defensibility_consequence(adjustment,
    "Each adjustment must be supportable from market evidence of the implicit price.").
defensibility_consequence(reconciliation,
    "Choice among approaches reflects which best navigates THIS property's heterogeneity.").

% Root claim: valuation methodology exists as a discipline BECAUSE
% real estate is heterogeneous. If it were homogeneous, value would be
% directly observable from posted prices.
root_claim(
    "Valuation methodology exists as a discipline because real estate is heterogeneous; in the
    ↪ homogeneous case, value would be directly observable.").

% =====
% WORKED EXAMPLE — PACIFICA COMPS
% =====
%
% Two recent sales in the same Pacifica, California neighborhood. The

```

```

% example demonstrates that even "identical" houses are not identical:
% the $145,000 price spread is the joint contribution of differences in
% lot size and view, two implicit prices entangled in a single pair.

% The 8-comp Pacifica dataset is shared across entries 001-006 and
% lives in kb/pacifica_comps.pl. Consulting it here brings property/1,
% in_market/2, attribute_value/3, and sale_price/2 into this article's
% namespace.
:- consult('../..kb/pacifica_comps').

% --- Derived facts from the example -----

% The attributes that differ between the two comps.
differing_attribute(comp_a, comp_b, lot_sqft).
differing_attribute(comp_a, comp_b, view).

% The price differential and what it's attributable to.
price_differential(comp_a, comp_b, 145000).
attributed_to(price_differential(comp_a, comp_b, 145000),
    [implicit_price_of(lot_sqft), implicit_price_of(view)]).

% --- Article's argument about identification -----

% A single pair cannot separately identify the two implicit prices —
% they are entangled in the single $145K observation.
joint_identification_only(price_differential(comp_a, comp_b, 145000),
    [lot_sqft, view]).

% Separate identification requires more pairs varying one attribute at
% a time. With sufficient variation, hedonic regression performs the
% disentanglement formally; with limited variation, the appraiser uses
% bracketed paired-sales reasoning, whose reliability depends on how
% close the bundles are in characteristics space.
identification_strategy(few_pairs,
    "Bracketed paired-sales reasoning. Reliability depends on bundle proximity in characteristics
    ↔ space.").
identification_strategy(many_pairs_with_variation,
    "Hedonic regression (see hedonic_regression).").

% =====
% INFERENCE RULES
% =====

%! comparable(?A, ?B) is nondet.
%
% A and B are comparable when they are distinct properties in the same
% market. This is the operational definition of "comp" used implicitly
% in the article.

comparable(A, B) :-
    property(A),
    property(B),
    A \== B,
    in_market(A, M),
    in_market(B, M).

%! attribute_difference(?A, ?B, ?Attr, ?DA, ?DB) is nondet.
%
% A and B differ on Attr, with DA the value at A and DB the value at B.

```

```

% Use this to enumerate the dimensions on which two comps actually vary.

attribute_difference(A, B, Attr, DA, DB) :-
    comparable(A, B),
    attribute_value(A, Attr, DA),
    attribute_value(B, Attr, DB),
    DA \== DB.

%! identifiable_implicit_price(?Attr) is nondet.
%
% An attribute's implicit price is identifiable from the observed comps
% if there exists at least one pair of comparables differing ONLY in
% that attribute. With our two-comp example this fails for lot_sqft AND
% view (both differ in the same pair), which is exactly the article's
% point.

identifiable_implicit_price(Attr) :-
    comparable(A, B),
    findall(X, attribute_difference(A, B, X, _, _), Diffs),
    Diffs == [Attr].

% =====
% CROSS-REFERENCES
% =====
%
% Concepts the article cross-references (corresponding to the
% \foundationsref{} macros in entry.tex).

cross_reference(characteristics_space).
cross_reference(hedonic_price_function).
cross_reference(implicit_price).

```