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A Comparative Analysis of Price Indexes for Older Consumers in Three Countries

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Abstract: Within the limits imposed by using existing survey data, Consumer Price Indexes for older consumers are compared to overall indexes in Canada, the United Kingdom, and the United States. Despite differences in expenditure patterns for the elderly, the results indicate fairly similar increases over the period of comparison. Differences in coverage and limitations of the comparisons are discussed.

Key words: Elderly; senior citizens; pensioner; expenditure pattern; CPI; Consumer Expenditure Survey.

1. Introduction

Several countries have conducted research on the differences in price indexes constructed for selected older consumers and the population as a whole. The purpose of this paper was to examine to what extent the consumer price index (CPI) for this subpopulation would be similar to the official CPI in the United States, United Kingdom, and Canada. In each country it was found that over several years these subpopulation indexes did move similarly to the official CPI indicating that using the official CPI to adjust income received by the older population was not a serious bias.

This is an important consideration because each of the three countries currently produce a consumer price index that is used as an economic indicator of price change for monetary and fiscal policies as well as to adjust private and public transfer payments. For example, in Canada the Official CPI is used to adjust Old Age Security (OAS) payments, Guaranteed Income Supplement (GIS) benefits, and the payment of pension and other benefits under the Canada/Quebec Pension Plan (C/QPP); the United Kingdom makes use of the Retail Price Index for index-linking social security benefits, state pensions, and public sector occupational pensions; the Old-Age, Survivors, and Disability Insurance (OASDI), the Supplement Security Income, as well as, military and Federal Civil Service retirement benefits in the United States are adjusted by the changes in the Consumer Price Index.

Each country's subpopulation consumer price index was developed within the existing framework of the official consumer price index. The items, outlets and prices collected for the general index were reweighted to account for expenditure pattern differences between the general population and the subpopulation. In this paper we discuss how each was constructed, and examine some of the differences in the rates of inflation as measured by each of the

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country's indexes. Because of significant differences in the construction of the market basket of goods and services that comprise the expenditure weights of each country's index, this paper is also a cautionary guide for researchers when evaluating price rate differences across countries.

The existing research of age-specific price indexes seems to suggest that over reasonably long periods of time price increases for most demographic groups do not deviate substantially from the increase for the general population. Allowing for substitution in consumption would further moderate differences in relative price effect on the increase in the price of the market basket actually purchased. No research performed to date has adequately addressed issues of outlets and particular items purchased.

2. General Framework for a Price Index

All three countries calculate their price indexes using a fixed-quantity index of the Laspeyres type formula. A true Laspeyres index requires both the fixed-basket expenditure base and reference periods to be the same. Currently, Canada is using 1981 as its base period, and updates its market basket every four years (1974, 1978, and 1982). The United States is using the years 1982–84 for its base period with revisions approximately every ten years. The United Kingdom updates its expenditure patterns annually; so the U.K.'s index is least like a true Laspeyres index. The standard formula for Laspeyres price index is as follows

$$I_{t,0} = \frac{\Sigma P_{i,t} Q_{i,r}}{\Sigma P_{i,0} Q_{i,r}} \times 100.$$

The index is denoted by $I_{t,0}$, where t is the comparison period for which a new index number is calculated and 0 is the reference or base period; $P_{i,t}$ is the price for the ith item in comparison period t; $P_{i,0}$ is the price for the ith item in reference period 0; $Q_{i,r}$ is the quantity of the ith item consumed in the expenditure base period r.

In each case six components are required in structuring a price index. First, the population to study must be defined and a sufficiently large sample of this group must be available to survey. Second, the geographic areas to survey must be decided. Next, relative importances or weights must be calculated for the expenditure items based on surveys of expenditures and purchases of the defined population. Then a sampling of the items and outlets where these items were purchased by this population must be identified. Finally, prices for these items must be collected from a sample of the outlets to make a comparison over time. For detailed information on the calculation of the consumer price index for the United States see the Bureau of Labor Statistics (1988); for Canada see Statistics Canada (1985); and for the United Kingdom see the Government Statistical Services (1986).

3. Case for Special Indexes

The demand for a separate price index for the elderly in these countries may be attributed to the growing concern over the effectiveness of the official national price indexes to capture the true cost of living changes for the older segment of the population. The argument runs as follows: "Since the consumption expenditure patterns of the elderly are different from the rest of the population, the inflation rates experienced by this group are also different."

The differences in expenditure patterns between the larger population group and the older consumers are based, in part, on demographic differences such as smaller family sizes, fewer children at home, and higher proportions of women, and home-

owners in the older population group. The older consumers change their preferences for goods and services due to changes in life-style and general income level. Because of budget constraints, this group spends a relatively higher proportion of expenditures on necessities compared to the general population. For example, the percentage of household expenditures for pensioners is higher for food and lower in transportation and vehicles than for the overall household in the United Kingdom (Department of Employment 1987d).

It is also argued that older consumers, because of decreased mobility, may have greater reliance on nearby neighborhood retail outlets. These outlets may experience different price changes than those used by the rest of the population. In addition, the older population may be purchasing items or services that experience price changes different from those purchased by the general population. For example, in the United States medical care services used by older consumers would include cataract surgery which may exhibit quite dissimilar price behavior than items for the general population medical care purchases such as pediatric care.

In spite of these differences, noted independently by each of the countries in this study, no difference in the inflation rate was found over the time periods studied by the three countries. Statistics Canada published a report (Hannett and Scobie 1986, p. 5) stating that expected differences between a special group index and the Official CPI did not necessarily result in a higher index for the special group because "there are a large number of price and weight relationships in effect at any given time, and they usually tend to be offsetting. The reason they tend to be offsetting is because it is not likely that price increases would be consistently larger for most important purchases by one group in the CPI population while at the same time they are consistently and substantially smaller for the most important purchases by the remainder of the CPI population."

This finding is consistent with that of other research. For example, a study of the United States (Michael 1979) indicated that there were quantitatively important differences in the rates of price increases experienced by different socioeconomic groups, but none of these differences appeared to be stable over time. From this, it is obvious that the distributional effect of inflation on any particular group is a short run windfall. Michael's conclusion, in the case of the U.S., was further supported by the findings of Grimaldi (1982), who demonstrated that on the average, aged households over 65 experienced lower inflation rates than the rest of the households between 1973–1981. However, the observed differences in inflation rates between the two groups on a yearly basis was not stable and consistent (Hagemann 1982; Kokoski 1987; Mason 1988).

4. Three Approaches to Special Index Construction

In order to make a comparison of the special group indexes and the official CPI, each country produced special group indexes using the same methodologies as their official CPI. In each country studied, expenditure patterns for the subpopulation were derived from expenditure surveys of the general population. Sampling frames based on subpopulations for particular items and outlets were not available or could not be produced without a large investment of resources, therefore it was necessary to use the same item samples, the same outlets for pricing, and the same prices as in the official CPI. Figure 1 presents the comparisons of the general index framework for the older population in each country.

	Canada	United Kingdom	United States
Population Coverage	All urban households whose household head is 65 or over & income below low income cut off	Households deriving at least 3/4 of their income from retirement pensions and other social security benefits	All urban consumer units whose household head is 62 years or older; excludes institutionalized persons
Geographic Coverage	Same as official CPI - 81 urban areas throughout Canada	Same as official RPI - representative sample of private households in the UK	Same as official CPI - 85 urban areas selected to represent United States' all urban consumers
Expenditure Weights	Based on expenditure weights reported on this population in 1982 Family Expenditure Survey (FES)	Revised each year by this population's expenditure patterns based on Family Expenditure Survey (FES)	Expenditure spending patterns of this population, by area based on 1982-84 Consumer Expenditure Survey (CE)
Item Samples	Same as official CPI	Same as official RPI - excluding housing costs	Same as official CPI
Outlet Samples	Same as official CPI	Same as official RPI	Same as official CPI
Prices	Same as official CPI	Same as official RPI	Same as official CPI
Scope of Expenditures	Same as official CPI	Same as official RPI - excluding housing costs	Same as official CPI

Fig. 1. Comparison of Index Composition for Elderly Price Indexes Produced by Canada, the U.K., and the U.S.

The relative importances of various expenditure categories of Canada, the United Kingdom, and the United States were considerably different. These differences could be attributed to explicit governmental policy such as the level of subsidization of medical care, different definitions of key index components such as the treatment of shelter in the three countries, and differences in taste and preferences. In each case, though, housing and food expenditures represented substantially larger proportions of total expenditures in the older populations studied than for the general population. Because the older population studied in the United States was not based on income size or source, it covered a wider sample of older consumers than the other two countries, and it showed less divergence with the general population in these categories.

4.1. Canada

Canada constructed a CPI for Low-Income Senior Citizens as a sub-index to the Low-Income Families and Unattached Individuals CPI (the Low-Income CPI) beginning in March 1982. In designing this index, low-income senior-citizens living in urban centers with 30,000 or more inhabitants were covered provided they were: (a) married couples whose reference person was at least 65 years old, with no others in their spending unit, and whose combined income fell below the low-income cut-offs for two persons, or (b) unattached individuals who were at least 65 years old, and whose income was below the low income cut-offs for individuals. In 1982, 82.5% of all low-income consumer units whose reference person was at least 65 years old were unattached individuals and married couples without children.

Statistics Canada's methodology defines Canadian families and individuals as low-income when they spend a 20% or greater proportion of their income before taxes than the national average expenditure for

necessities: food, shelter, and clothing. In calculating the low-income definitions, expenditures on food, shelter, and clothing are divided by income before taxes. In 1984, 49.6% of the unattached individuals aged 65 or over, and 11.4% of the married couples whose reference person was aged 65 or over fell below the low-income cut-offs. Those living in institutions or on Indian reservations were excluded. (Hannett and Scobie 1986).

4.2. United Kingdom

Low income pensioners are excluded from the United Kingdom's general index of retail prices. High income households are also excluded. High income is limited to those households comprising the highest 4% of income (Department of Employment 1988b). Since 1968 two special indexes of retail prices have been produced to cover the low-income pensioner households in the United Kingdom. They are compiled the same way as the general index, but the expenditure patterns are based on "pensioner households" – defined as those deriving at least three-quarters of their income from national insurance retirement pensions and other social security benefits.

In producing the Pensioner's Indexes the Government Statistical Service used data derived from the expenditure weights in the annual Family Expenditure Surveys (FES). Excluded in the official index weights were both high-income households and pensioner households. Pensioner households represented approximately 14% of all households in 1986. This was nearly 60% of all retired households. To minimize sampling errors pensioner expenditure weights were based on the combined results of the FES for the latest available three-year period (Department of Employment 1988a).

FES expenditures collected do not include "holiday-type" or "miscellaneous expenditure," such as children's pocket money or air fares (Department of Employment 1986, 1987b). The Pensioner Indexes do not cover housing costs.

4.3. United States

An experimental index was constructed by the Bureau of Labor Statistics as a one time experiment at the request of the Special Committee on Aging, United States Senate (Mason 1988). Because the Consumer Expenditure Surveys collect data about families or other people who pool their income and expenditures, the data used in the experimental index exclude some older consumers' expenditures and include some expenditures of family members who are under 62 years of age. Among the older consumers whose expenditures are excluded from the index are the institutionalized elderly population, and those 62 and over who live in a consumer unit where the reference person and the reference spouse are under age 62. For example, older consumers living with their grown children are excluded from the experimental index population. On the other hand, expenditures of children or other related individuals living in consumer units where the reference person or spouse is 62 or over are included. However, the effect of these differences in population coverage is relatively small, since about 82% of older consumers are included in the definition used.

5. Results

In Canada, the all items index in both the Low-Income Senior-Citizens CPI and the Official CPI showed strong similarity in movement during the period December 1982 and December 1987, (23.7% versus 22.9%). The price change in the food category was virtually the same at 22.6% for

Table 1. Comparison of Canadian Consumer Price Index, for Low-Income Senior-Citizens and Official CPI between March 1982 and December 1985, for All Items (March 1982 = 100)

	Low-income senior-citizens CPI	Official CPI
March 1982	100.0	100.0
December 1982	105.1	105.9
December 1983	110.1	110.7
December 1984	114.5	114.9
December 1985	119.4	119.9
December 1986	125.0	124.9
December 1987	130.0	130.1
December 1982–December 1987		
Percent change	23.7	22.9

Source: Statistics Canada (1988).

both indexes. More variation occurred in other lower level aggregations, such as in housing (22% versus 20%) and in tobacco products and alcoholic beverages (56% versus 51.6%) (Statistics Canada 1988).

The price changes in housing, health and personal care, and especially tobacco had a larger effect on the Lower-Income Senior-Citizens CPI than that of the larger population. In 1982 the low-income senior citizens' relative expenditure on necessities (food, shelter, and clothing) was 26.8% larger than the proportion for families and unattached individuals covered by the Official CPI (Hannett and Scobie 1986). Two of the categories, tobacco products and public transportation, included commodities whose prices were reviewed by a government agency and had a portion of their prices set by legislation.

In the United Kingdom high-income and pensioner households are excluded from coverage in the general index because their expenditure patterns differ markedly from those of the majority of households. Pensioner indexes reflect a higher relative importance for food, fuel, and light and a much lower relative importance for motoring costs (Department of Employment 1988a). (See Table A2.) For these differences in weighting to be significant, they would have to be correlated with differences in price movements between the item stratum as well. In spite of the lower level item differences, the differences in percentage change at the all items level in prices over the 1982–87 period among these indexes have been slight (one-person pensioner household, 20.1%; two-person pensioner household, 20.5%; and, the general retail price index, 20.2%).

Table 2. Comparison of United Kindom's Retail Price Index and Pensioner's Indexes, for All Items (excluding housing), Annual Averages, 1983–1987

	One-person pensioner household	Two-person pensioner household	General Index
1982	321.8	318.8	314.3
1983	336.2	333.3	329.8
1984	352.9	350.4	343.9
1985	370.1	367.6	360.7
1986	382.0	379.2	371.5
1987	386.5	384.2	377.8
1982–1987			
Percent change	20.1	20.5	20.2

Source: Department of Employment (1989).

Table 3. Selected United States CPI Indexes, December 1982–December 1987

	CPI-U	Experimental Index
December 1982	100.0	100.0
December 1983	103.8	103.7
December 1984	107.9	107.9
December 1985	112.0	112.4
December 1986	113.2	114.4
December 1987	118.2	119.5
December 1982–December 1987 Percent change	18.2	19.5

Source: Mason (1988).

In the United States the older consumers index was calculated for the period December 1982 through March 1988. Over the five-year period from December 1982 to December 1987, the experimental index rose 19.5%. This compares with an increase of 18.2% for the CPI for all urban consumers (CPI-U). These differences occurred because the expenditure weights of the items that comprised the major groups varied among the index populations. The expenditure weight that an item had in a particular population's index reflected the importance of that item as a proportion of total expenditures. During the five years which we are examining, the medical care index rose about twice as fast as the All Items Index in the U.S. CPI. The larger than average price increase, coupled with the significantly larger relative importance of medical care in the older consumers index, resulted in this component having a large effect on the All Items Index for the older population than for the CPI-U.

6. Limitations

In constructing experimental indexes for the elderly each of the national governments recognizes the limitations of the methods used in deriving the necessary data from the surveys developed for the general populations. While the consumer expenditures survey data are used to derive weights for the special indexes, the specific item classes selected for pricing each stratum may not be representative of the experimental index population. Furthermore, in the selection of items for pricing within an outlet, the items with larger market shares have a higher probability of selection than do items with smaller market shares. While the items selected for pricing are appropriate for the general populations, there is no certainty that they are equally appropriate for the older populations. As an example, housing costs for selected populations are subject to variability among age groups. Younger age groups are more likely to be renters while older consumers move less frequently and have a higher representation of homeowners.

Outlets selected for pricing items in the consumer price index produced by these three countries are chosen to properly represent all types of outlets and reflect each outlet's share of total purchases of individual items. Statistics Canada selects outlets in consultation with retailers, distributors, and manufacturers from each regional office. The outlet sample is designed primarily to include retail outlets with high sales volume. Approximately 120,000 quotes are priced monthly in Canada.

In the United Kingdom several thousand retailers provide nearly 130,000 price quotations used monthly by the Government Statistical Service. Some large retailers charge the same prices in all outlets and they provide this information on selected items directly to the Department Headquarters. In other cases price collectors from 180 unemployment benefits offices reprice the same goods in the same shops on a selected day each month. These shops are chosen to provide a balanced sample, by region and type of shop, in the country as a whole.

In the United States a point of purchase survey is conducted to select stores for pricing based on data reported by all urban households, and outlets may not be representative of the places of purchase for the older consumers. The sample sizes for outlet selections in these countries are not sufficient to determine whether subgroups of the population typically shop in different types of stores or localities from the general population.

In addition consumer price indexes for the general population reflect the geographic distribution of the general population rather than the subpopulation selected to study. In the United States, for example, it was found that the population age 62 and older were more likely to live in smaller cities in all regions and in those larger cities experiencing low rates of economic growth in the first half of the 1980s.

7. Differences in the Treatment of Housing and Health Care

The treatment of the housing component in the older persons indexes for these countries is very different. Canada's Official CPI defines owned accommodation as the cost of owning and using the stock of dwellings that were owner-occupied at the end of 1982 by the target population. Mortgage interest cost and replacement cost are included as well as property taxes. The weight for the replacement cost of owned accommodation is estimated at 2% of the 1982 market value necessary to replace the stock of dwellings owned and occupied by the target population at the end of the year. This replacement cost is based on estimates made by individual owners as to the possible selling price of their dwellings, adjusted to exclude the value of land.

The housing component of the retail price index in the United Kingdom is based on standardized mortgage interest payments and represents the net cost of housing. As of January 1987 the pensioner indexes exclude imputed rents of owner-occupiers and rent-free tenures, but includes the assistance which some households receive towards meeting their housing costs as income. As a means of making comparisons with the general price index, the Retail Price Index is published excluding housing costs (Department of Employment 1987a).

Housing costs in the CPI for all urban consumers in the United States as well as the older consumers index, reflect a rental equivalence approach to measure the change in the cost of the flow of shelter service received from one's house. Asset costs for homeownership are viewed as investments and are excluded from a price index that measures the average change in the prices paid by consumers for consumption goods and services.

Therefore, in addition to the previously discussed limitations in directly comparing the indexes of the three countries, direct comparisons of the rate of price change is further encumbered by the definitional differences in the shelter component.

Another major component of these consumer price indexes which contributes to the observed differences among the three countries is medical care costs. Both Canada and the United Kingdom play active roles in regulating health care costs and medical services are highly subsidized in both countries. The United Kingdom excludes health care costs from both the pensioner and general retail price indexes in their entirety, while Canada includes only dental and eye care, and some medical care commodity and pharmaceutical products in their expenditure weights.

Health services received by the population through the health insurance system in Canada are excluded from the Official

CPI. Their health insurance premiums do not reflect either the full value of the services rendered or a constant proportion of the value. Actual amounts paid for services are also not included as they too are affected by government financing of medical care. Medical supplies, pharmaceuticals and dental care are included in the Official CPI as expenditures on these items relate to specific quantities and qualities of goods or services. Some of these items are subsidized for low-income senior-citizens as well.

In the United States there is no similar national health insurance program. While medical assistance for certain low-income individuals and families is available under Title XIX of the Social Security Act, eligibility requirements and benefit structures differ among the individual states. Health care expenditures include those for physicians and other professional services, inpatient and outpatient hospital care, and medical care commodities.

8. Conclusions

In all these countries the elderly price index differed from the general price indexes. But the difference does not appear to be large. Moreover, the policy question centers around whether the observed differences between the general population and the older subpopulation indexes are stable in the long run. From the point of view of policy formulation, a stable relationship between the two indexes is crucial. A few studies conducted in the U.S. suggest that the distributional effect of inflation on any particular group is a short-run windfall and in the long-run, no particular group seems to have any advantage over the other (Grimaldi 1982; Michael 1979).

Both Statistics Canada and the United Kingdom's Government Statistical Service have monitored special-group indexes over a long period and have concluded that over time, both empirically and theoretically, sub-group indexes do not differ substantially from the all-items index for the Official CPI (Hannett and Scobie 1986) or the general retail price index (Department of Employment 1988b). Therefore, the use of the Official CPI or the general retail price index as an adjustment for payments received by senior citizens in these countries is appropriate.

Those who favor a separate CPI for the elderly on the other hand, draw attention to the methodological drawbacks of the studies and argue that a separate CPI based on the shopping habits of the elderly and with proper adjustments to the family size would yield an altogether different result. We have discussed some of the differences in the indexes and great care should be taken in generalizing them to compare one country to another. In addition to adjusting for the limitations of the indexes in each country discussed earlier, work needs to be performed to address the significant definitive differences among the countries in their treatment of medical care and homeownership.

It is important to note that the foregoing analysis of the behavior of the subpopulation indexes does not attempt to evaluate the statistical significance of the differences observed among the indexes. For example, the fact that samples from which expenditure weights for the subpopulation index were calculated are substantially smaller than those used in the official price index means that the subpopulation indexes are subject to much larger sampling errors than the official index. This in turn increases the uncertainty of statements concerning the significance of observed differences among the indexes.

Appendix

Table A1. Canada's Official CPI and Low-Income Senior Citizens CPI Weights, as of December 1984

	Official CPI	Low-Income Senior-Citizens CPI
All Items	100.0	100.0
Food	19.6	26.1
Housing	38.3	49.3
Clothing	8.1	4.8
Transportation	15.7	7.3
Health and personal care	4.0	4.4
Recreation, reading and education	8.2	3.8
Tobacco products and alcoholic beverages	6.1	4.3

Source: Hannett and Scobie (1986, p. 31).

Table A2. Comparison of U.K.'s Pensioner and General Index Weights (excluding housing), 1988

	One-person pensioner household	Two-person pensioner household	General Index
Food	31.8	33.3	19.8
Catering	3.2	2.3	5.4
Alcoholic drink	3.3	4.3	9.0
Tobacco	3.3	4.7	4.5
Fuel and light	18.2	13.7	7.2
Household goods	7.5	8.7	8.7
Household services	7.9	4.8	5.2
Clothing and footwear	6.8	6.7	8.8
Personal goods and services	5.0	4.9	4.5
Motoring expenditure	2.4	7.7	15.1
Fares and other travel costs	2.1	1.7	2.6
Leisure goods	4.6	4.5	5.6
Leisure services	3.9	2.7	3.6

Source: Department of Employment (1988b, p. 334).

Table A3. Relative Importance of Selected Major Categories of Expenditures in the United States, December 1986

	CPI-U	Experimental Index
All items	100.00	100.00
Food and Beverages	17.66	15.62
Food at home	9.86	9.88
Food away from home	6.19	4.60
Alcoholic Beverages	1.55	1.14
Housing	42.48	48.47
Rent	6.03	4.43
Owners' Equivalent Rent	19.26	25.25
Fuel Oil	0.30	0.49
Electricity	2.67	2.99
Natural Gas	1.23	1.68
Apparel and Upkeep	6.34	4.66
Transportation	17.45	14.24
Motor fuel	3.29	2.35
Medical Care	5.83	9.38
Entertainment	4.37	3.36
Other Goods and Services	5.93	4.27

Source: Mason (1988, p. 7).

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