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Comment Marshall Reinsdorf

Overview of the Chapter's Results

This chapter uses transactions data collected from the households in the ACNielsen Fresh Foods Homescan Panel to obtain very interesting new

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estimates of outlet substitution bias for twenty food items. These data permit direct estimation of the average price paid for an item by the households in a market area, such as Atlanta or Baltimore-Washington. The data include "random weight" items, which, despite their importance, are often omitted from scanner data sets because they lack bar codes.

The authors estimate the effect of the market share of supercenters, mass merchandisers, and club stores (SMC) on the average price paid by the households in an area. They include dummy variables to control for area-specific or time-specific fixed effects, and they use two-stage least squares to avoid any bias from a possible covariance between the regression error term and the SMC market share. The coefficient on SMC share is negative in every case, though only seven of the twenty items have statistically significant coefficients. The authors also estimate the effect of the SMC share on the average price paid in supermarkets, because evidence suggests that incumbent supermarkets tend to reduce their prices when SMCs enter or gain market share. For most items the regression coefficient is again negative, but smaller in magnitude than in the first set of regressions. Thus, the total negative effect of SMCs on overall average price paid seems to have a direct component reflecting outlet substitution and an indirect component reflecting price responses of supermarkets to competition from SMCs. The BLS indexes presumably capture the indirect effect, but miss the direct effect.

Next, the authors calculate four kinds of price index for each food product. The first uses contemporaneous weights and tracks the average price paid, which is equivalent to a unit value price. The second holds expenditure weights for outlets constant at their initial values. The third links in new outlet weights annually, and the fourth links in new outlet weights biannually.

Over the four years in the sample, the constant weight index rises an average of 0.32 percent per year faster than the preferred average-price-paid index. However, the description of the index construction procedure suggests that the authors have confused expenditure weights with quantity weights; if so, outlets with high prices received too much weight.[1] Presuming—as is commonly the case—that initially low prices tended to rise more than average, the effect of the confusion would have been to depress the constant-weight index, possibly causing an understatement of the difference between a constant basket index and an average-price-paid index.

Surprisingly, the authors also find that linking in updated outlet weights annually or biannually tends to make the indexes rise faster than they do with constant weights. They do not offer a detailed explanation of this finding, but I can suggest a plausible explanation. The theoretical result that chaining reduces a constant-weight index's upward substitution bias depends on an assumption that markets adjust immediately to their complete information

1. When averaging prices arithmetically, the weights should be proportional to quantities; weights proportional to current-period expenditures or to adjusted base-period expenditures can be used in a *harmonic* average of prices to obtain a unit-value, or its constant-basket average price.

equilibrium. The markets investigated in this chapter are, however, likely to be characterized by delayed responses. Supermarkets' losses of market share following the entry of SMCs occur gradually as information diffuses and consumers adjust their shopping patterns, and the supermarkets may make defensive price cuts in response to the losses of market share with an additional lag. If supermarket prices start to rise more slowly than SMC prices after the supermarkets have lost market share, linking in updated outlet weights will reduce the growth rate of the index.

Some Caveats

Two effects that could make the chapter's estimates of outlet substitution bias too high have been hypothesized. A comment by Mick Silver suggests that the Homescan sample contains unusually price-sensitive consumers, and that the respondents who stay in the sample for all four years are more price-sensitive than average. In response, the authors show that the proportion of respondents who shop at SMCs is not lower in portions of the sample that are lost to early attrition. This suggests that nonrandom attrition does not cause an overstatement of the propensity to substitute lower SMC prices, contrary to Silver's hypothesis. On the other hand, no direct evidence is available on whether the process of initial selection into the Homescan sample favors those who are most price-sensitive. However, the continued purchases of Homescan data by commercial customers who can check them against store sales data shows that any such sample selection bias is not so severe as to undermine their usefulness. Moreover, store-level confirm the general finding that SMCs have made significant gains at the expense of supermarkets.

Second, consumers who shop at SMCs may be giving up some valuable elements of quality in exchange for lower prices. The SMC stores often offer less convenient locations than traditional supermarkets and a more limited selection of varieties and goods, and SMCs do not have the kind of upscale ambience that some supermarkets achieve by offering attractive displays of fresh produce and seafood and elaborate deli counters. Finally, the need to pay a membership fee to shop at a club store offsets some fraction of the savings from these stores' low prices. The importance of the services offered by retailers is analyzed in Betancourt and Gautschi (1992, 1993).

The authors are dismissive of the argument that consumers' price savings are offset by differences in outlet quality. The consumers who buy from the SMCs probably place a small enough value on the outlet quality differences to make the average-price-paid index, which makes no adjustment for outlet quality differentials, an acceptable measure for practical purposes. I therefore agree that their average-price-paid index is a reasonable benchmark for approximating outlet substitution bias. Nevertheless, in a perfect index, the adjustment for outlet quality would probably not be zero. A framework for analyzing the effect of quality variation when a lower-cost, lower-quality alternative is introduced was developed for treatment of the entry of generic

pharmaceuticals by Griliches and Cockburn (1994) and Fisher and Griliches (1995). They estimate the average willingness-to-pay for brandedness of the buyers of generics by the midpoint of its theoretical bounds of zero and the total price savings offered by the generic, though I would argue that attributing half the price savings to quality overdoes the quality adjustment because the distribution of the willingness-to-pay for brandedness in the subpopulation that chooses generics is probably concentrated near zero.[2] A highly elastic response to a narrowing of the price gap between the two alternatives—implying that the value of the foregone quality approaches the price savings for many consumers—is more plausible in the SMC substitution case than in the generics substitution case. The likely existence of small net gains for some SMC shoppers is, however, offset in the aggregate by the likely existence of large gains for other SMC shoppers: the distribution of willingness-to-pay for the extra services offered by supermarkets probably has a lower bound of *below* zero because some consumers strictly prefer SMCs for reasons such as their broader assortments of nonfood products.

Although sample selection and outlet quality differentials are unlikely to have substantially affected the chapter's estimates of the bias inherent in the methods used in the CPI, a third potential source of error in the chapter's estimates should also be recognized. With the exception of bananas, the items in this study are aggregates of a range of varieties of varying qualities. Variation in the average price paid for an item caused by variation in the average quality of the varieties purchased is undoubtedly one of the reasons for the relatively high standard errors of the regression coefficients. However, in addition to high variances, differences in the quality of varieties are a likely source of bias. The varieties sold in supermarkets are likely to include more representatives of the high end of the quality range than the varieties sold in SMCs; for example, organic meat and produce is likely to be more widely available in supermarkets. If so, the varieties in sample of purchases from supermarkets will tend to represent higher average levels of quality.

These three possible problems of sample selection effects, outlet quality differentials, and variety noncomparability mean that the estimates in the chapter are subject to some uncertainty beyond the variance from sampling error that is inherent in all sample-based statistics. Nevertheless, even in combination, the effects of these problems seem unlikely to be large enough to explain away all of the upward bias that the authors find for the constant basket index, and for the annually and biannually linked indexes. The esti-

2. The midpoint of this distribution overestimates its expected value because many of the consumers who choose generics perceive the quality differences as inconsequential, and few would substitute back to the branded drug if the price differential narrowed slightly. Otherwise, manufacturers of the branded products are giving up significant profits by not making small price cuts that would allow them to regain most of their customers. A symmetric argument that the existence of large consumer surplus implies that the generics manufacturers would profit by raising their prices cannot be made, because competition with each other prevents them from raising prices.

mates remain valuable documentation of the existence and likely range of outlet bias in the CPI for the products covered by this study.

Conclusion

Showing that a problem exists in the CPI is usually much easier than developing a workable and accurate solution for it. (That is, of course, the way things should be—we would expect all the easy problems to have been solved by now!) Alternatives to the assumption that the differences in price for items sold side-by-side in the same market are a measure of the value of their differences in quality are not easy to implement. In the case of outlet substitution bias, estimating quality adjustments for outlets from CPI samples is especially difficult because prices from different stores often represent varieties of differing quality levels. The diversity of varieties in the CPI follows from the need to obtain representative samples of the varieties purchased by consumers.

In the mid-1960s BLS asked Edward Denison to provide expert advice on improving the CPI. One of his remarks was that ideally prices should be collected from households rather than from stores, so the prices that are actually paid could be reflected in the index. Of course, he added, this would never be practical. Now the authors of the current chapter have used a unique data set to do just that. In doing so, they have provided important new evidence on the possible magnitude of outlet substitution bias in one component of the CPI.

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Comment Mick Silver

This excellent chapter addresses the important issue of outlet substitution bias. There is much in the methodology that is to be commended. The con-

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