Comment on: "Quality Adjustment at Scale: Hedonic vs. Exact Demand-Based Price Indices" by Ehrlich, Haltiwanger, ...

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The Paper's Goal.

This is an important and timely paper on improving the CPI. In particular it argues that

"Use of item-level transactions data with price, quantity, and attribute information enables the production of quality-adjustment price indices at scale".

- Paper considers two methods for making these improvements.
  - A hedonic based method with the adjustments suggested by Erickson and Pakes (2011).
  - A demand function based index with the parameterization and adjustments suggested by Redding and Weinstein (2020).

The Theory Underlying the Adjustments.

- The theoretical basis for the two adjustments are different.
  - The hedonic adjustment requires the assumption that the utility derived from a good can be adequately approximated by its characteristics, one of which is "unobservable" (to account for the characteristics not conditioned on).
  - The demand function adjustment requires the assumption that a CES "representative agent" utility function adequately approximates the sum (or mean) of the utilities of the agents in society.

- Under their respective assumptions they approximate different objects. Either
  - an upper bound to the ideal index (hedonics), or
  - an exact measure of the ideal index (demand-based).

A Comment on Usefulness.

• Keep in mind that the current CPI uses different techniques to construct different component indices. So to be useful these techniques do not need to be applicable to all component indices.

• For components where the data needed is available and not too costly, these techniques should

- enable the BLS to incorporate the increasingly important set of transactions from internet based sales quite easily, and
- enable instantaneous turnaround between the time the data is received and the time the component index is available,
- as well as make some adjustment for quality change.

• I now turn to a discussion of the pros and cons on both indices. Not unexpectedly, I am partial to the hedonic index (as is the paper). But there are issues with both indices, as there are with the computational techniques currently in use (though I will not discuss the latter).

Conceptual problems with the CES approach.

• Assuming a representative agent. The utility function is a non-linear function of the quantities consumed, and demand analysis indicates differences in household attributes generate markedly different preferences for different goods (that do not generate an aggregate with a CES structure).

• The CES assumes symmetry: any two goods are equally substitutable for each other. This is incorrect, and forming nests does solve the problem (the partition into nests is arbitrary, and can not deal with price endogeneity). I suspect it also underlies many of the empirical problems the authors cite in obtaining their demand based indices (e.g. incorporating goods with small shares as the model says they have high marginal utility and related issues with entry and exit,...).

Problems With The Hedonic Approach.

• Obtaining data sources that can be accessed in a timely fashion, and have reasonably rich enough product characteristic (though here the use of the unobserved characteristic helps a lot) and is not too costly. The ability to do so is likely to vary across components.

• Note however, that my paper with Tim Erickson uses BLS data, so a less comprehensive data source for doing this is currently available for several component indices, and not being used.

• To use other data sources to compute more detailed hedonic indices, will require both start up costs and a retraining (perhaps a rehiring) of BLS employees.

• The hedonic only produces an upper bound to the required price change, and gives no way of assessing how tight that bound is. However the upper bound tends to be lower than the alternative "exact" indices; so this does not seem to be a real constraint.

Questions and Practical Problems.

• Question (CES). You conclude that the demand based adjustment "assumes a national market for each CES-based nest of goods". I am guessing this is because they are implicitly requiring a law of one price, is that correct?

• They show that for the demand based indices to produce realistic estimates they require adjustments which; (i) are not rationalized by the theory, (ii) vary across component indices, and (iii) could vary over time. This makes it hard to defend the index and easy for an interested party (like the AARP) to complain about particular adjustments.

• Question: (Hedonics) In equation (3) all coefficients are allowed to vary over time but the coefficient of the lagged unobservable. Is their a reason for this, and did you try letting the coefficient of the unobservable to vary?

Continue questions and issues.

• Hedonics and the new goods problems. Traditional hedonic indices follow goods prices after they are introduced. There is no gain registered for the infra-marginal purchasers; that is people who value the new good more than the highest price observed.

• Question: You seem to be predicting the new goods' price prior to entry and then constructing a "price relative" by comparing that predicted value to the entry value. This may move us in the right direction, but could be problematic.

- Transformational new goods tend to have characteristics which are outside the range of the characteristics of goods marketed in prior periods. So the hedonic prediction evaluation of these goods needs to project values outside the range of the data.
- You have to predict (or "backcast") what the value of the unobserved characteristic was in the period prior to its entry year. Did you do that and does it look sensible.

A General Issue.

• We are currently not set up to produce separate indices for different sectors of the population. The CPI is used to inflation adjust many different entities that effect different population groups. Take their use in price adjusting entitlement programs. The social security adjustment only effect the elderly. The adjustments to the poverty line that determines eligibility for and magnitude for programs to alleviate poverty only effects the poor.

• Of course different types of goods (and locations of sale) have prices that rise at different rates, and different population groups differ in their expenditure shares across goods.

• More detailed research on how to match demographic and income groups to purchase patterns (both of goods per se, and where they are bought) is needed. Data that matches individual attributes to products purchased and locations of sale is often available from Marketing and Advertising companies.