



# When Supply and Demand Meet: Structural Models of Pricing

## Background

- Reduced-form models represent only one side of the market, usually the demand. They are made of a single equation where only one variable can be estimated, the others being set as fixed. For instance, demand functions typically produce estimates of sales volumes (or market share) for a given price.
- Structural models provide a full modeling of the market where supply and demand are estimated simultaneously via a system of equations.
- Structural models make a full use of microeconomics: firm theory, consumer theory, market structure and industrial organization.

## Pros

- The full modeling of the market implies fewer assumptions than with a reduced-form model and leads to more accurate results.
- Structural models are well suited when interactions between agents on the market are complex, especially on the supply side (strongly competitive markets with frequent changes in price).
- Like the reduced form ones, structural models can (and should) be updated on a regular basis in order to provide accurate parameters.

## How It Works

- On the demand side, consumers maximize their utility (satisfaction) under a budget constraint. The resulting demand function is estimated using POS or market data. The outcome of this exercise is an optimal quantity demanded based on market price.
- On the supply side, the firm maximizes its profits, also under a budget constraint. Data on the firm's production costs are required here.
- The two equations are estimated simultaneously (system of equations) and provide optimal price and quantity.

## Cons

- Structural models require more data than reduced-form ones. There is trade-off between the increased accuracy of parameters and the extra cost of collecting market data for the supply side.
- Knowing exactly the actual structure of competition on the market can be challenging. Results can be completely different from one type of competition to the other and can then be misleading if the "wrong" type is assumed.

**Reference:** Chan, T., V. Kadiyali and P. Xiao (2009): "Structural Models of Pricing", in "Handbook of Pricing Research in Marketing", eds. V.R. Rao, Edward Elgar Publishing.