

Item Selection and Quality Change in the Canadian CPI

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Abstract: This paper examines adjustments made to the CPI sample in Canada from 1989 to 1994. It finds that in most cases the procedure used ensures that the replacement of one commodity by another, one outlet by another, or one variety of a commodity by another, has no impact on the index movement. Exceptions occur sometimes in replacing varieties of commodities that are purchased only occasionally: - when a judgement is made that the ratio of the price of an item to the price of the item it replaces is not the same as the ratio of their qualities. However, in these cases there is a correlation between the price ratio of an item to its replacement and the calculated pure price movement such that the impact on the index depends largely on what an item is replaced with. For these reasons, the paper argues that more attention should be paid to ensuring that the item selection is more representative of current sales than has traditionally been the case.

1. Introduction

The evaluation of quality change - that is, how the sample of price observations is adjusted to take into account changes in what is being observed, has always been regarded as a most important aspect of price index construction. Questions of sampling and item selection have been given less attention. While the weights for commodity groups are carefully determined from expenditure surveys, most samples for these commodities are selected by judgement. They are chosen, where possible, to be observable easily for a good length of time, as well as to be representative of all the varieties in the commodity group. Usually, quality change evaluation is an unfortunate necessity forced by the unavailability of some observations.

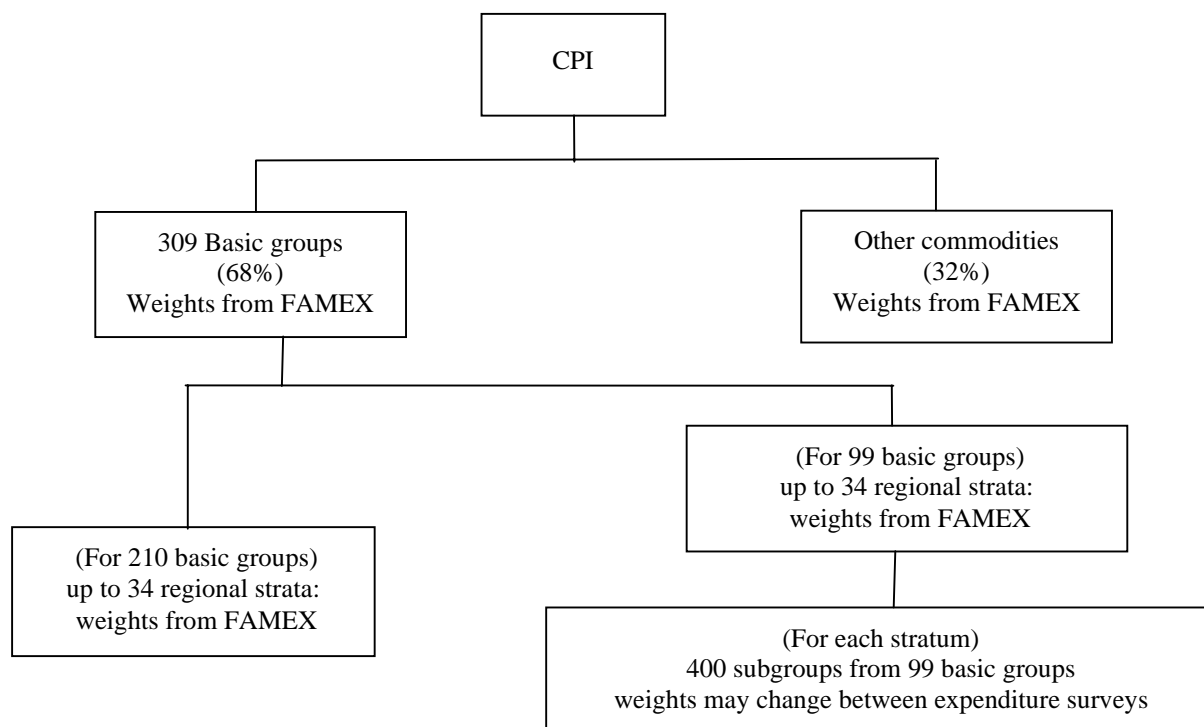
In this paper, we examine how the sample changes as discontinuities occur in the streams of observations.² The data are all quality change adjustments and all deletions from the sample made in the Canadian CPI between January 1989 and December 1994 for indexes derived from market surveys. Two arguments are made. First, that in many areas of the index possibly obsolete item selections are continued for a non-existent benefit, as the cost of replacing them is minimal, (and the replacement method should be improved). Second, in those cases where the evaluation of quality change is not an automatic procedure, the result is largely determined by the ratio of the price of the replacement item to the price of the item that was in the survey before.

¹ This is revised from the a draft prepared for the meeting of the Ottawa Group in April 1997. It has benefited from discussions with many people responsible for the CPI, but particularly Ted Baldwin. Candace Ruscher and Micki Kaminska performed most of the calculations.

² We consider only those commodities for which indexes are calculated from surveys of prices observed in the market. These account for about 68.5% of the CPI. The commodities not covered here include shelter, and those for which prices are obtained from producers or governments - cable-vision, drivers' licenses, property taxes, telephone service, auto insurance. Adjustments for quality change are made for most of these commodities, but in a different context.

2. Organisation of the CPI structure

A brief description of the organisation of index sample design and computation in the Canadian CPI may be useful. This describes the situation from January 1989 to December 1994 when the CPI was based on expenditure patterns from a 1986 survey.³ The chart below illustrates the organisation:



Since 1995, the organisation has remained similar, though the total size of the sample has been reduced, and some of the stratification⁴ has been simplified. From the Family Expenditure Survey (FAMEX) 309 basic groups are defined. The weights of these remain constant till the next updating.

In designing commodity samples, about 100 of the basic groups are sub-divided, into about 400 sub-groups, so there are a little over 600 separate commodity definitions. The weights of the sub-groups within a basic group can be changed between basket updates. This has happened to the varieties of automobile (about 20 different models), package vacations (35 different locations) and other commodities, to reflect changing purchase patterns; or to introduce new commodities such as CDs, or the latest type of battery, that were not available, or significant, at the beginning of the period. In these cases a weight was transferred from other similar commodities. In all these cases the change in the weighting patterns was not allowed to affect the index movement.

³ Normally the weighting patterns above the basic level are updated every four years. This exceptional six-year period was due to the replacement, in January 1991, of the Manufacturers' Sales Tax by the Goods and Services Tax (GST). It was thought that the GST, being levied on a broader range of goods and services at the retail level, though at a lower rate, would change the relative prices of commodities and might affect expenditures, so that a 1990 survey could be obsolete by the time its results were introduced. The 1990 survey was postponed, therefore, to 1992. With the 1996 survey of expenditures, the results to be introduced in 1998, we return to the regular timetable.

⁴ The main change was to reduce the geographic strata from 34 to 17.

The sample for each commodity basic group is also stratified geographically, (before any sub-groups are identified), so that there are potentially several thousand samples from which indexes are built up. The actual number of sample is less because some sub-group stratum indexes are imputed from others.

Each item in a sample is described physically, and often by the terms of sale. For each sample the most recent index is updated by the movement of the prices in the sample that can be matched from the last pricing period to the current one. So long as the price is available for each identical item as specified there is no problem. The ratio of the unweighted average of all prices in the current period to the unweighted average for the same items in the previous period is calculated; then the previous index is updated by multiplying it by this ratio. If an observation is missing for the current period, but it is expected to be temporary, a current price is imputed. However, if a price for the identical item cannot be found some action must be taken to deal with this change in the sample of observations.

3. Types of quality change evaluation

The various methods for treating quality change have frequently been described in the literature, (see Turvey, 1997), and fall into two classes, depending on whether relative market prices reflect relative qualities. If they do, a number of automatic procedures can be followed. Comparisons of market prices can be used to make one-to-one comparisons between an item and its replacement (“splicing” in the Canadian terminology) using the ratio of prices at a common time period. Alternatively, two different samples can be linked using the movement of the items common to both samples. Thirdly, descriptions of items may be transformed into lists of characteristics, and regression analysis used to convert the market prices for physical agglomerations that may change into market prices for characteristics that do not. This method is useful when it is difficult to find the identical items from period to period, but when the list of characteristics, and the range of values they take, do not change between periods.

If the market evaluation is not accepted, then interventions to superimpose a judgement, as if there is some essential quality embodied in an item, independent from the value the market puts on it, can be used. Such judgements may come from the producer of the item, or from someone in a good position to assess quality from a consumer’s view, such as a price collector, or editor. Whether or not to accept the market evaluation is itself a matter of judgement. There are clearly some occasions when changes occur suddenly to the whole range of the market, impeding the comparison of prices—for example: the issue and expiration of patents, changes in the amount of insulation required in houses, legally required equipment in cars or television sets, changes in the amount or type of auto insurance required, or allowed. In all these cases, some judgement has to be made of their monetary value, as the consumer cannot exercise a choice. But whether regular market activity distorts values is more difficult to decide. It should be noted that using one of these methods is the only way in which the introduction of a new commodity can have an impact on the index.

In treating changes in the sample, all the techniques except regression are used in the Canadian CPI.⁵ The incidence of changes varies with different groups of commodities, and the type of treatment used differs among different commodities as well. One constant method, which applies to all commodities, is in treating the loss of an outlet. If a price for an item is no longer available because the outlet from which it is collected is no longer available, it is always replaced by finding a new outlet, and modifying the sample by introducing the new item, from the new outlet, at some later date. In the interim, the two samples are linked together by calculating the index from the reduced matched sample. The cases where

⁵ With the introduction of computers in the 1992 basket, regression techniques are used to adjust for quality changes

this occurs are described as “Outlet replacement” in the rest of the paper. There are other possible reasons for changing the sample in this way, but the loss of an outlet accounts for most of them. All the other treatments of changes in the sample involve a one-to-one comparison between the missing item and its replacement. This is referred to as “Quality change”.

The amount of outlet replacement is quite constant across most commodities, while the incidence of quality change varies widely. In total, there were about three times as many one-to-one quality change adjustments as changes caused by losses of outlets in the sample.

4. Dealing with changes for routinely purchased commodities

4a. Incidence of changes

In looking at the different groups of commodities, let us first identify what can be called routine purchases. The consumer shops for these every day, or every week, - frequently enough that if he tries a new item and does not like it, he can easily return to the original item later. This category includes all food purchased from stores, some take-out food, household cleaning products, some basic clothing items, gasoline, personal care items, some reading and recreational items such as magazines, books, tapes and CDs, and tobacco and alcohol products. Altogether, 172 of the 309 basic groups in the CPI fall into this group, accounting for 32.7 out of the total weight of 68.4%. For these commodities a seller of a new product has to sell it not just once to each customer, but over and over again, so that the market is constantly assessing the relative values of the different items for sale.

Table 1 shows the incidence of outlet replacement and quality changes for each commodity, and for quality changes, the type of treatment used to deal with them. Within each defined sample, a number of observations are collected for each pricing period. The incidence is calculated as the number of observations that either disappear because the outlet is lost, or experience a quality change, during each year, as a percentage of the average number of observations in the sample during the year. Thus ten per cent under the “outlet replacement” heading means that there is a ten per cent chance that any observation in a sample for that commodity will be dropped from the sample within a year. Similarly, under the quality change heading, there is a ten per cent chance that it will have at least one quality change adjustment. This measure of incidence enables comparisons among commodities that have different pricing frequencies. For example, if there are ten observations for coffee, which is priced every month, and one has a quality change in a year, (10%), the total percentage of observations that have a change is about .8% (1/120). For dry-cleaning, however, which is priced four time a year, the same incidence would imply that 2.5% of the observations had a change (1/40). As we are primarily concerned about the chance of getting an interruption in the flow of data, the incidence numbers are more useful than the ratios. The incidences shown in the tables are calculated for each year and averaged over the entire six years, or less for some commodities.⁶

“Judgement changes” are those quality changes where the replacement item is not spliced into the index, but another judgement imposed. They are a subset of all quality changes. The final column shows the percentage of quality changes that are described as splices.⁷ (The remainder are judgements). In assembling these figures from the historical record it was impossible to distinguish real quality change

⁶ The two incidences are independent of each other, though the sum overstates the incidence of all discontinuities slightly. This is because some items may have had a quality change before being dropped from the sample in the same year.

⁷ This is a misnomer, as is explained later.

adjustments from corrections to data. These corrections were almost certainly splices, so the total incidence, and the percentage that was spliced, may be overstated.

4b. The consequences of splicing

It can be seen that the overwhelming majority of interruptions for these commodities are treated by splicing a quality change, or by linking in observations from a new outlet via the common matched sample. There were about half as many outlet replacements as quality changes. Judgement quality changes are rare; only two commodities had an incidence of judgement quality change as much as 10% and only 14 commodities (8% of the total) had an incidence over 5%.

Any splice could be handled as outlet replacements are. The result is similar. Splices should be replaced by the movement of matched samples, for two reasons. The first reason is that they do not produce exactly the same result - as splices are not applied in a pure form. We do not have overlapping prices for the original item and its replacement in the same period. We call it a splice when we decide that the ratio of the price of the replacement item in the next period to the price of the original in the first period is the ratio of their qualities. This implies a combination of a splice and an assumption of no price change between the two periods. If there are ten observations in a sample and one is spliced, the index for the period will be based on the movement of the other nine and no movement for the tenth. With the linked matched sample it will depend only on the movement of the other nine. Although the difference is usually not great,⁸ it would be better not to assume no price change if we do not have to. Furthermore, although it appears not to be a serious problem when the commodity is priced monthly, and there is a low rate of price change, these conditions may not always hold. Many commodities are priced quarterly, or even less frequently, and the assumption of no price change over the longer period is less sustainable. As the result of this method is always to dampen the index movement, whether up or down, the impact of this needs examining.

The second reason to prefer adjusting the sample rather than splicing is a reflection of attitude. As currently designed, the adjustment process, except for outlet changes, is set up to maintain continuity as far as possible. It is well-known that the price index maker is faced with a trade-off between maintaining continuity and keeping the sample up-to-date. However, in this case the trade-off is unbalanced, as there is no cost to keeping the sample up-to-date; a replacement can be made at any time, and to anything. The current method maintains the old sample well beyond its relevant period, without any compensating advantage in the treatment of quality change. The perspective and philosophy needs to be changed with the aim of keeping the sample up-to-date and allowing frequent changes to that sample.

Most changes to an existing sample are made because they are forced. One might think that this is because the concept of a fixed basket is being applied down to the finest detail - to preserve the selection of items from particular outlets under the same terms of sale. However, apart from being a very restrictive measurement, it is not applied at higher levels of aggregation. The weights of the sub-indexes within the categories identified from the family expenditure survey can be and are changed occasionally between basket updates. Some new commodities were introduced during the period, and some dropped. Furthermore, the specifications for items may be changed, and such changes probably account for a significant percentage of judgement changes. For example, the item to be priced for soft drinks was changed from a can to a larger plastic bottle. When the ratio of prices was not the same as the ratio of

⁸ An extreme example of how it can be significant was in late 1994 when broccoli was added to the survey. As often happens with a new sample there were a large number of corrections to be made after the first collection. These corrections were spliced into the index the following month, dampening the index movement by almost half. The prices of broccoli, as shown by the rest of the sample, had risen sharply that month.

sizes, the change registered as a judgement change. However, the numbers show that modifying the item selection is not very common. In most cases, the sample selection, once made, has been maintained as if it was the intention to preserve an unchanged basket for as long as possible.

It is not just the fact that the treatment of discontinuities is one simple method, but also that the incidence of changes is so low, that indicates that samples are allowed to become outdated. Less than half of them had incidences of any kind of quality change above 10%, and only 25 of the 172 above 20%. Although some basic food commodities may not have changed over the years, product development and variation are extensive for many of these commodities, and are barely noticed. In recent work using scanner data for coffee, we have found that 30% of the sales of roasted coffee at the end of the study period were for varieties that were not available at the beginning of the period, three years earlier (Scobie, 1997). Yet the incidence of quality changes in the CPI for coffee is 3.7%; we see similarly low incidence for other commodities where the variety of choices have clearly grown.

The same considerations that apply to using prices as a valid indicator of quality among competing items in a commodity apply also to competing outlets. Whatever the variation in the amount of service provided by different outlets (and the margin in supermarkets is only about 20% of the sale price) the best way to track their influence is to have them all in the sample.

5. Dealing with changes for commodities that are purchased occasionally

For non-routine commodities, dealing with discontinuities is more complicated. The individual purchaser is in much less of a position to make judgements of quality. Even when such an apparently straightforward purchase as a pair of sneakers is made, it is not easy to repeat the last purchase made, and it is not easy to compare the values of the replacements. The field is ripe for advertisers and marketers to disguise quality, and market the good on the basis of improvements from some earlier age, rather than on price. It is not surprising, therefore, to find that the price collector often judges that a replacement item is better or worse than the ratio of its prices would imply. It is also not surprising if items disappear more frequently, as there is more incentive for a producer to replace them by a new variety that can be promoted as improved.

5a. Incidence of changes

Table 2 shows the incidence of outlet replacement, and quality changes, for commodities that could be called occasional purchases. These include restaurant meals, household equipment and furnishings, most clothing, new cars, repairs and maintenance to vehicles, dental care, most recreation equipment and services, and packaged vacations. Altogether there are 137 commodities covering 35.7 points out of the total weight of 68.5% of the CPI. Compared to the routine category, the incidence of quality changes is much higher and there is a significant proportion of cases for which a judgement is applied, rather than being spliced. Although the incidence of outlet replacement is about the same as for routinely purchased commodities, it only amounts to about one-fifth the number of quality changes.

Within this group there are wide variations in the incidence of quality change and the type of treatment. The lowest incidence of judgements falls on a group of commodities that are service oriented -- they include shoe repairs, oil changes, dental care, auto maintenance, VCR repairs, and piano lessons. Several of them have low overall incidence of quality change as well.

Other commodities with a high incidence of splicing are those undergoing rapid technical change -- portable radios, microwave ovens, stereo equipment, VCRs, colour TVs, and hair dryers.

The highest incidence of judgements generally is in the clothing group, and new car purchases. However, quality changes occur so frequently for some women's clothing that they show up in the list of high incidence of splicing as well.

Overall, it appears that splicing is chosen as the preferred method of treatment for the easiest and most difficult items, and judgements are used for the commodities in between.⁹

5b. Patterns of judgement

The first judgement is whether to splice or to impose some other evaluation. Splicing is a little more common when the price change is small, due largely to the strong tendency to regard the replacement to be of equal quality when the price is the same, but the difference in incidence is not very great. It is not very different for most commodities taken individually, either. For example, 71% of changes on portable radios are spliced when the change is over 10%, and 69% are spliced when it is under. There are few commodities where there is a big difference; for instance cars (6% of small changes spliced, 15% of larger ones) and trucks and vans (3% and 32%, respectively). The difference comes from how judgements are applied.

When judgement is applied, there are differences in the patterns, according to whether there is a large price difference between the missing item and its replacement, or not. In examining these differences it will be useful to look at clothing separately from the other commodities. In the Canadian CPI, quality judgements for most commodities are applied by editors in Ottawa, based on the commodity intelligence they have gathered, and information from producers. For clothing, however, the judgements are applied in the field by the price collectors.

For all occasionally purchased commodities other than clothing, there are approximately the same number of cases where the replacement price is within 10% of the old item's price, as there are cases where the price difference is more. Chart 1 shows patterns of judgements.

For these commodities, where a judgement was used, the index rose in 61% of small changes. The price of the replacement item was the same or higher in 60% of the changes. For larger changes the overall picture was similar - the index rose in 58% of the cases, as prices rose in 57% of them.

However, when the price difference between the item and its replacement was large, the kinds of judgement were concentrated in a few patterns. Situations where the replacement item was more expensive, and the quality judged to have increased, but less than the price, accounted for 37% of all cases. The corresponding downside -- price falls, but quality falls less, accounted for another 22% of cases. In only 8% of cases did the quality increase as the price fell, or decrease as the price rose. For smaller changes, on the other hand, there was a more even distribution of results. Price and quality changes only ran together, with quality changes less than the price changes in 28% of cases (compared to 59% of large changes), and they moved in opposite directions in 19% of cases, compared to 8% of large changes. Clothing judgements were applied somewhat differently.

⁹ This is perhaps not so bizarre. Just as there is no price dispersion in two extreme circumstances -- perfect competition and monopoly -- so in allowing the market to set value there are two extremes. In the case of a truly new good the manufacturer has no frame of reference; it is not competing with other varieties of the same commodity, but in a much wider context, and its value in the marketplace is unknown at first.

There were rather more large changes than small (14,000 against 10,500 in six years) and small changes were much more likely to be spliced. Otherwise the patterns are similar, but more extreme.

This strong association between price changes and quality changes accounts for the main difference in the pattern of judgements; the index rises for 68% of judgement changes in clothing compared to only 58% for other commodities.

When the change is small any combination of price and quality change is possible. However, when it is large, the index will rise or fall, depending on whether the replacement costs more or less than the replaced item. This is quite plausible, at least for increases. Many small changes are likely to be slight modifications to what is essentially the same item, while if there is a major replacement the manufacturer may try to take advantage of it to introduce a price increase with the new model. This tendency is more pronounced with price increases than with declines - when price and quality increased the index went up almost four times as often as down, while when they both declined, the index only declined twice as often as it rose.¹⁰ In some cases, the tendency to view changes in this particular way is absolute. In preliminary work attempting to apply regression techniques to clothing, a comparison was made between the adjustments called for by the regression model in certain changes in men's shirts, and those actually made. In 29 occurrences during part of 1996, there were no cases where the quality increase was considered to be greater than the price increase, no cases where there was a quality decline greater than the price decline, and no cases where the quality was judged to have changed when the price did not. The regression model gave changes in almost every case (Markle, 1997).

5c. The association between judgement replacements and index changes

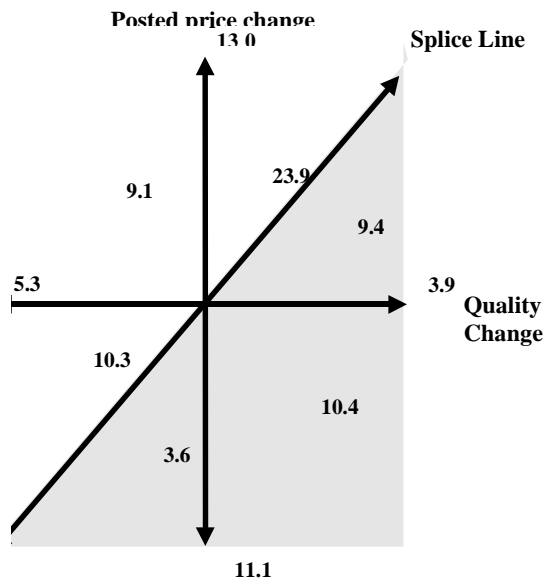
It is not just the direction of changes that follows a pattern, but the sizes of price and quality adjustment. On Chart 2 the relationship between the ratio of prices of each item and its replacement and the impact on the index movement (its judged pure price movement) is plotted for all judgement changes on occasionally purchased goods. There are a little over 32,000 cases over the six year period. The average index ratio is calculated for all changes in each price range - in 5% intervals up to a price ratio of 1.5 and 10% intervals above that. The first graph shows all cases together, and clothing, the largest group, which accounts for just over 40% of the total. The second graph shows the relationship for three of the largest groups of commodities: furniture and appliances, "sports equipment" which includes most of the recreation group, and "recreation equipment" which covers TVs, stereos, VCRs, cameras, (those commodities that are highly influenced by advances in electronics). It is clear that the larger the difference between the sticker price of an item and its replacement, the larger will be the change to the index. If the price of the replacement is 50% higher, the quality increase, on average, will be judged to be about 35% and the index increase will be 15%. If the price increase is 15%, the quality increase will be about 7% and the index increase 8%.

Chart 1: Distribution of Judgement Quality Change Adjustments¹¹

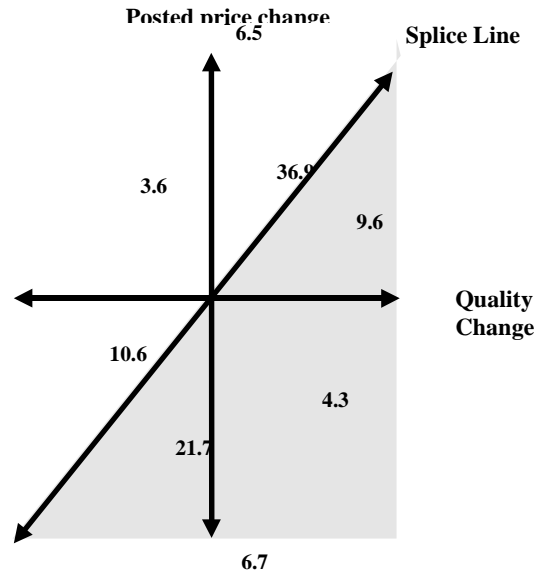
¹⁰ The tendency was not true for all items - for portable radios, for example, the index went down with a price and quality increase in 17% of all changes (though it still went up in 20%). Its pattern of small changes, other than recognising no quality change in a large number of cases, was similar to other commodities.

¹¹ In this chart the ratio of the price of the replacement to the price of the item it replaces can be plotted against the ratio of their qualities. If these are equal, the index will not change as a result of the replacement. This is a splice, and accounts for the splice line drawn on the chart. The shaded area shows those combinations where the index will fall, and conversely, combinations above the line will result in an increase in the index. One can plot each individual change on this chart, but the data points would saturate the area. Instead, it shows the percentage of cases that fall into each combination. There are thirteen possible combinations. Three of them are on the splice line: Price and quality both increasing, decreasing, or

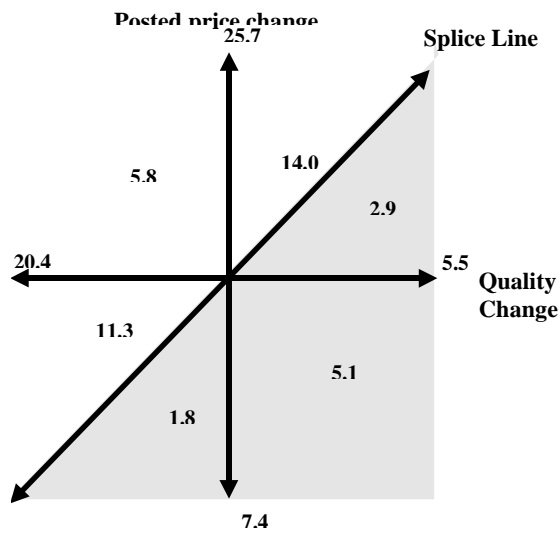
Occasional Purchases, excluding clothing:
Small Changes in Price (< 10%)



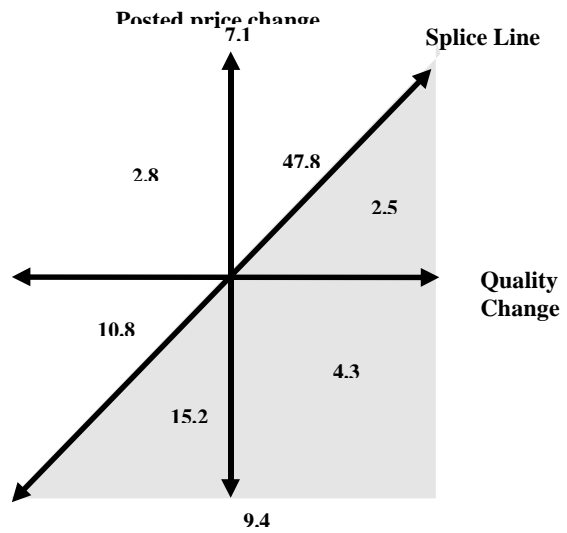
Large Changes in Price



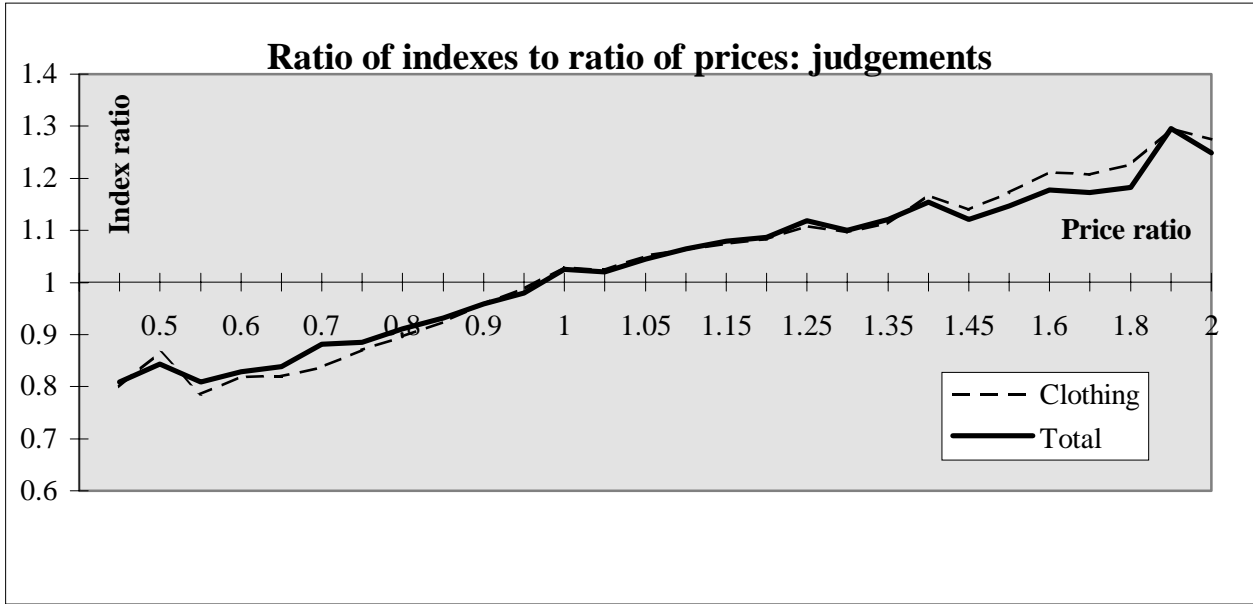
Clothing: Small Changes in Price (< 10%)



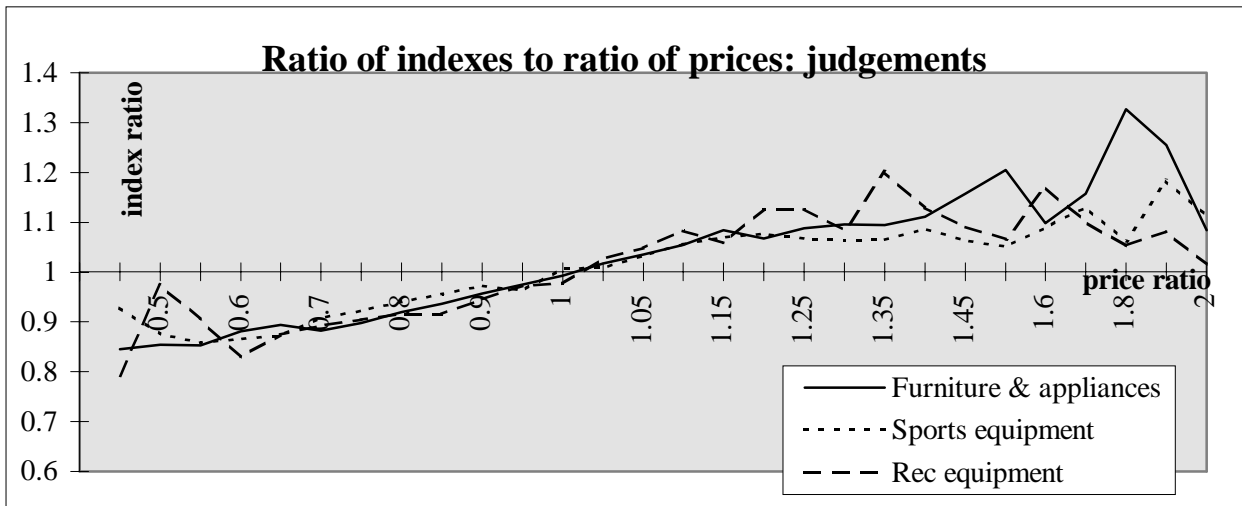
Large Changes in Price



staying the same. Then there are six segments; and four combinations, on the axes, where either the price or the quality does not change, but the other does. As only the judgement cases are plotted here, there are no numbers on the splice line. On the graphs showing large changes in the price ratio, there can be no combinations on the Y axis either.



	Distribution of price ratios																				Count								
Clothing	0.7	1.5	1.8	3.2	3.5	4.8	4.7	5.0	5.0	3.5	8.6	5.6	9.9	7.8	5.3	4.6	4.4	3.3	2.1	2.4	1.2	3.0	2.4	1.2	0.9	0.4	0.1	1.9	13635
Total	0.6	1.2	1.3	2.4	3.0	4.2	4.8	5.9	7.2	6.0	6.0	10.1	11.6	8.4	5.2	4.1	3.4	2.6	1.7	1.6	0.9	2.1	1.5	0.9	0.7	0.3	0.1	1.4	32488



	Distribution of price ratios																				Count								
Furniture & appl:	0.5	1.0	1.1	2.4	3.5	5.3	6.6	8.8	11.3	8.8	4.7	11.6	10.2	7.0	4.5	3.1	2.0	1.6	1.1	0.7	0.7	0.9	0.5	0.3	0.2	0.1	0.0	0.4	5111
Sports equipment	0.6	1.6	1.3	2.8	3.5	4.4	5.8	6.8	8.1	6.4	5.6	6.9	9.4	7.3	5.1	3.9	4.2	3.2	2.4	1.6	1.0	2.3	1.7	1.2	0.8	0.3	0.1	1.1	5065
Rec equipment	0.6	0.6	0.7	1.4	2.3	4.0	5.8	10.3	15.0	7.9	4.6	8.7	9.9	7.7	4.4	4.5	2.9	2.2	1.5	0.8	0.5	1.5	0.6	0.4	0.3	0.2	0.1	0.4	2258

This shape holds for all commodities. For clothing the line is a little steeper than for the others, but all tend to rise in approximately the same way.¹²

It is not obvious why this should be. We would expect price changes and quality changes to be correlated with each other, but why the difference between them? Splices would show as a flat line along $Y = 1$; we might expect judgements to lie along another line, or for there to be no discernible pattern.

Two possible explanations come to mind. The first is that price evaluators, whatever their rationalisations, subconsciously trim observed changes. There is something reassuring in this; they are consumers too, and the feeling that nothing is quite as good as it appears or quite as bad, is a common one. Another explanation could be that all producers, whatever they are making, or all retailers, whatever they are selling, may think that it is easier to put in a large real price increase with a large increase in quality and in the sticker price, than it is with a smaller one. It is more difficult though, to see why they would combine a large real price decline with a large apparent one.

For whatever reason, let us suppose that the judgements are correct. It follows that it is of paramount importance to ensure that the replacements are made consistently with the evolution of the market. If consumers are generally trading up in the market, then the replacement should generally be of a higher quality and price. According to statistics available for automobiles, this has generally been the case. On the other hand, if, as it has been observed in recent years for many commodities, the squeeze on incomes has led consumers to find cheaper goods, the replacement should be generally cheaper.

Is it possible that in the operation of the survey, the replacements have reflected these changes in the market? From the instructions given price collectors this would seem unlikely. They are instructed to find an item satisfying the same specification, which probably is not up-to-date with recent market trends. They are also told to find a market seller, but as the item being replaced is almost certainly not a market seller by the time it is replaced, that provides no guarantees for direct comparison.

However, it is possible that replacements may still, in this narrower field, mirror market evolution. It can be said with more confidence, that over the six years under study, the overall impact of judgement quality changes on commodity indexes at the Canada level has been small. This is because there have been almost as many downward replacements as upward ones. The average price ratio of replacements is not far from one for most commodities. This is despite the fact that over half the replacements have price ratios of more than 110% or less than 90%. There is a wide range of replacements within each commodity, whose impacts tend to cancel out for each commodity.¹³ There is no noticeable difference in the pattern of replacements among different commodities.

¹² At the extremes there is more noise; only 5% of price ratios are over 1.5. Recreational equipment in particular has a falling line at the right, but there are only 2% of its changes with a price ratio over 1.5 - 45 cases in six years). The other main group with a lot of changes - cars and vans - is not shown here; almost all its changes are within 25% of its previous price and within those boundaries, its relationship, when plotted, is indistinguishable from the others.

¹³ It does not cancel out within each geographic stratum, though. Index movements below the Canada level, for individual commodities, can vary widely, because of the impact of one quality change adjustment.

6. Conclusion

From what we see there is no justification to abandon all judgements to concentrate on drawing better samples. The ability to make small adjustments for occasionally purchased commodities is probably necessary. Clothing adjustments are not clearly wrong, and with the rapid turnover in the sample of seasonal items, matched samples would be very small. For that reason it may be worth using regression methods to match characteristics. But, if we are putting faith in regression methods for clothing, it is inconsistent to continue imposing judgements. If the consumer cannot make an informed assessment of the total package it is difficult to see how that consumer can assess the relative values of the embodied characteristics within it. An index based on regression methods should move in the long run like a matched sample. In any case, a good regression index requires a representative sample just as much as a conventional one does. And since a regression index can value a new characteristic no better than any other, it is vital, for any conventional one, that new products, even those with little importance, should be included in the sample as early as possible.

Many will disappear quickly too, but no-one can know which.

In summary, the impact of quality change assessment on index measurement has been quite limited in recent years. Apart from the high degree of dependence on relative prices reflecting relative qualities, the impact of judgements on the index has been muted, because of the relatively even distribution of upward and downward adjustments. Furthermore, their impact is compromised by a lack of current market data, which would guide us to the kinds of replacements that should be made. More attention to this would improve the quality adjustment process as well as providing us with other benefits associated with developing a more diverse and more up-to-date sample.

References:

Markle, Terri. 1997. *An application of the hedonic approach to clothing items in the Consumer Price Index*. Ottawa, Canada: Statistics Canada 62F0014MPB.

Scobie, Hugh. 1997. *Use of scanner data - the impact of new goods*. Ottawa, Canada: Statistics Canada, unpublished paper prepared for meeting of Price Measurement Advisory Committee, May 1997.

Turvey, Ralph. 1997. *New outlets & new products*, this volume.

Table 1. Incidence of changes for routine items

Basic group number	Title	Weight in 1986	Incidence of outlet losses (%)	Incidence of quality changes		% of quality changes that are splices
				all changes (%)	judgement changes (%)	
1009	round steak	0.28	5.3	1.4	0.5	65.5
1011	sirloin steak	0.25	5.1	3.9	1.9	51.8
1013	prime rib roast	0.09	5.3	5.9	2.4	59.7
1015	chuck or blade roast	0.17	4.5	10.8	3.9	64.2
1017	stewing beef	0.05	4.6	2.0	0.2	89.1
1019	ground beef	0.44	4.3	2.6	0.9	65.6
1025	veal	0.09	4.0	17.1	3.4	80.3
1027	lamb	0.05	3.9	19.1	3.3	82.5
1033	pork loin chops	0.31	5.2	1.1	0.3	69.6
1037	boston butt	0.05	4.2	5.2	1.0	80.6
1045	beef liver	0.03	3.6	12.6	1.9	84.6
1053	chicken	0.48	4.2	6.1	0.9	85.7
1055	frozen turkey	0.08	4.1	17.2	3.1	82.3
1061	sliced bacon	0.15	4.6	13.0	0.9	93.4
1063	dinner ham	0.09	3.4	35.5	2.7	92.3
1069	pork sausage	0.12	3.9	18.0	1.4	92.1
1073	weiners	0.11	4.4	11.2	1.1	90.5
1075	salami sausage	0.17	3.7	19.7	1.0	95.2
1079	sliced cooked meats	0.24	4.4	17.3	0.7	96.0
1081	beef or chicken conc.	0.06	4.5	10.2	0.7	93.3
1089	canned luncheon meat	0.05	5.1	6.7	0.2	97.2
1095	frozen cod fillets	0.07	4.8	19.6	6.4	67.2
1097	frozen sole fillets	0.09	4.9	21.2	7.2	66.2
1099	frozen haddock fillet	0.04	5.4	21.6	2.4	88.9
1113	fish sticks	0.01	4.8	7.6	0.5	93.2
1121	canned salmon	0.06	3.8	20.6	1.2	93.9
1123	canned tuna	0.05	3.9	24.7	1.5	93.9
1131	canned shrimp	0.05	5.7	18.2	0.6	96.5
1133	canned smoked oysters	0.06	4.5	15.7	0.6	95.9
1143	half and half cream	0.04	0.5	0.7	0.0	100.0
1145	homogenised milk	0.29	5.5	0.4	0.0	87.5
1147	2% milk	0.65	5.8	0.4	0.0	87.0
1151	yoghurt	0.11		8.7	0.9	89.2
1153	butter	0.19		6.8	0.8	88.9
1155	cheddar cheese	0.20	4.7	9.0	0.5	94.2
1159	processed cheese slices	0.19	4.9	6.2	0.5	91.2
1161	cottage cheese	0.04	4.5	11.1	1.5	86.8
1163	mozzarella cheese	0.22	4.4	16.1	1.0	93.8
1165	powdered skim milk	0.01	4.8	10.6	0.5	95.6
1167	evaporated milk	0.03	5.1	6.2	1.1	82.4
1169	ice cream	0.12	4.7	12.0	1.3	89.1
1177	eggs	0.21	5.3	0.6	0.3	58.3
1183	bread	0.47	1.5	7.5	0.7	91.3
1185	hamburger buns	0.18	4.7	11.7	1.2	90.0
1187	soda crackers	0.11	4.7	6.4	1.4	78.6
1189	cookies	0.23	4.2	10.9	1.2	88.8
1191	doughnuts	0.03	4.4	25.2	2.1	91.7
1195	bran muffins	0.17	4.5	4.2	0.6	87.0
1203	macaroni	0.09	5.0	8.8	0.9	89.4
1205	macaroni/cheese dinner	0.03	5.0	6.1	0.6	90.8
1209	long grain rice	0.07	5.1	6.3	0.4	93.9
1211	flour	0.06	4.9	8.1	0.5	93.6

Basic group number	Title	Weight in 1986	Incidence of outlet losses	Incidence of quality changes		% of quality changes that are splices
				all changes	judgement changes	
			(%)	(%)	(%)	
1219	breakfast cereal	0.23	4.8	7.6	0.9	88.3
1221	cake mix	0.04	5.0	6.2	1.0	84.5
1229	apples	0.20	5.4	1.3	0.3	80.0
1231	bananas	0.15	5.6	0.4	0.2	42.9
1235	grapefruit	0.03	6.0	0.9	0.5	47.4
1237	grapes	0.13	3.3	11.3	0.1	98.8
1241	melon	0.05	10.6	2.2	0.2	89.1
1243	oranges	0.18	5.4	2.2	0.3	84.4
1245	peaches	0.05	20.2	0.5	0.5	12.5
1247	pears	0.04	5.6	1.0	0.3	70.0
1249	plums	0.02	20.4	0.1	0.1	0.0
1255	fresh strawberries	0.03	20.7	5.5	2.9	46.8
1269	seedless raisons	0.05	4.9	9.2	0.4	95.5
1277	canned apple juice	0.12	4.6	13.9	1.4	90.2
1281	canned orange juice	0.10	5.0	30.8	3.6	88.2
1287	frozen orange juice	0.14	4.9	8.0	1.2	85.5
1301	canned fruit cocktail	0.02	4.9	9.5	0.3	96.6
1305	strawberry jam	0.11	5.0	9.7	0.5	94.6
1315	shelled peanuts	0.08	4.9	20.0	1.2	94.1
1325	broccoli	0.05	0.6	7.2	1.2	83.8
1329	cabbage	0.03	5.5	3.7	0.6	82.7
1331	carrots	0.07	5.6	1.9	0.5	75.7
1335	celery	0.05	6.2	2.2	0.5	76.1
1337	corn	0.03	20.9	13.7	3.9	71.9
1339	cucumbers	0.05	5.3	2.4	1.3	48.0
1341	lettuce	0.12	5.5	3.7	1.6	56.0
1343	mushrooms	0.08	4.5	4.4	1.1	75.7
1345	onions	0.07	5.5	0.5	0.3	33.3
1349	potatoes	0.16	5.4	1.5	0.6	58.6
1355	tomatoes	0.17	5.2	1.9	0.8	55.0
1373	frozen french fries	0.08	3.8	4.7	0.3	92.9
1383	canned green beans	0.05	5.0	15.0	0.4	97.2
1385	canned baked beans	0.04	4.7	5.8	0.4	92.7
1393	canned corn	0.04	5.0	10.7	0.9	91.7
1397	canned peas	0.03	4.8	11.2	0.4	96.3
1399	canned tomatoes	0.06	4.5	9.5	0.5	94.4
1403	canned tomato juice	0.03	4.5	9.5	1.1	88.4
1409	pickles	0.06	4.9	11.8	1.0	91.3
1413	ketchup	0.04	4.6	12.5	1.2	90.1
1415	spaghetti sauce	0.11	4.8	13.3	1.3	90.4
1417	salad dressing	0.09	4.8	9.7	1.0	90.1
1421	black pepper	0.03	5.0	23.5	10.0	57.6
1427	white sugar	0.08	4.9	1.5	1.0	28.1
1435	candy bar, chocolate	0.22	19.4	12.1	0.7	94.4
1449	roasted coffee	0.13	2.9	3.7	0.8	79.7
1451	instant coffee	0.15	4.7	7.0	1.1	84.2
1455	tea bags	0.08	4.8	12.3	1.6	87.3
1461	margarine	0.12	4.8	14.2	1.8	87.4
1473	cooking or salad oil	0.07	4.9	7.9	0.8	90.4
1479	canned vegetable soup	0.14	5.2	5.9	0.7	88.7
1485	baby food	0.02	31.9	10.6	1.5	86.1
1489	infant formula	0.04	0.0	0.0	0.0	100.0
1495	frozen cake, iced	0.09	4.9	15.2	0.7	95.2
1497	frozen meat pie	0.05	4.9	8.9	1.6	82.4

Basic group number	Title	Weight in 1986	Incidence of outlet losses (%)	Incidence of quality changes		% of quality changes that are splices
				all changes (%)	judgement changes (%)	
1503	cocoa	0.06	4.7	3.7	0.6	84.6
1509	honey	0.03	4.8	12.1	0.5	95.9
1511	peanut butter	0.10	5.2	6.2	0.4	93.7
1517	fruit flavoured crystals	0.06	5.1	7.1	1.1	84.8
1519	table salt	0.03	5.0	2.5	0.0	96.2
1525	potato chips	0.16	5.0	14.8	1.8	87.9
1537	soft drinks	0.52	4.2	22.1	9.0	59.1
1717	snacks	0.68	19.1	26.4	8.4	68.0
1729	take home food	0.81	4.7	9.1	1.6	82.8
2041	fuel oil, furnace	0.48	3.7	1.5	0.1	91.7
2223	day care	0.58	4.7	2.7	1.4	47.4
2229	baby sitting	0.22	19.9	1.3	0.2	84.6
2231	house cleaning service	0.29	12.5	12.0	4.9	59.5
2235	canned dog food	0.29	5.0	17.4	2.7	84.6
2237	dry/moist dog food	0.22	5.0	14.0	1.7	88.0
2247	synthetic deterg. powder	0.25	4.1	51.6	16.2	68.6
2249	dishwashing detergent	0.09	4.7	28.2	6.7	76.1
2251	dishwasher detergent	0.06	4.8	11.1	2.3	78.9
2257	scouring powder	0.12	4.5	4.3	0.6	84.8
2259	liquid floor wax	0.09	4.8	15.6	1.3	91.7
2265	liquid bleach	0.08	4.6	9.3	1.8	80.7
2267	liquid fabric softener	0.14	4.7	17.7*	5.0	71.8
2275	paper towels	0.12	4.2	21.6	2.2	90.0
2277	tissues	0.36	4.4	16.2	2.1	86.7
2281	envelopes	0.05	7.1	31.9	7.3	77.1
2285	paper	0.11	4.7	14.7*	1.0	93.0
2287	garbage bags	0.11	4.6	8.2	1.3	84.0
2289	plastic wrap	0.05	5.0	6.3	0.8	87.5
2291	aluminum foil	0.07	4.9	9.0	1.1	87.6
2309	light bulbs	0.09	5.1	33.7	6.7	80.0
2311	batteries	0.10	10.9	14.8	4.0	73.2
3713	sewing thread	0.03	7.5	4.4	1.4	69.2
3731	drycleaning	0.38	5.4	3.2	0.8	75.6
3733	coin operated laundry	0.21	4.2	3.4	0.3	92.6
4019	auto fuel	3.76	10.4	2.2	0.1	94.4
4045	parking - hourly	0.14	5.5	2.6	0.6	76.2
5003	bandages	0.03	6.9	26.6	1.6	94.2
5005	pharmaceuticals	0.48	6.5	11.1*	1.4	87.2
5015	soaking solution	0.05	6.8	0.3	0.0	100.0
5207	cleansing cream	0.17	6.8	32.2	1.8	94.5
5211	lipstick	0.09	8.0	14.0	2.3	83.2
5215	cologne	0.19	7.2	37.5	2.0	94.7
5221	shampoo	0.32	7.4	21.6	2.5	88.6
5229	deodorant	0.19	6.9	17.6	2.4	86.6
5231	shaving cream	0.08	4.5	11.2	0.8	92.6
5239	toothpaste	0.16	6.6	12.0	2.1	82.9
5243	toilet soap	0.12	6.5	32.3	2.1	93.4
5245	razor blades	0.05	6.5	15.1	0.7	95.3
5247	infants' disposable diapers	0.12	7.0	36.3	2.9	92.0
5253	saniarty napkins	0.16	6.5	31.1	9.1	70.8
6057	35 mm colour film	0.12	5.1	14.3	2.8	80.4
6059	35mm colour film printing	0.27	8.2	14.2	8.9	37.6
6143	cassettes and CDs	0.30	17.6	10.3*	6.3	38.9
6145	video tape	0.07	5.4	33.3	5.7	82.8

Basic group number	Title	Weight in 1986	Incidence of outlet losses (%)	Incidence of quality changes		% of quality changes that are splices
				all changes (%)	judgement changes (%)	
6151	movie cassette rental	0.15	6.1	20.3	1.2	94.0
6159	movie admission	0.20	7.5	3.3	0.3	89.5
6305	magazines	0.22	6.0	0.5	3.3	77.3
6307	books	0.25	5.2	0.4	0.0	96.8
7005	cigarellos	0.02	21.7	15.9	3.4	78.9
7007	cigarettes	1.89	13.7	9.1	3.5	62.0
7205	beer in licensed premises	0.87	8.7	10.6	2.8	73.7
7209	liquor in licensed premises	0.48	8.7	14.7	3.6	75.6
7213	beer at home	0.99	8.9	6.8	2.4	64.5
7215	wine	0.56	1.6	13.5	6.2	54.0
7217	liquor	0.85	1.3	9.5	5.7	40.2

* indicates some diversity in the incidence of changes within sub-groups of this basic group.

Table 2. Incidence of changes for occasional items

Basic group number	Title	Weight in 1986	Incidence of outlet losses (%)	Incidence of quality changes		% of quality changes that are splices
				all changes (%)	judgement changes (%)	
1705	breakfast	0.28	13.1	11.6	2.4	79.0
1707	lunch	1.05	5.9	16.6	6.0	64.0
1709	dinner	2.22	7.5	34.7	13.7	60.5
2015	home maintenance	1.76	3.9	31.3*	12.5	59.9
2055	hotel accommodation	0.42	8.3	6.4	2.3	63.8
2057	motel accommodation	0.41	11.1	3.9	1.9	50.0
2297	nursery shrubs	0.18	11.0	27.4	8.1	70.4
2299	flowers	0.19	9.5	20.5*	8.0	61.1
2303	lawn fertilizer	0.08	12.2	38.1	12.6	66.8
2511	sofa	0.60	4.4	62.9	30.2	52.0
2517	bedroom suite	0.40	4.4	43.3	19.0	56.1
2521	dining room suite	0.27	3.8	49.0	23.1	53.0
2525	entertainment centre	0.24	3.8	30.6*	9.0	70.5
2527	patio furniture	0.04	11.9	45.0	19.4	57.0
2531	mattress & boxspring	0.20	5.2	50.3	22.8	54.7
2539	curtains	0.17	7.2	27.5	12.7	53.9
2541	drapes	0.16	7.3	33.1	18.3	44.9
2547	bed sheets	0.11	4.9	46.1	22.0	52.2
2551	comforter	0.12	4.8	42.5	21.9	48.5
2555	bath towel	0.09	5.0	33.5	17.5	47.8
2559	broadloom	0.12	9.2	48.7	26.6	45.4
2583	refrigerator	0.29	4.8	75.3	42.1	44.1
2591	electric range	0.12	4.9	68.3	36.3	46.8
2593	microwave oven	0.23	7.3	72.4	31.8	56.0
2594	gas barbecue	0.05	5.6	53.0	32.6	38.5
2595	electric kettle	0.05	4.5	32.4	8.9	72.6
2605	food mixer	0.04	4.6	31.9	5.3	83.4
2611	automatic washer	0.18	5.0	63.7	33.2	47.8
2613	clothes dryer	0.11	5.0	68.1	38.1	44.1
2621	vacuum cleaner	0.20	6.8	51.3	21.0	59.1
2623	dishwasher	0.05	4.8	65.1	34.8	46.5
2633	cookware	0.08	6.3	40.3*	9.6	76.2
2643	silverplated flatware	0.02	6.2	7.6	2.3	69.4
2645	stainless steel flatware	0.03	6.5	16.1	5.6	65.5
2647	bone china dishes	0.09	5.1	31.2*	8.1	74.1
2649	crystal glassware	0.04	7.2	21.5	6.3	70.8
2655	power tools	0.10	15.8	30.1	9.3	69.3
2657	hand tools	0.15	9.9	18.5	2.9	84.3
2663	lawnmower, gasoline	0.23	13.5	50.1	30.0	40.1
2687	luggage	0.05	6.8	30.0	11.2	62.8
2701	appliance repairs	0.09	7.4	20.9	5.5	73.8
3007	women's fur coat	0.17	10.7	72.2	56.2	22.1
3009	women's winter coat	0.24	6.8	89.3	66.0	26.0
3011	women's raincoat	0.06	3.6	76.9	56.8	26.1
3013	women's blazer	0.09	8.3	67.2*	40.2	40.2
3019	women's dress	0.72	2.3	99.7	48.7	51.1
3025	women's slacks	0.28	6.4	64.8	37.4	42.3
3027	women's skirt	0.22	5.4	70.0	42.9	38.8
3029	women's blouse	0.34	3.9	96.9	47.1	51.4
3033	women's sweater	0.34	6.6	89.4	53.6	40.0
3039	women's bathing suit	0.18	9.2	93.5	63.6	31.9
3047	women's brassiere	0.12	6.6	29.4	12.5	57.6

Basic group number	Title	Weight in 1986	Incidence of outlet losses	Incidence of quality changes		% of quality changes that are splices
				all changes	judgement changes	
			(%)	(%)	(%)	
3049	women's underwear	0.10	6.6	36.4	16.1	55.9
3051	women's pantyhose	0.24	5.6	23.9	10.5	56.1
3053	women's nightgown	0.07	6.2	82.3	47.5	42.2
3055	women's lounge gown	0.04	7.5	86.6	47.2	45.5
3059	women's gloves	0.04	4.5	63.0	30.8	51.2
3063	women's handbag, etc.	0.17	4.8	79.9*	37.8	52.6
3069	women's wrist watch	0.06	5.8	61.0	30.8	49.5
3071	women's gold jewelry	0.38	9.5	32.6	14.0	57.0
3077	women's shoes	0.57	3.9	67.6	39.2	42.0
3203	girls winterwear	0.08	3.2	40.2	28.6	28.9
3209	girls sweater	0.10	6.6	90.8	50.5	44.3
3211	girls socks	0.06	5.8	60.0	22.2	63.0
3215	girls shoes	0.11	3.4	75.7	36.9	51.2
3307	men's coat	0.17	9.2	56.5*	38.5	31.9
3309	men's raincoat	0.02	4.2	63.7	40.7	36.1
3311	men's golf jacket	0.08	5.6	74.3	44.9	39.6
3315	men's business suit	0.34	2.6	75.6	48.6	35.7
3317	men's sports jacket	0.13	3.3	45.4	29.7	34.6
3321	men's jeans	0.20	3.9	25.6	12.2	52.4
3323	men's dress/casual slacks	0.21	4.6	37.1	19.8	46.7
3327	men's dress shirt	0.20	5.1	40.9	23.6	42.3
3333	men's sweatshirt	0.18	4.0	65.3	37.7	42.3
3335	men's sweater	0.17	5.6	84.2	50.8	39.7
3337	men's socks	0.08	3.9	46.1	18.7	59.4
3339	men's briefs	0.08	5.2	23.0	11.1	51.7
3345	men's ski jacket	0.04	5.4	92.5	62.9	32.0
3347	men's swim trunks	0.07	4.5	63.0	35.4	43.8
3357	men's wallet	0.13	4.8	77.7	39.1	49.7
3363	men's wrist watch	0.15	5.1	68.2	31.4	53.9
3371	men's shoes	0.22	5.0	48.4*	26.9	44.5
3373	men's work boots	0.09	9.3	26.5	12.0	54.6
3375	men's athletic shoes	0.09	3.6	65.3	39.6	39.3
3503	boys ski jacket	0.05	7.3	90.2	61.4	31.9
3505	boys jeans	0.09	5.5	40.3	20.9	48.2
3507	boys shirt	0.07	6.6	80.4	45.5	43.4
3513	boys shoes	0.08	4.7	65.0	36.2	44.3
3605	infants sleeper	0.12	4.8	64.1	29.3	54.2
3705	knitting yarn	0.07	6.3	11.1	4.1	63.3
3709	broadcloth	0.09	7.3	34.7*	19.6	43.5
3715	zipper	0.03	8.0	16.7	4.7	72.0
3725	shoe repairs	0.04	6.5	2.9	0.2	92.9
4005	new car purchase	7.10	7.9	57.2	51.9	9.2
4007	new van purchase	1.01	5.0	77.9	65.8	15.5
4015	car rental	0.41	1.3	16.0	9.5	40.8
4023	automobile tire replacement	0.30	5.6	33.5	6.3	81.2
4025	car battery	0.05	6.4	22.1	3.3	85.3
4027	auto maintenance items	0.29	11.9	34.8*	0.8	97.6
4031	oil change	0.02	16.6	23.4*	0.4	98.2
4033	tune up	0.21	3.4	35.6	3.4	90.6
4035	auto repairs	0.76	3.5	36.2	3.2	91.1
4047	driving lessons	0.04	5.5	23.9	15.5	34.9
5009	eyeglass lenses	0.23	6.9	3.0	0.4	85.7
5011	contact lenses	0.02	6.7	4.9	1.5	68.9
5013	eyeglass frames	0.03	6.2	36.2	1.2	96.6

Basic group number	Title	Weight in 1986	Incidence of outlet losses (%)	Incidence of quality changes		% of quality changes that are splices
				all changes (%)	judgement changes (%)	
5023	dentures	0.14	5.4	5.9	3.0	49.0
5025	dental care	0.51	12.8	1.8	0.4	75.4
5249	portable hair dryer	0.02	4.9	46.0	5.7	87.6
5257	hairdressing	0.96	5.1	9.3	2.9	69.4
6007	golf equipment?	0.06	10.2	32.1*	21.8	32.2
6009	hockey equipment	0.04	10.6	48.2	36.0	25.2
6011	men's hockey skates	0.04	23.3	50.7	43.1	15.1
6013	alpine ski equipment	0.08	8.8	76.2	63.3	17.0
6015	cross country skis	0.02	27.7	51.6	37.7	26.9
6017	fishing gear	0.05	14.7	21.9*	13.4	38.7
6019	sports equipment	0.14	12.7	57.3	34.4	39.9
6025	doll	0.09	8.9	54.1	34.8	35.7
6027	toys	0.09	9.6	51.0	36.5	28.4
6043	games	0.42	7.5	31.3	25.0	20.3
6049	camera	0.11	19.7	46.6	18.2	61.0
6075	sleeping bag	0.05	8.5	43.2	24.3	43.6
6087	travel trailer	0.11	9.3	39.3*	31.9	18.9
6091	motorcycle	0.14	8.1	33.5	20.3	39.4
6099	boat	0.13	12.5	27.6*	18.2	34.0
6101	bicycle	0.12	18.6	39.0*	25.3	35.2
6127	portable radio/cassette player	0.12	8.7	65.4	19.6	70.0
6131	colour TV	0.33	14.7	56.0	23.2	58.5
6139	VCR	0.28	10.1	59.2	24.9	58.0
6141	stereo equipment	0.23	31.2	56.5	18.1	67.9
6153	VCR repairs	0.03	21.8	9.2	1.1	88.0
6179	golf membership	0.16	6.9	6.3	4.5	29.3
6181	bowling	0.03	4.5	1.8	1.7	7.7
6189	fitness centre	0.23	5.1	13.3	7.1	46.6
6195	golf green fee	0.18	6.6	3.5	1.5	56.5
6201	alpine ski lift fee	0.17	1.5	15.5	7.5	51.9
6213	package holiday trip	0.84	10.6	32.8	31.2	4.9
6513	piano lessons	0.19	8.1	3.7	1.3	64.7

* Indicates some diversity in the incidence of changes within sub-groups of this basic group.