

# Hedonic Housing Model

## Lecture 20

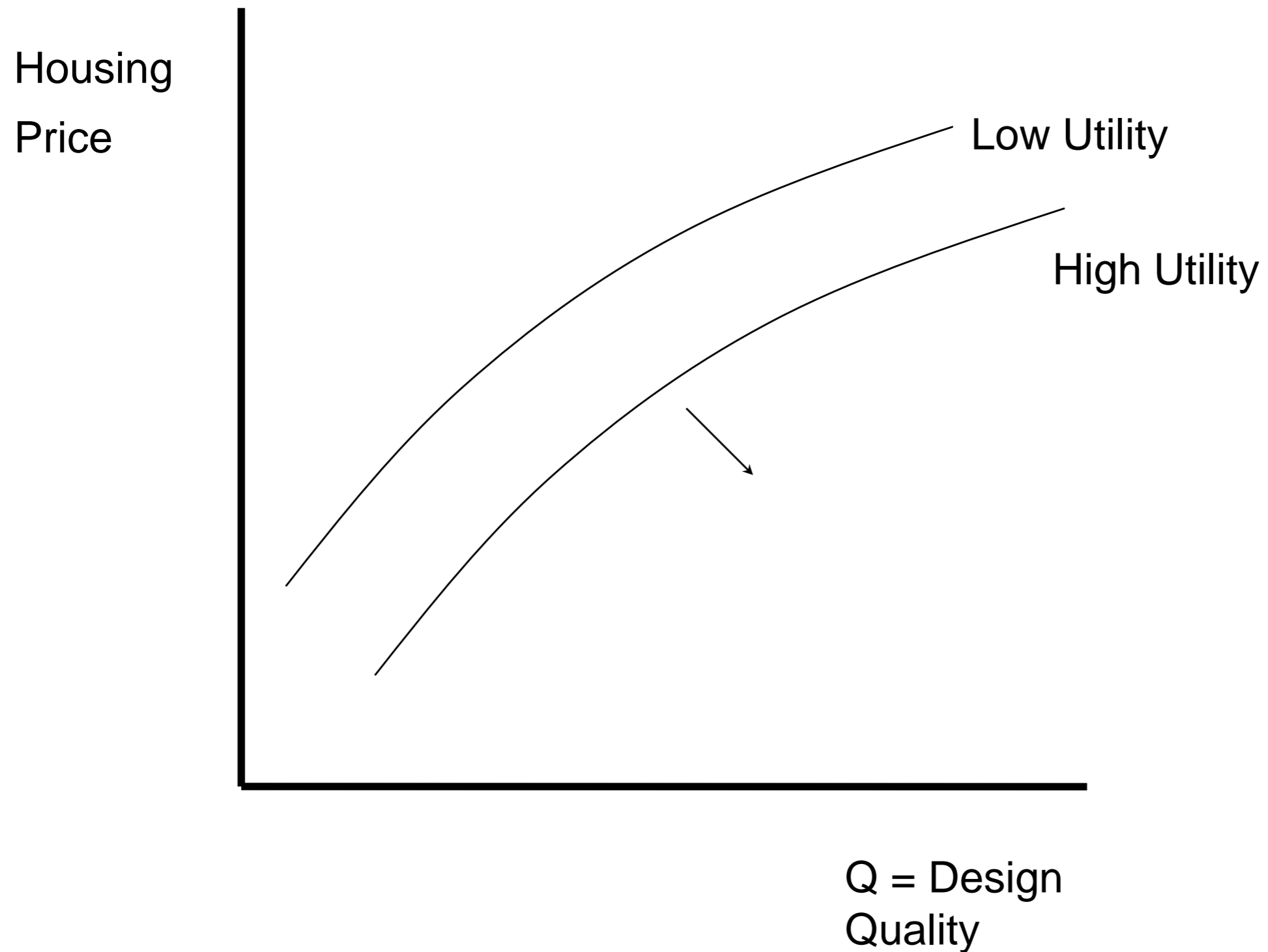
J. M. Pogodzinski

# Chapter 10

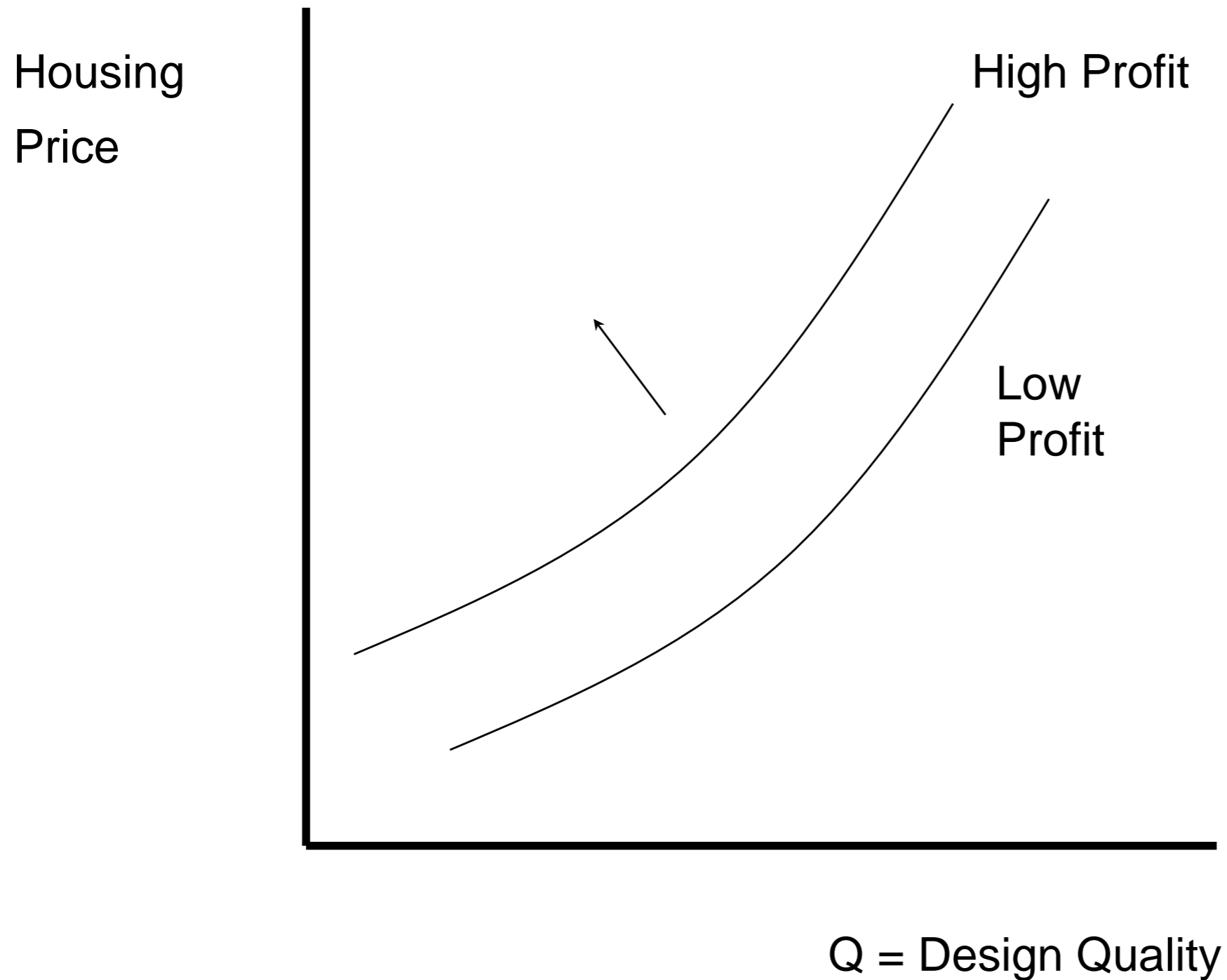
## The Hedonic Housing Model

- Implicit price of multi-faceted good
  - Housing, wages, cars
  - Price is a function of multiple characteristics:
    - $P_H(h_1, h_2, \dots, h_n)$
  - Marginal Price is simply the partial derivative:
    - $P_j = \partial P_H(h_1, h_2, \dots, h_n) / \partial h_j$
- Consumers get utility from numeraire good and various housing characteristics
  - Utility function:  $U(G, H(h_1, h_2, \dots, h_n))$
  - Budget constraint:  $W = G + P_H(h_1, h_2, \dots, h_n)$
- Producers vary mix of housing characteristics

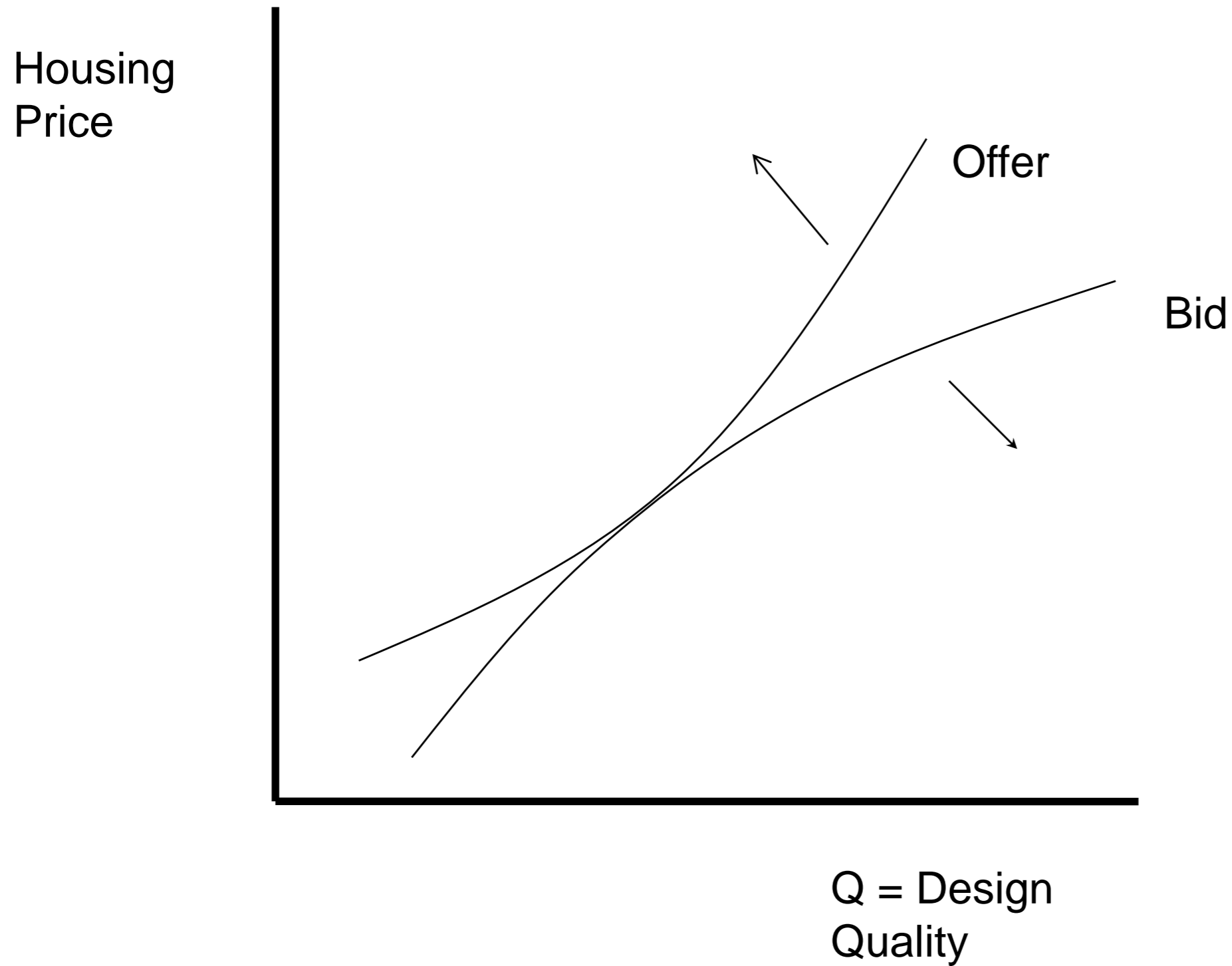
# Household Bid Curves



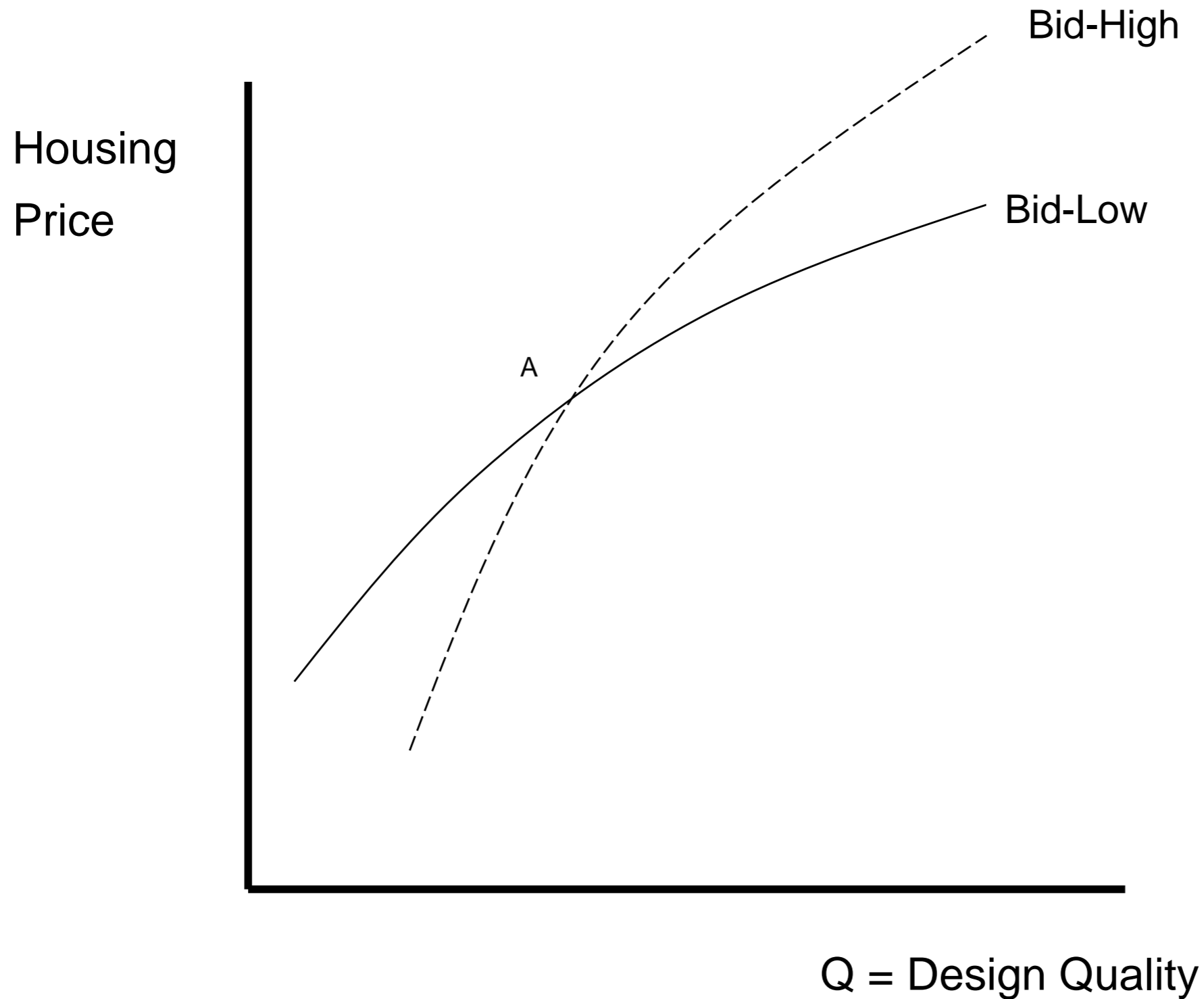
# Producer Offer Curves



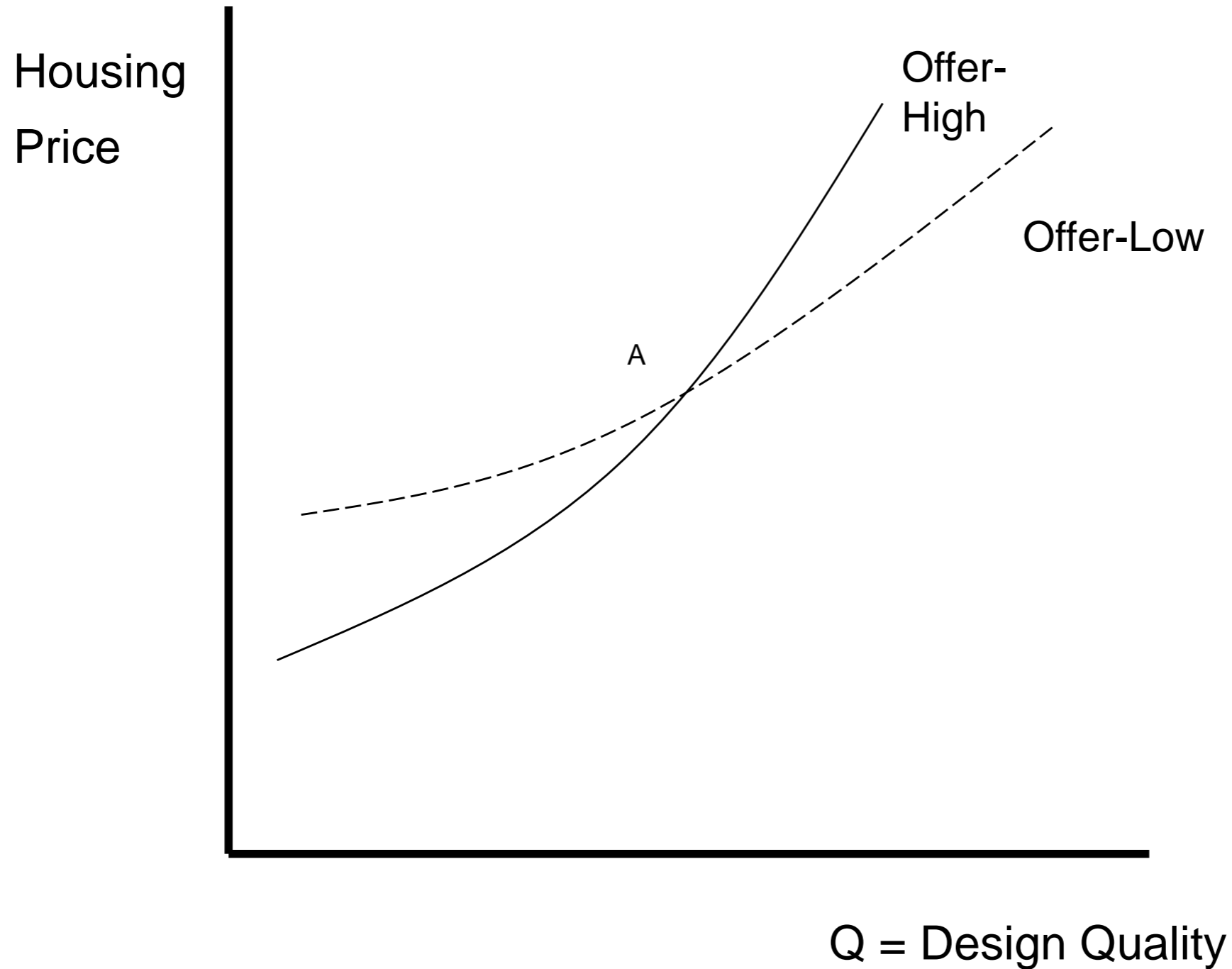
# Hedonic Equilibrium



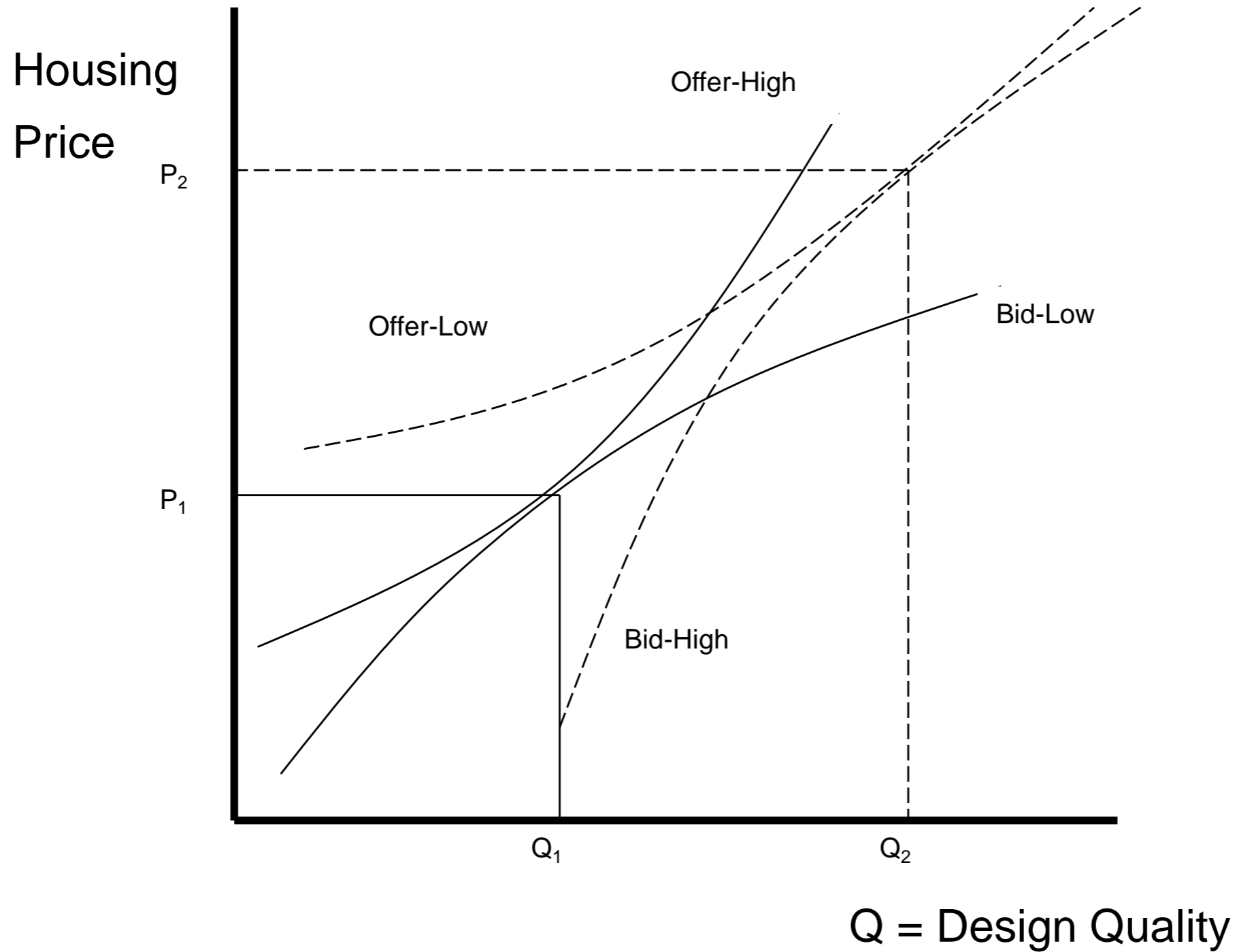
# Heterogeneous Consumers: High versus Low Demand



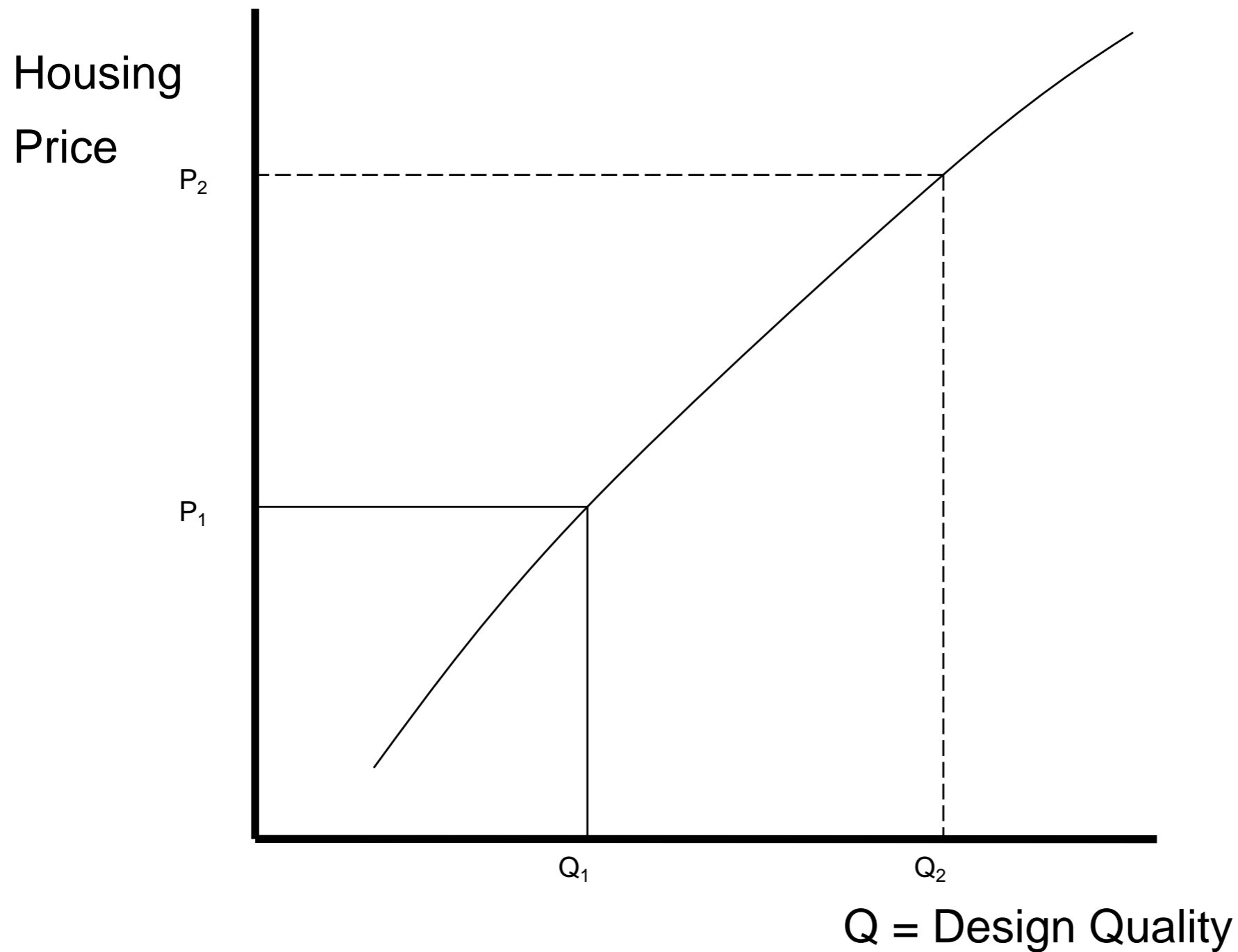
# Heterogeneous Producers: High versus Low Cost



# Hedonic Equilibrium



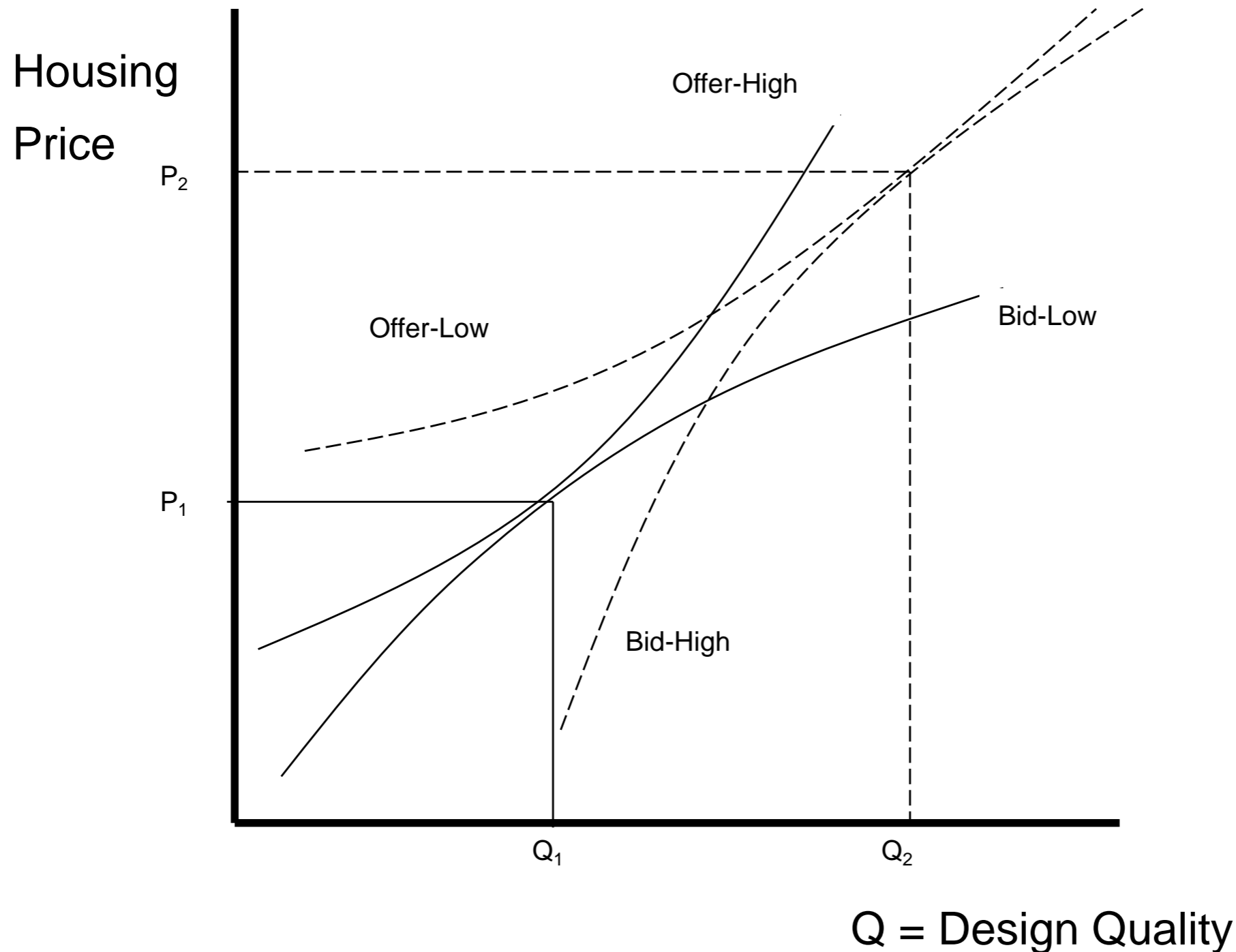
# Hedonic Price Function – Set of Tangencies for Multiple Consumers & Producers



# Implications of the Model

- $P = P_H(h_1, h_2, \dots, h_n)$  “Hedonic Price Function”
- $P_j = \partial P_H(h_1, h_2, \dots, h_n) / \partial h_j$  Marginal price of good of good j
- Marginal Price = Marginal willingness to pay by consumer
- Marginal Price = Marginal cost to producer
- Matching of high-demand consumers to low-cost firms

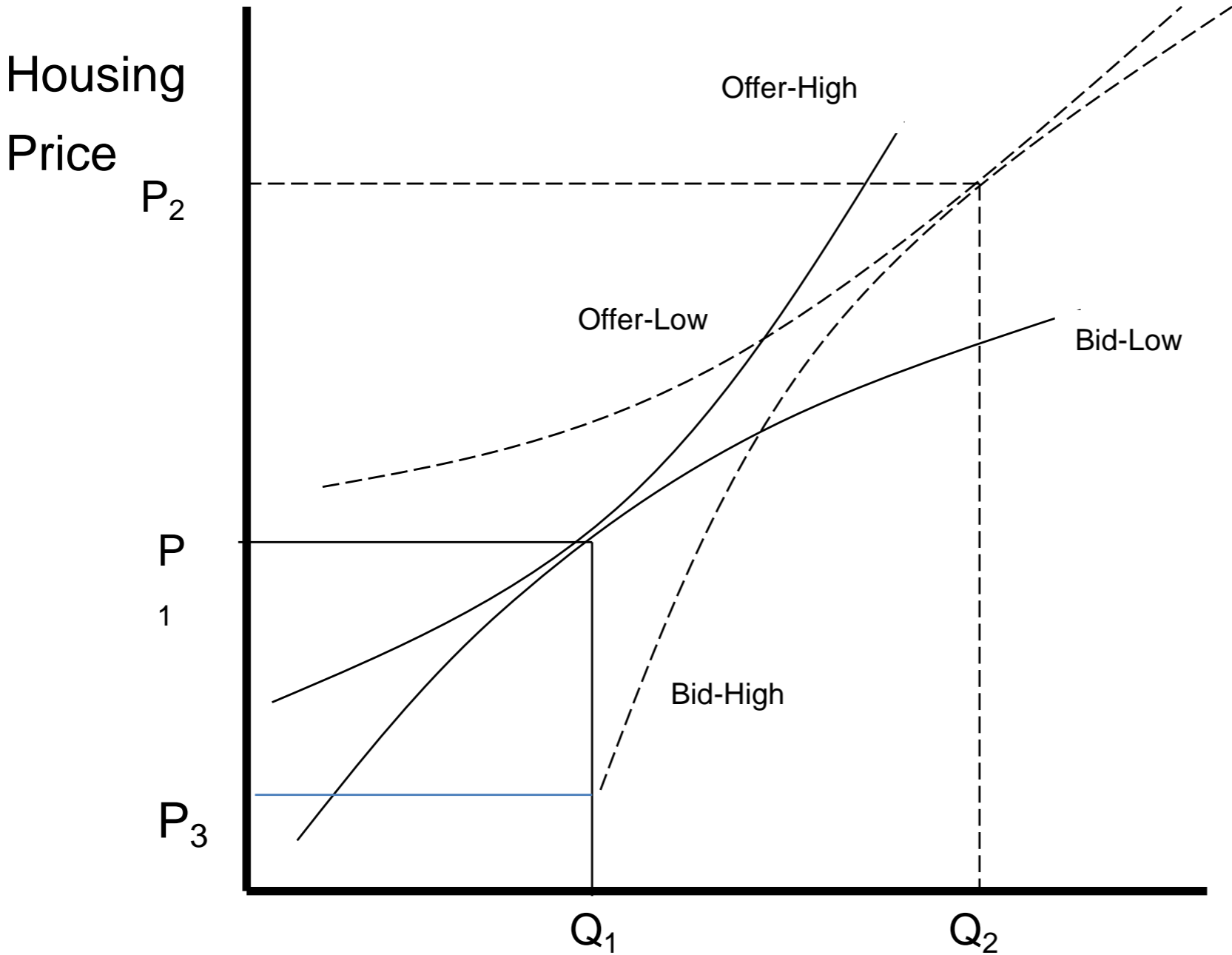
# Marginal Willingness to Pay for an Increase from $Q_1$ to $Q_2$



Hedonic price function implies that “consumers” will pay  $P_1$  for  $Q_1$  units and  $P_2$  for  $Q_2$  units.

Is  $P_2 - P_1$  a measure of the benefit of increasing  $Q$  from  $Q_1$  to  $Q_2$ ? **NO!**

# Marginal Willingness to Pay by High-Demand Consumer



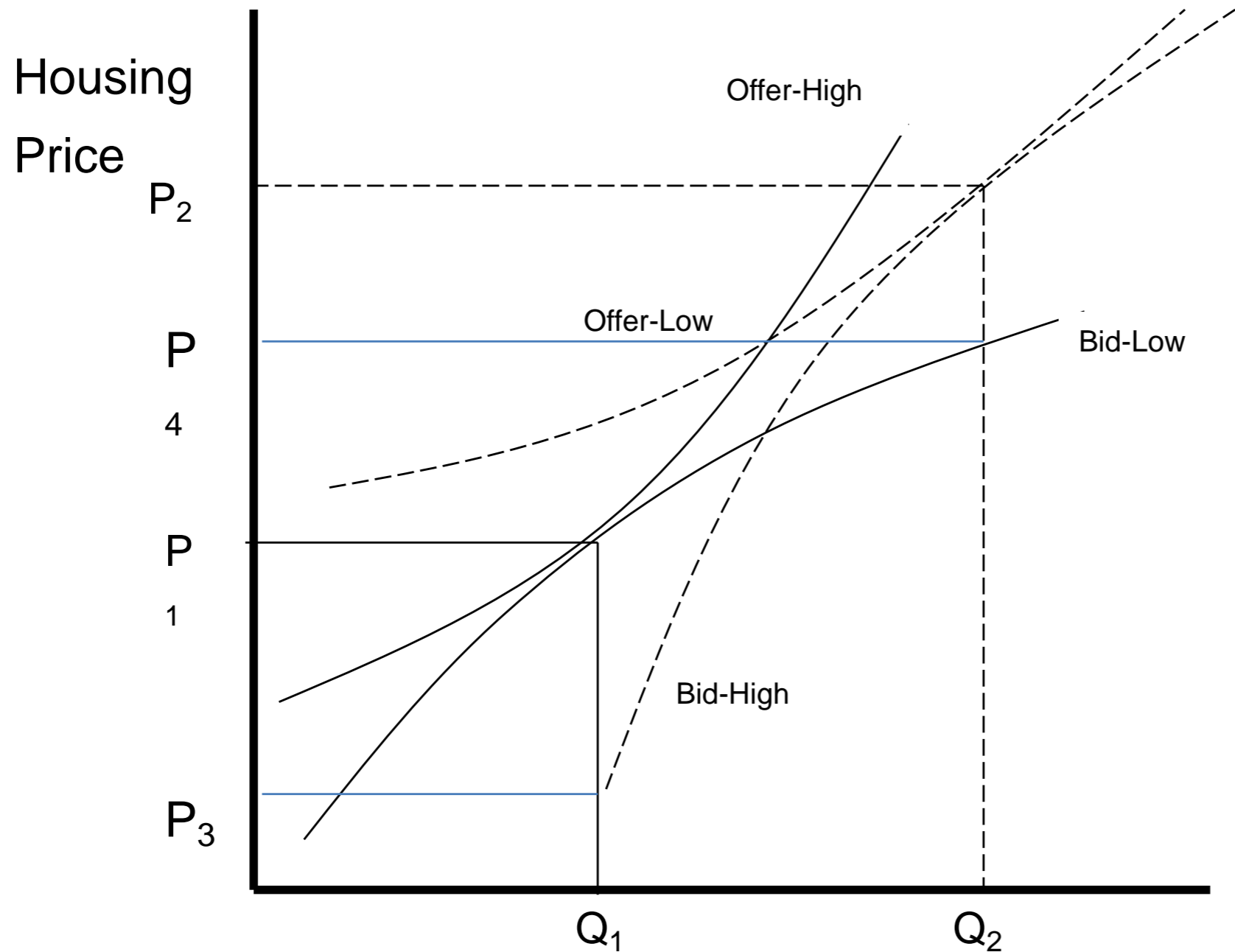
High-demand consumer's marginal willingness to pay for Q<sub>2</sub> units is P<sub>2</sub>.

High-demand's MWP for Q<sub>1</sub> units is NOT P<sub>1</sub>, it is P<sub>3</sub>.

Marginal benefit of increase from Q<sub>1</sub> to Q<sub>2</sub> is P<sub>2</sub> - P<sub>3</sub>, which is much greater than P<sub>2</sub> - P<sub>1</sub>.

Q = Design Quality

# Marginal Willingness to Pay by Low-Demand Consumer



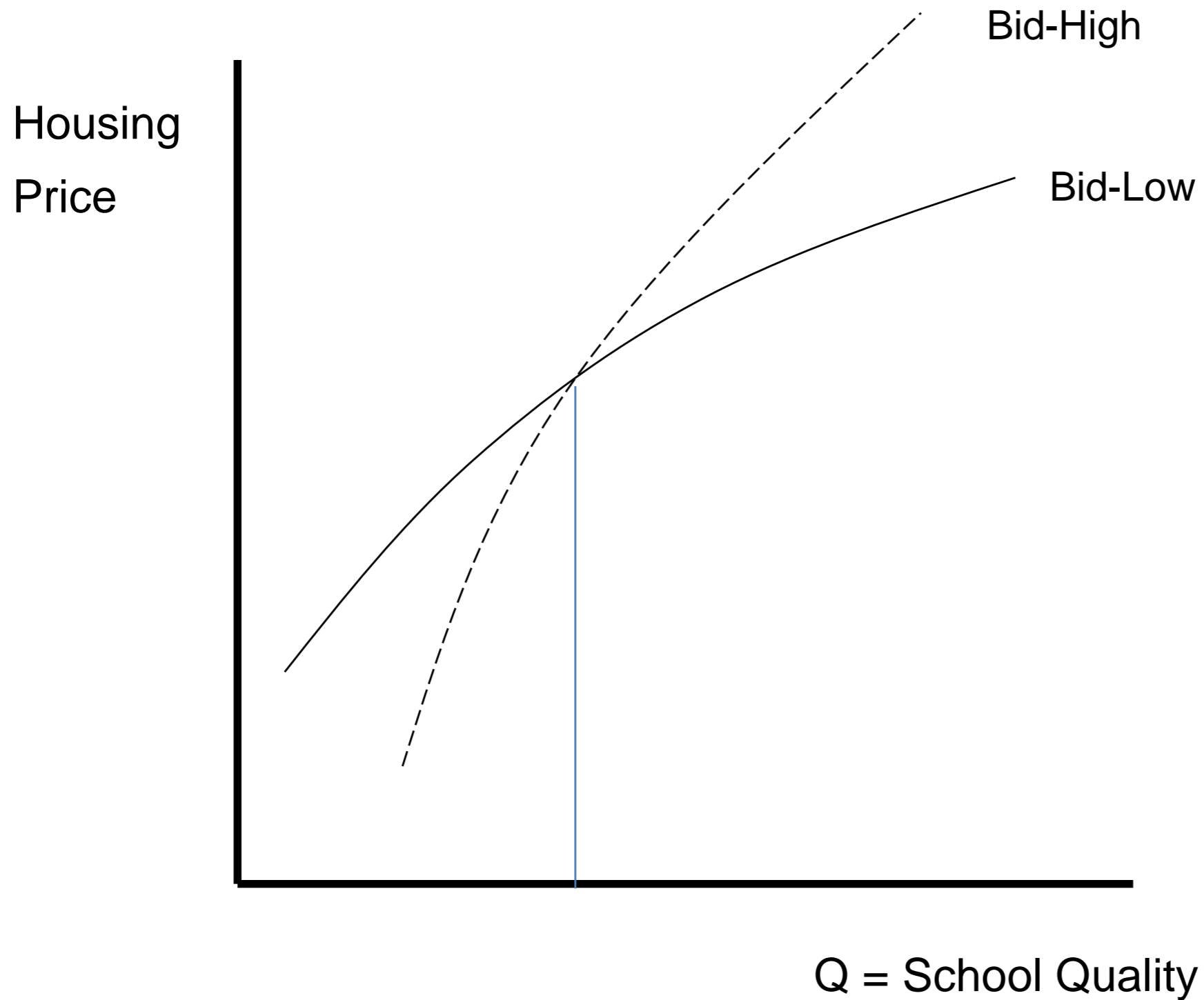
Low-demand consumer's marginal willingness to pay for  $Q_1$  units is  $P_1$ .

Low-demand's MWP for  $Q_2$  units is NOT  $P_2$ , it is  $P_4$ .

Marginal benefit of increase from  $Q_1$  to  $Q_2$  is  $P_4 - P_1$ , which is much less than  $P_2 - P_1$ .

Q = Design Quality

# Exogenous Supply – Higher Bid Wins



# Exogenous Supply and Multiple Household Types – Hedonic Price Function is the Upper Envelope of Individual Curves

