

# Panel on Hedonic Price Indexes

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# Difference in Emphasis – Long-run History vs. Short-run Index Number Construction

- In historical research
  - Data doesn't have to be contemporaneous, it doesn't matter how long it takes to arrive
  - We keep revising history when new data arrive
  - Emphasis on yearly or even decade-by-decade changes, not monthly
- Over long time periods, cumulative changes in both quality and price can be large

# How can we check price indexes for plausibility?

- Over decades, price indexes and implied quality indexes can drift away from plausibility
- But for *some* products (not all), can compare “closely similar models” across decades
- Catalog photos and specifications, *Consumer Reports*
  - Doesn't help with computers
- Vancouver evokes thoughts
  - Wimpy Vancouver Chevy taxi vs. the 1949 Buick Roadmaster. CPI implies 3x quality
  - Vancouver at sunset, classic 1955 Chevrolet convertible

# Why Doesn't Every Study Exhibit Quality and Price Indexes Side-by-Side?

- Every hedonic study has the raw material for a quality index
- $\text{Quality} = \text{raw price} \div \text{hedonic price index}$
- Quality index can be checked for plausibility (apparel study, memo for rental shelter study)

# Another Neglected Theme

- For some products operating costs are large relative to initial capital cost
- Fuel economy and energy efficiency can shift but need to be valued separately (different fuel price regimes)
  - Autos
  - Refrigerators
  - Air conditioners

# Stark Differences between Products

- For mainframe computers and PCs, quality change is so rapid that small differences in measurement methodology don't matter
- For apparel, price changes are so big over decades and quality change is so small that we can get away with no quality adjustments at all
- Many products are in between, no alternative but to do the hard work and get as much data as possible

# The Hedonic Literature is Dominated by Durable Goods

- Durable Goods: Continual Arrival of New Products, Quality Improvements in Old Products
- But much of the market basket consists of nondurables, services.
  - Lawnmowing services, two inventions in the last two centuries (better fertilizers and weed killers?)
  - Barber shops, just one invention in two centuries?
- Court, Griliches on autos
  - Auto issues dominated the hedonic literature in the 1960s, 1970s

# In the 1960s Zvi and Jack Triplett wrestled with the core issues about autos

- Early recognition of hedonic limitations
  - Physical characteristics vs. performance
  - We wanted speed, power, comfort, fuel economy
  - What we had was weight, length, horsepower
- General issue: shifting ratio of utility-enhancing performance attributes to physical attributes



# The “Luxury Model” Problem

- Coefficient on weight overstated
- Reflected “prestige” attribute, 10% extra weight might add 30% to price
- Overstated coefficient on weight
- The upward biased coefficient on weight caused quality change to be overstated, price change

# Solution for Luxury Models?

- Make Effects
- Zvi first pointed out compact car bias in mixed samples (1959, 1960)
- Simple solution, restrict sample to same makes
- Griliches-Ohta (1976) – extensive attention to make-effect dummies
- This has been picked up in studies of TV and PCs. The “Sony” effect

# Left-out Variables, Zvi had nailed this issue intuitively

- Biggest example, very important after 1973: fuel economy
- Fuel economy negatively correlated with weight
- Couldn't estimate its own coefficient
- Solution: Wilcox, separate regression explaining FE as a function of weight, time, and other characteristics
  - We can actually do a pretty good job of comparing the 1949 Buick Roadmaster with the wimpy Vancouver Chevy taxis
  - Value the fuel economy, value the air bags

# Reasons hedonics were necessary but not sufficient

- Had to add auxiliary regression for fuel economy
- Weight-saving innovations, downsizing
- Triplett concluded much later: autos “too complicated” for hedonic studies
- Difficulty of estimating plausible coefficients on accessories, e.g., air conditioning
- No alternative to going beyond simple hedonic regressions

# Examples where hedonics work well and badly

- Autos – too complex
- Commercial aircraft, not enough models
  - Net revenue criterion
- Computers, ideal but becoming more complex
  - OK, speed and memory
  - Size, clarity of screen. CDs vs. floppies, ethernet vs. phone cord (my delightful experience in Vancouver)
- Complementarities (web/PC, I-state/auto)

# The Biggest CPI Component of all: Rental Shelter

- Good data getting better: 1975-2003 American housing survey
- Huge sample, lots of quality characteristics
- Controls for quality and non-quality characteristics
  - Quality: sq feet, # of rooms, AC
  - Non-quality: regional location, implied land rent

# The Hard Part: 1914-1975

- 1975-2003 Hedonics provides coefficients to evaluate earlier changes in quality (sq ft, # of rooms, # of bathrooms)
- Comparisons over decades
- How did we get from there to here?
  - Start with no indoor plumbing, no central heating. How much could that have been worth?

# Conclusions

- #1 Hedonics necessary but not sufficient
- #2 Everyone should be producing quality indexes, not just price indexes
- #3 Every historical study should have an obligation to check the implicit quality index for plausibility
- #4 Huge differences across products
  - In ratio of price change to quality change
  - In the adequacy of hedonics and beyond-hedonic adjustments, e.g., fuel economy and energy efficiency