

隱含價格

繁體中文版

基礎概念 (Foundations) • The Valuation Engineer

Bert Craytor • 2026 年 8 月 4 日

版本 1.0.0

DOI: [10.67330/md6wke17](https://doi.org/10.67330/md6wke17)

繁體中文譯本，由人工智慧輔助翻譯並經編輯部審校；英文版為權威版本。

形式定義。一項特徵的隱含價格 (implicit price) 是特徵價格函數對該特徵的偏導數，在特徵空間中某一點取值；它代表在其他特徵保持不變的情況下，該特徵增加一個單位的邊際市場價格。

直觀闡釋。特徵價格函數 $p(\mathbf{z})$ 為每個組合賦予一個價格。然而，估價實務中的大多數問題並不關乎完整組合的價格，而是關乎組合中某個具體組成部分的價格。景觀值多少錢？多出一百平方英尺能增加多少？「良好」與「優秀」狀況之間的差異貢獻多少？

隱含價格回答的正是這些問題。這一術語源自 Rosen (1974)，他證明了差異化產品的觀測價格連同其特徵「定義了一組隱含的或『特徵』價格」；Lancaster (1966) 則提供了將商品視為特徵組合的底層觀點。對每項特徵 z_i 而言，隱含價格是在其他所有特徵保持不變時， $p(\mathbf{z})$ 隨 z_i 變化的變化率：

$$\pi_i(\mathbf{z}) = \frac{\partial p(\mathbf{z})}{\partial z_i}.$$

隱含價格的單位是美元每單位特徵——建築面積每平方英尺多少美元、地塊每平方英尺多少美元、狀況每提升一級多少美元。對於景觀這樣的二元特徵，隱含價格就是從無景觀 (0) 變為有景觀 (1) 所支付的全部溢價。

「隱含」一詞點明了核心事實：這些價格沒有被標價。沒有人以 \$575 出售「一平方英尺建築面積」。這一價格隱含在確實被標價的均衡組合價格之中，而特徵價格分析工具的存在正是為了把它提取出來。

隱含價格是特徵價格框架中與估價直接相關的產出。銷售比較網絡中的調整，原則上就是隱含價格的估計值乘以特徵差異。每一項調整都是對特徵空間中相關點處 π_i 取值的一次押注。

估價師在何處遇到它。銷售比較調整網絡就是一張隱含價格應用表，即便估價師並不這樣稱呼它。網絡中「因建築面積比估價對象少 200 平方英尺而 +\$10,000」的調整，是在斷言：在特徵空間的相關位置上，建築面積的隱含價格為每平方英尺 \$50。「因景觀較差而調整 \$100,000」的網絡條目，是在斷言二元景觀特徵的隱含價格為 \$100,000。市場比較法的全部可辯護性，都取決於這些隱含價格能否從市場中得到支持。然而在實踐中，估價師是直接估計調整額的——依據配對案例、經驗或同業做法——從未計算過底層的價值貢獻；傳統網絡只記錄調整本身。隱含價格的解讀是對這些調整所斷言內容的一種詮釋，而不是對其推導方式的描述。

這一命名也闡明了為什麼配對銷售分析是推導調整的基礎技術。恰好只在一項特徵上不同的兩個可比案例，可以直接估計該特徵的隱含價格：價格差除以特徵差。配對銷售分析的可靠性，取決於這兩個案例在特徵空間中是否真的足夠接近，以致從中還原的隱含價格能夠推廣到估價對象。

隱含價格有三個對實務重要的性質：

它們是局部的。在 1,650 平方英尺處的建築面積隱含價格，未必與在 2,500 平方英尺處相同。特徵價格函數一般是非線性的，其偏導數隨特徵空間中的位置而變化。由 1,500 平方英尺的配對銷售分析推導出的調整，未必適用於 3,000 平方英尺的估價對象。

它們是有條件的。海濱次市場中景觀的隱含價格，與內陸次市場中的並不相同。偏導數是在其他特徵保持不變的情況下求取的，但該導數的取值取決於其他特徵被固定在什麼位置。

它們依賴於市場。隱含價格是均衡價格，因而反映交易發生時買方群體的偏好。即使特徵本身沒有變化，市場的變動也會改變隱含價格。時間調整實際上是在承認：昨天的隱含價格未必是今天的。

為何關乎可辯護性。隱含價格的視角揭示了非正式網格可能掩蓋的調整可辯護性問題：

你處在特徵空間中的什麼位置？只有在估價對象於特徵空間中所處位置附近估計出的隱含價格才是可辯護的。由內陸可比案例推導出的景觀溢價被套用於海濱估價對象，等於在函數行為未知的特徵空間區域上作外推。

局部幾何結構是什麼？如果兩項特徵存在交互作用——例如景觀在更大的地塊上更值錢——那麼將它們分別作可加處理就是一種模型設定錯誤。景觀的隱含價格依賴於地塊面積，忽略交互作用的調整低估了函數的實際結構。

隱含價格是如何還原的？配對銷售分析、迴歸係數、業界經驗法則與「專業判斷」指向的是同一個量——隱含價格——但其認識論地位截然不同。估價師的可辯護性取決於說明每項調整所使用的隱含價格出自哪個來源。

估價實例演算。對於採用上一條目可加設定的帕西菲卡 (Pacifica) 運行示例，隱含價格就是線性函數的係數：

$$\pi_{\text{GLA}} = \beta_{\text{GLA}}, \quad \pi_{\text{lot}} = \beta_{\text{lot}}, \quad \pi_{\text{view}} = \beta_{\text{view}}, \quad \pi_{\text{cond}} = \beta_{\text{cond}}.$$

使用條目 003 的估計係數：

特徵	隱含價格	單位
建築面積	\$575	每平方英尺
地塊	\$22.70	每平方英尺
景觀	\$86,179	每 (有/無)
狀況	\$49,824	每級

這些隱含價格蘊含了一次配對銷售分析。回到條目 001 中可比案例 A 與可比案例 B 的差異：

- 可比案例 A 有景觀 ($\Delta z_{\text{view}} = +1$)；貢獻 +\$86,179。
- 可比案例 A 的地塊大 1,800 平方英尺 ($\Delta z_{\text{lot}} = +1,800$)；貢獻 $1,800 \times \$22.70 = +\$40,860$ 。
- 其他所有特徵相同。
- 預測價格差： $\$86,179 + \$40,860 = \$127,039$ 。

觀測到的價格差為 \$145,000。隱含價格分解解釋了其中約 \$127,000；其餘 \$18,000 反映了小資料集中的抽樣變異（更一般地說，反映了潛變數條目將要討論的那類未觀測因素）。

有兩個操作層面的要點值得注意。第一，線性假設承擔著實實在在的工作：在非線性的 $p(\mathbf{z})$ 下，同樣的地塊面積差在小地塊上可能比在大地塊上更值錢，上述可加分解便會有偏。第二，地塊每平方英尺 \$22.70 的隱含價格是增加一平方英尺的邊際價值，而不是地塊的總價值。一塊 9,000 平方英尺的地塊對組合價格的總貢獻為 $9,000 \times \$22.70 = \$204,300$ ，但再增加一平方英尺只使組合價格提高 \$22.70。

這一區分——邊際與總量——是日常估價語言中大量混淆的根源，也是明確命名隱含價格所帶來的最重要的概念收穫之一。

參考文獻。

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

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

- Freeman, A. M., III (1979). Hedonic Prices, Property Values and Measuring Environmental Benefits: A Survey of the Issues. *Scandinavian Journal of Economics*, 81(2), 154–173.
- Taylor, L. O. (2003). The Hedonic Method. In *A Primer on Nonmarket Valuation* (pp. 331–393). Kluwer Academic Publishers.
- Palmquist, R. B. (2005). Property Value Models. In *Handbook of Environmental Economics* (Vol. 2, pp. 763–819). North-Holland.
- Triplett, J. E. (2006). *Handbook on Hedonic Indexes and Quality Adjustments in Price Indexes*. OECD Publishing.

交叉引用：異質商品 (*heterogeneous good*)；特徵空間 (*characteristics space*)；特徵價格函數 (*hedonic price function*)；特徵價格迴歸 (*hedonic regression*)。

附錄：Prolog 形式化

以下機器可讀的隨附檔案 (004-implicit-price.pl) 在本刊的 Prolog 知識庫中對本條目進行了形式化。該檔案同時作為可瀏覽的 Prolog 版本隨本文一併發布。

```
%% 004-implicit-price.pl
%%
%% Prolog companion to Foundations Vol. 1, Issue 1, Article 004
%% Title: Implicit Price
%% Author: Bert Craytor
%% Concept: implicit_price
%% Version: 0.1.0-draft

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

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

% --- From the dictionary (loaded via :- use_module above) -----
% 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, ...).
% term(paired_sales_analysis, ...).
% term(adjustment, ...).
%
% formalized_by(implicit_price, rosen_1974).
% depends_on(implicit_price, hedonic_price_function).
% -----

:- use_terms([ implicit_price, hedonic_price_function, characteristics_space,
               heterogeneous_good, hedonic_regression,
               sales_comparison_approach, paired_sales_analysis, adjustment,
               comp_selection ]).
:- use_relations([related/2, depends_on/2, formalized_by/2]).
```

```

% Provenance: the term originates with Rosen (1974).
formalized_by(implicit_price, rosen_1974).

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

article_concept(implicit_price).
article_issue(volume(1), number(1), year(2026)).
article_id('foundations.2026.004').

% =====
% LOCAL VOCABULARY
% =====

local_term(partial_derivative).
local_term(marginal).
local_term(total).
local_term(locality).
local_term(conditionality).
local_term(market_dependence).

% =====
% IMPLICIT PRICE AS PARTIAL DERIVATIVE
% =====
%
%  $\pi_i(z) = \partial p(z) / \partial z_i$ 

implicit_price_definition(
    "Implicit price of characteristic i at point z = partial derivative of p with
    ↳ respect to z_i, evaluated at z.").

unit_of_implicit_price(continuous, "dollars per unit of the characteristic").
unit_of_implicit_price(binary, "the full premium between the two states").

% =====
% THREE PROPERTIES OF IMPLICIT PRICES (per the article)
% =====

property_of_implicit_prices(local,
    "The implicit price of GLA at 1,650 sf is not necessarily the same as at 2,500 sf.
    ↳ p is generally nonlinear; partial derivatives vary with location.").
property_of_implicit_prices(conditional,
    "Implicit price depends on where the OTHER characteristics are held fixed. View
    ↳ premium on a beachfront submarket differs from inland.").
property_of_implicit_prices(market_dependent,
    "Implicit prices are equilibrium prices reflecting the current buyer pool. Market
    ↳ shifts change implicit prices even when characteristics do not.").

% =====
% IMPLICIT-PRICE / ADJUSTMENT EQUIVALENCE
% =====
%
% Every adjustment in a sales-comparison grid can be READ as asserting an
% implicit price applied to a characteristic difference. This is an
% interpretation of what the adjustment asserts, not a description of how
% traditional adjustments are derived in practice.

adjustment_as_implicit_price_application(

```

```

    "Interpretation: adjustment magnitude = (implicit price of attribute at relevant
    ↳ point) * (characteristic difference between comp and subject) --- what the
    ↳ adjustment asserts, not how it is derived.")).

adjustment_derivation_in_practice(
    "Traditional adjustments are estimated directly --- from matched pairs, experience
    ↳ , or peer practice --- without computing the underlying value contributions; the
    ↳ traditional grid records only the adjustments themselves.")).

% =====
% LINEAR-FORM IMPLICIT PRICES (from entry 003's adopted specification)
% =====
%
% Under the additive linear specification, implicit prices ARE the
% regression coefficients. The article reproduces them:

:- consult('../..//kb/pacifica_comps').

% Implicit price per characteristic, as inherited from the additive
% form of p adopted in entry 003.
implicit_price_of(gla_sqft, 575.00, "per square foot").
implicit_price_of(lot_sqft, 22.70, "per square foot").
implicit_price_of(view, 86179.03, "per yes/no").
implicit_price_of(cond, 49824.33, "per step on the ordinal scale").

% =====
% PAIRED-SALES DECOMPOSITION: COMP A vs COMP B
% =====
%
% Returns to the article-001 paired comparison and decomposes it using
% implicit prices.
%
% Comp A and Comp B share GLA, bedrooms, baths, condition.
% They differ in: view (+1) and lot_sqft (+1800).
% Predicted differential = 86179 + 40860 = 127039.
% Observed differential = 145000.
% Unexplained = 17961 (~$18,000).

paired_sales_decomposition(comp_a, comp_b,
    [ contribution(view, 86179),
      contribution(lot_sqft, 40860) ],
    127039,
    145000,
    17961).

% Derived from the data + coefficients (for the linter to type-check
% against the dataset rather than the hand-computed values).
contribution_for_pair(A, B, Attr, Contribution) :-
    coord(A, Attr, VA),
    coord(B, Attr, VB),
    Diff is VA - VB,
    Diff == 0,
    implicit_price_of(Attr, Pi, _),
    Contribution is Diff * Pi.

% Tiny coord helper for symbolic view/cond values.
coord(P, A, N) :-
    attribute_value(P, A, V),
    ( number(V) -> N = V

```

```

; A == view, V == yes -> N = 1
; A == view, V == no  -> N = 0
; V = N
).

% =====
% MARGINAL vs TOTAL CONTRIBUTION
% =====
%
% The article emphasizes the distinction. The implicit price of lot is
% $22.70 per square foot (marginal); the TOTAL contribution of Comp A's
% 9,000-sf lot is 9,000 * 22.70 = $204,300.

distinction(marginal_vs_total,
    "Implicit price is MARGINAL ($22.70 per additional sqft of lot). Total
    ↳ contribution of a 9,000-sf lot is 9,000 * $22.70 = $204,300. Confusing them is a
    ↳ common source of error in everyday appraisal language.>").

%! total_contribution(?Property, ?Attribute, -Total) is det.
%
% Total dollar contribution of a characteristic to a property's bundle
% price under the linear specification.

total_contribution(P, A, Total) :-
    coord(P, A, V),
    implicit_price_of(A, Pi, _),
    Total is V * Pi.

% =====
% DEFENSIBILITY QUESTIONS RAISED
% =====

defensibility_question(location_in_space,
    "An implicit price is defensible only when estimated near the subject's location
    ↳ in characteristics space; a view premium from inland comps applied to a beachfront
    ↳ subject extrapolates into unknown territory.>").
defensibility_question(local_geometry,
    "If view interacts with lot size, treating them as additively separable
    ↳ misspecifies the function. The implicit price of view depends on lot.>").
defensibility_question(epistemic_provenance,
    "Paired-sales analysis, regression coefficient, industry rule, and professional
    ↳ judgment all point to the same quantity but have different epistemic standing.
    ↳ Defensibility requires declaring the source.>").

% =====
% CROSS-REFERENCES
% =====

cross_reference(heterogeneous_good).
cross_reference(characteristics_space).
cross_reference(hedonic_price_function).
cross_reference(hedonic_regression).

```