U.S. Hedonic Model Development - Lessons Learned

Bonnie Murphy
Chief, Branch of Industry Pricing
Producer Price Index
US Bureau of Labor Statistics
26th Voorburg Group meeting
Newport, South Wales
26 September 2011
U.S. Retail Trade Hedonic Model Development - History

Model attempted for Grocery stores
- industry contained diverse product types
- model was not feasible due to widely differing margin percentages

Beer, Wine and Liquor stores
- industry contains homogeneity of margin percentages
- successful model implemented in 2004
Store Characteristics Collected

- Liquor type (wine, beer, etc.)
- Nearest Competition
- # of checkouts
- # of full time equivalent employees
- # of skus
- Domestic/import
- Scanners
- Store selling area
- Store area
- Store hours (24 hours, open Sunday, open Saturday, etc.)
- Type of liquor store (freestanding, strip mall, etc.)
- Years since renovation
- Lottery tickets
Implementation

- The model uses independent variables that were based on store and item characteristics to explain the variation in price movements in the dependent variable, margin percentage.
- Survey units contacted annually to update store characteristics.
- Regression run on updated dataset (many types of models have been used over time – linear, log-log, log-linear).
- Base price adjustments are made for changes in variables found to be significant. Typically:
  - number of full-time equivalent employees
  - number of stock keeping units (SKUs)
  - number of checkouts
  - number of years since last renovation
  - number of hours open per week
  - use of scanners
Lessons Learned

- Survey respondents report price changes store characteristic updates were too burdensome.

- Annual phone contact to update characteristics is resource and time intensive – requires entire 4 month correction cycle to update the dataset and adjust base prices.

- Implementation of the hedonic model causes almost no change in published indexes.

- Therefore, the U.S. has not pursued hedonic models in other retail industries.
Contact Information

David Friedman & Bonnie Murphy
Producer Price Index Program
Friedman.David@bls.gov
Murphy.Bonnie@bls.gov