Chapter 6

THE RECEIPTS APPROACH TO THE COLLECTION OF HOUSEHOLD EXPENDITURE DATA

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1. Introduction

The receipts approach to the collection of household expenditure data involves allowing Household Expenditure Survey (HES) participants to turn in bar code receipts. This paper describes the innovative introduction of this approach in the Icelandic HES and some of the realized and potential benefits. For the Icelandic HES, each participating household keeps a diary for two weeks and hands in receipts obtained at the point of sale. The use of data from receipts has enabled more accurate estimates of private household consumption than previous traditional surveys. This approach provides comprehensive information on the types of goods purchased as well as on the outlets where the purchases were made. The fact that receipts provide details not only about the goods bought but also about where the transactions took place has enabled improvements in weighting procedures, and has enhanced the value of scanner data collected from outlets. In addition, the receipts approach has proved helpful for addressing questions of broader public interest. For example, HES data were used for analysing the sudden increase in shopping substitution bias when inflation rose in Iceland during the second quarter of 2001.

This paper describes the elements and some of the advantages of the receipts approach. The agenda for future research opened up by the receipts approach is also briefly discussed.

2. The Receipts Approach

2.1 Detailed data from shopping receipts

The receipts approach involves gathering information from the detailed receipts handed over to consumers when they shop. This method was first described and applied in 1995 in

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Iceland.[2] In 2000, the receipts approach was built in as a standard aspect of the continuous HES started that year. The survey cycle for the continuous HES is three years.[3]

During the two weeks of keeping a diary, survey participants record the total amount of each transaction, and then place the receipt into a special pocket in the diary book. In the beginning, the main idea was to make participation in the HES easier for households by allowing them to record their purchases with less writing. However, the receipts turned out to be a valuable source of additional information. As Guðnason (1997, p. 129) explains: "This method allows much more accurate estimates of the composition and quantity of household goods than otherwise would be the case. The utilisation of this method also enables precise information to be gathered about consumer activities at much lower effort and cost than previous methods and show[s] a link between the goods purchased and the buyer."

The following information can usually be found on a receipt:

1. *The total amount, and a breakdown by the items purchased*. The fact that the item components always add up to the purchase total is handy.[4] The results in the survey database can be compared with the total amounts on the receipts. Also, the total expenditures and transactions can be estimated immediately.

2. *The name of the outlet where the purchases were made,* clarifying the point of sale. Hence, the exact share in household expenditures can be measured for each shop. That information is useful for the creation of chain weights for the CPI.

3. *The date and time of the purchase.* This opens up the possibility of mapping consumption behaviour by day of the week and even the time of day.

4. *A detailed description of each item purchased* including the brand and package size, the unit price, and the total dollar cost. Fruits and vegetables are often weighed at the cash register, and this information appears on the receipt as well.

5. *How the items were paid for;* whether by cash, by debit or credit card, or by check.

The household address is known for HES participants. When this information is combined with the receipt information, regional and demographic group shopping patterns can be observed.

Purchases made in chain store outlets now comprise nearly 18 % of base expenditures in the Icelandic CPI. Three groups of chain stores dominate the retail market for groceries: Hagar, Kaupás and Samkaup. In calculating the index, the retailers are divided into four groups: Hagar, Kaupás, Samkaup, and "Other". Each group is then divided into its various chains, which now total eleven altogether. Prices at outlets within each chain are similar, regardless of the locality. Hence only chain-specific weights are now used; regional weights are no longer applied.[5] The

[2] See Guðnason (1995, p. 173).

[3] The number of households in the sample for each year is about one-third of what it was prior to the start of the continuous HES. In the 1995 survey, 1375 households participated, while in 2000, 2001 and 2002 the participating households numbered 657, 611, and 639, respectively. Data coverage can be analysed by adding up transactions from the receipts and the diaries, and can be viewed by either the number of transactions or by the expenditures.

[4] In an international context, the Icelandic HES was the first household survey to exploit this possibility, balancing one-third of expenditures in this way in each year of the continuous survey.

[5] From March 1997 to March 2002, regional indices for groceries were calculated in the CPI, and the CPI total index was weighted regionally.

use of chain-specific weights since 2002 renders calculation of the index simpler, and makes dealing with changes in shopping habits easier, especially when one store replaces another.

Data from the continuous HES is incorporated in April of each year. The weight of individual groceries is based on three-year, price-updated average expenditures.

2.2 Scanner data and receipts: two records of the same information

The majority of retail sales are now scanned at the point of sale. The scanner data on each sale are captured in the outlet database, the buyer obtains a detailed receipt for the transaction. The consumer receipts mirror the information recorded in the outlet database. If all the receipts, whether from private customers or firms, were collected together, they would provide the same result as the sales information available from the retailers.

However, receipts collected in the HES are linked to household information collected by interviews with individuals in the participating households. This information on the consumer side lends a special value to the receipts data. HES data also include receipts for goods bought from shops that do not collect scanner data. Even though electronic data records have become very prevalent, some retail establishments still gather no scanner data.[6]

On the other hand, transactions with other sectors are recorded in the outlet database. HES data are for a sample of households whereas scanner data reflect an outlet's total sales.

Scanner data have been used intensively for research in recent years. For example, data of this kind have been used to evaluate the influence of varying sampling methods on price measurement.[7] There is potential for considerable further development.[8] The next steps in its utilisation can be described as follows (Guðnason and Snorrason 1999, p. 337):

> "Further, shopping habits of households as mapped in the HES could be used as a source for weights. This would be done by utilising information on the detailed expenditure of typical customers at each type of outlet. Calculations of the average price change would then be based on the expenditures of different households at the outlets, so that for each outlet there would be varying indices calculated for the different types of households".

[6] In the 1995 survey, 41 % of all transactions were gathered from receipts. This number climbed to about 69 % in 2000 and reached 74 % in 2001 and 77 % in 2002. For food and beverages, 53 % of the records were of this type in 1995, 84 % in 2000, and around 89 % in 2001 and 2002. The prevalence of receipts can also be judged on an expenditures basis. Receipts covered more than 12 % of total household expenditures in the 1995 survey, 26 % in the 2000 survey, some 31 % in the 2001 survey, and 36 % in 2002.

[7] See Haan (2001), Haan et al. (1997), Silver (1995), Reinsdorf (1996), and Dalén (1997).

[8] See Guðnason (1998, p. 209).

3. Utilising Receipts Data

In the Icelandic CPI, each type of substitution bias is accounted for separately. The geometric mean is used to calculate elementary indices. Outlet substitution is allowed for when an item is not available at a particular store. [9]

The prices of the same or similar goods can vary widely among shops. Consumer price indices measure price changes concerning private consumption at the outlets whereas ideally the prices should be measured for households. The reason that this is not usually done is that sufficient information about the shopping habits of households is normally lacking. Index prices are calculated with prices measured in the shops, and the average prices are weighted by sales information. However, if households change their shopping habits, the average prices of the goods they buy change even if the prices of the goods in each store remain the same. In the Icelandic CPI, shopping substitution is accounted for by measuring it through household weights made possible by the receipts HES data.

In April 2001, inflation climbed steeply in Iceland. In 2002, on the other hand, the price level increases slowed.[10] Rising inflation brought changes in shopping habits, especially for groceries, as consumers transferred their trade to shops where prices were lower. These changes can better be analysed by separating the stores into two sets: low-price stores[11] and other. In 2000, the total amount of groceries bought in the low-price stores amounted to 25 %. This share rose to 31.5 % for 2001. Moreover, the low-price share increased further still during 2002 and 2003, from not quite 38 % of the total sales volume in 2002 to over 41 % in 2003. Thus the total market share of low-price stores increased by nearly 64 % during the overall period.

Five types of households are defined in the HES. Separate household-type indices would shed light on cost of living differences by household type and could be used to correct more precisely for biases arising from changes in shopping patterns. The effect of shopping pattern trends on different types of households can be analysed by examining the following categories:

- *One-person households.* The share of their purchases taking place at low-price stores increased in the period of 2000-2002 from over 21 % to over 26 %. This increase is less than the rise for other household types.

- *Couples without children.* About one-fourth of their shopping was carried out at the low-price end in 2000. Two years later, such couples bought nearly 37 % of their groceries at the low-price stores.

- *Couples with children.* While low-price shopping comprised 25 % of their food and beverage purchases in 2000, this portion had risen to nearly 43 % in 2002.

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[9] Substitution bias in household shopping has been called outlet substitution bias, though it in fact has more to do with household shopping behaviour than outlet prices. See Guðnason (2003, pp. 304-308). See also Reinsdorf (1993). On the construction of the elementary indices and the theory behind these, see Balk (1997), and Diewert (1998, 1999, 2004, 2009).

[10] The way households behaved in reaction to the abrupt changes in inflation is shown by twelve tables available from the author.

[11] The Bónus, Krónan and Nettó chains are identified as low-price stores.

- *Single-parent households.* Just under 23 % of their shopping was conducted at low-price stores in 2000, but this went up to 37 % in the year 2002.

- *Other households.* Low-price shopping initially exceeded 28 % of their purchases (highest among the households of that time) and passed 40 % in 2002.

This assembly of facts makes clear that shopping behaviour changes during the period of 2000-2002 were substantial. Thanks to the receipts approach, these changes could be closely observed.

4. Future Possibilities for Development of the Receipts Approach

The receipts approach is still in its embryonic stage of development. The volume of accessible receipts is the same as that of scanner data. The gigantic amount of data collected at all the points of sale has its counterpart in customer receipts. Collecting HES data from receipts is a more convenient and probably cheaper approach than the traditional HES one.

It is obvious that the receipts approach presents a very powerful method for gathering detailed information about household behaviour. These data sets are available everywhere. It is my belief that every statistical office ought to consider the receipts approach for their future statistical work, as it could improve their household statistics significantly.

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