

The Ottawa Group after Ten Meetings: Future Priorities

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Abstract

The paper briefly reviews the accomplishments of the Ottawa Group on the occasion of its tenth meeting and then goes on to list ten problem areas in price measurement that have not been completely resolved and hence should be a focus of future meetings. The ten problem areas are: (1) the construction of elementary indexes when price and quantity data are available; (2) the construction of user costs for capital inputs; (3) the quality adjustment of prices; (4) the construction of price indexes for owner occupied housing; (5) problems associated with difficult to measure services; (6) the treatment of prices associated with household production; (7) the measurement of export and import prices in the production accounts of the System of National Accounts; (8) the treatment of seasonal products; (9) the measurement of core inflation and (10) the treatment of new goods.

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Ottawa Group, index numbers, elementary price indexes, user costs, owner occupied housing, hedonic regressions, seasonal products, core inflation, new goods.

1. Introduction

David Fenwick (2007) in his excellent overview paper reviewing the performance of the Ottawa Group at its tenth meeting² provided:

¹ This is a written version of Diewert's discussion at session 11, "Panel Discussion of the 10th Ottawa Group Meeting: State of CPIs after 10 meetings and 13 years", of the 10th Meeting of the Ottawa Group (International Working Group on Price Indices) held in Ottawa, October 9-12, 2007. The author thanks Paul Armknecht, Bert Balk, Carsten Boldsen Hansen, Paul Schreyer, Mick Silver and Kim Zieschang for helpful comments. This paper was also presented on October 22, 2007 at the ESRI Forum of the Economic and Social Research Institute, Cabinet Office, Government of Japan, Tokyo.

² The first meeting of the Ottawa Group was at Ottawa in October 1994 and was followed by meetings at Stockholm, Voorburg, Washington D.C., Reykjavik, Canberra, Paris, Helsinki, London and now Ottawa again. The idea of having this group to look at price measurement problems originated with Paul

- An overview of the topics discussed at all of the meetings;
- The achievements of the Group;
- Outstanding issues that need to be resolved;
- Suggestions for improving the effectiveness of the Group and
- A small list of future priorities.³

Fenwick's paper led off the Panel Discussion on the Ottawa Group after ten meetings and his paper should certainly be read in conjunction with the panelists' remarks.⁴ Panelists were asked to comment on the following three questions:

- What were the Ottawa Group's noteworthy achievements?
- What are the main outstanding issues?
- What are the implications of the outstanding issues for the Group's future program of work, its methods for addressing the work program and its terms of reference?

On the first question, it seems to me that the Ottawa Group's major achievement was to mobilize resources to write the CPI and PPI Manuals; see the ILO (2004) and IMF (2004). Virtually all of the Manual chapters were written by members of the Ottawa Group.⁵ One of the main strengths of the Ottawa Group was that it brought together academic specialists in the area of price measurement with practitioners in statistical agencies that actually had to construct price indexes. Both groups learned from each other and the result was that the Manuals could be read by both the academic and practitioner communities.

Armknecht, Bert Balk and Bohdan Schultz at a meeting in Geneva. Schultz persuaded Jacob Ryten (then at Statistics Canada) to setup the Group.

³ One of Fenwick's main priorities was the development of a coherent, overall framework for relating the various price indexes to each other and their uses: "There continue to be issues of coherence between different price indices within the family of price indices. ... A coordinated approach to the systematic application of frameworks for the development of price indices is long overdue and the lack of one may be considered to be one of the main reasons for the current lack of supplementary indices to fill in the gaps in our understanding of inflation and for outstanding issues of coherence between indices and for the limited international comparability between the different indices produced by different countries." David Fenwick (2007; 4-5). This framework theme, which is addressed in the context of the prevailing *System of National Accounts 1993* in Chapter 14 of both the *CPI Manual* (2004) and *PPI Manual* (2004), is further developed in Fenwick (2006) and Diewert (2007), who suggest that an expanded System of National Accounts should be the starting point for the overall framework. The main problem with *SNA 1993* is that it does not provide for a decomposition of primary input value flows into their price and quantity components, except that a labour price index was suggested. The current revision of the international System of National Accounts is addressing this omission by introducing the user cost of capital concept into the production accounts.

⁴ The other three panelists were Paul Armknecht, Bert Balk and Yoel Finkel.

⁵ Ottawa Group members are active in writing the next generation of price index manuals as well; e.g., the IMF is the lead organization involved in writing a Manual on export and import price indexes (the XMPI Manual) and Ottawa Group members have written most of the chapters in this Manual as well.

Since I do not have any expertise in organizational matters, I will not attempt to answer the third question listed above: other members of the Ottawa Group are far more competent to answer this question.

On the second question about outstanding issues, I will give a list of ten issues that I feel are either unresolved or not completely resolved. The list is approximately in order of priority in my view. In keeping with the fact that I am primarily an academic, some of the issues that I will raise are rather far from resolution but I think it will be useful to put these issues on the table so that we can at least think about them over the next ten years.

2. Elementary Indexes and Electronically Collected Data

One of the major problem areas in constructing price indexes is the difficulty in obtaining data on quantity or value *weights* that could be used to weight either individual prices or price relatives at the lowest level of aggregation. However, with the development of computers, data on prices and quantities at the lowest level of aggregation are available both for households (with the development of household panel data by various private enterprises) and for firms⁶ (from their computerized sales, managerial or financial accounting records).

Unfortunately, the indexes that result from the use of scanner data are not always “sensible”. In particular, if weekly unit values for retail sales are constructed using scanner data, the resulting weekly indexes frequently show wild fluctuations, even if fixed base indexes are used.⁷ The problem seems to be due to seasonal fluctuations and more or less random price changes made by firms in order to price discriminate. My suggested solution to this problem is to move to say four week unit values as the basic prices that would go into an index number formula and if the resulting indexes are still unstable, then it may be necessary to move to six week unit values or even quarterly unit values for the case of prices that have very large week to week fluctuations. More research into these problems of randomly fluctuating prices is required.

As a side note, I believe that statistical agencies should be planning to eventually collect prices along with the corresponding quantities at the elementary level (to at least some extent) and this collection should be done electronically. In particular, I think that statistical agencies should pay some attention to the electronic data collection methods being pioneered by Statistics Iceland for its PPI.

Another area of concern in the construction of elementary indexes is the problem of outlet substitution bias. Greenlees and McClelland (2007) make a nice contribution to the resolution of this problem, adding considerable value to earlier outlet substitution measurement methodologies developed by Diewert (1988) and Hausman and Leibtag

⁶ The Icelandic PPI is using this methodological approach with great success to construct their PPI; see Gudmundsdottir, Gudnason, Joensen and Jonsdottir (2007).

⁷ See Ivancic (2007) for evidence on this phenomenon. Dutch experience with the use of scanner data uncovered the same type of instability.

(2008). The main unsolved problem in this area is how exactly can we adjust for possible amenity differences in “comparable” outlets?

3. Input and Intermediate Input Price Indexes

Fenwick (2007) in his Appendix A lists the terms of reference for the Ottawa Group and if the reader looks at these terms of reference, it will be seen that while the primary focus is on Consumer Price Indexes, all aspects of price statistics are within its terms of reference. With the publication of the CPI and PPI Manuals on price measurement, the methodology for the CPI and PPI is reasonably well developed, at least for Consumer Price Indexes and Producer Price Indexes for the outputs produced by firms.

However, there are some gaps in the system of price indexes that are covered by the two Manuals. One gap is that the role of internationally traded goods and services was not well articulated in the PPI Manual. This gap is being addressed in the forthcoming XMPI Manual, which is being coordinated by the IMF. But there are some additional large gaps in our system of price statistics; namely, there are gaps in our coverage of price indexes for intermediate and primary inputs in the production accounts of the System of National Accounts. Why are these gaps important? Because an increasing number of countries and private researchers want to be able to calculate the *productivity growth* of the economy as a whole and of particular industrial sectors as well.

The basic methodology for calculating productivity growth for an economy or industrial sector was laid out many years ago by Jorgenson and Griliches (1967) (1972).⁸ A key aspect of their methodology was that they introduced the concept of the *user cost of capital* in order to estimate a price for the services of a capital input being used by a production unit over the course of a period. This concept is not present in the last version of the *System of National Accounts 1993* but it is being considered as a way of decomposing operating surplus into price and quantity components in the current revision of SNA 1993.⁹ A major problem with SNA 1993 is that in the production accounts, it did not deal well with the problems caused by *the durability of capital inputs*; i.e., the current flow of capital services does not show up in the production accounts and should be integrated into these accounts. Durable inputs provide their flow of services over many periods and so the purchase price of a durable input must be decomposed into its current and future service flows and its current flow of services (its user cost) should appear in the production accounts, at least if we want to use the production accounts in order to measure productivity. Unfortunately, constructing a user cost is not completely straightforward. Price statisticians are generally aware of the user cost concept because it

⁸ Basically productivity growth over two periods can be regarded as an index of rates of growth of individual outputs produced by the production unit divided by an index of rates of growth of the input services used by the unit. See Schreyer (2001) for a more comprehensive review of methods.

⁹ See Schreyer (2007). Introducing the user cost of capital into the System of National Accounts can be regarded as a method for splitting up gross operating surplus into price and quantity components and this is how Schreyer presents the user cost concept to national income accountants.

arises in the context of measuring the price of owner occupied housing services as an alternative to the more familiar rental equivalence concept.¹⁰

Since user costs may creep into the next version of the SNA (at least for countries that want to have productivity accounts), there will be a need for price statisticians in these countries to provide user costs as deflators for various rows in the primary input and intermediate input parts of the production accounts. Thus there is a need for price statisticians to prepare for the increased demand for their services that will result from this possible expansion of the SNA.¹¹

4. Quality Adjustment and Hedonics

The topic of quality adjustment has been with us since the formation of the Ottawa Group and it is still with us. We have chapters in the CPI and PPI Manuals on methods of quality adjustment¹² and the use of hedonic methods but somehow, we still seem to have trouble making definite recommendations for specific situations. In addition, the theory surrounding the use of hedonic regressions has still not stabilized. Hopefully, in future years, the methodology in this area will become more routine.¹³

5. Housing Price Indexes and the Treatment of Owner Occupied Housing

It is apparent that for many purposes, we need two kinds of price index for owner occupied housing:

- An asset value price index and
- An index that would price the flow of services from the use of owner occupied housing.

Diewert (2007a) considered the problems associated with forming the first type of index in some detail and briefly considered some of the alternative approaches to measuring the flow of services from OOH. For additional detail on the problems associated with forming these indexes, see Fenwick (2006), Olczyk and Neideck (2007) and Prud'Homme and Erdur (2007).

There is not a lot of controversy on the necessity of forming an asset type price index for housing; the only controversy is on how exactly to do it, taking into account that houses are subject to depreciation and renovations and hence the usual matched model methodology for pricing is not (precisely) applicable. In addition, there is a certain

¹⁰ See Diewert (2007) for a summary of the issues involved in deciding between the various methods for measuring housing services.

¹¹ There are many problems that remain to be solved in developing these productivity accounts. In particular, financial flows of capital and the treatment of monetary deposits will create many difficulties in both the intermediate and primary input parts of these expanded production accounts.

¹² See also Triplett (2004) who developed a very extensive handbook on the use of hedonic methods of quality control and compared these methods with other methods used by statistical agencies.

¹³ The papers by Diewert, Heravi and Silver (2007) and de Haan (2007) presented at this conference compare various approaches to hedonic regressions.

amount of controversy on how to deal with the services of owner occupied housing. Statistics New Zealand and Eurostat prefer the *acquisitions approach*, Statistics Iceland prefers a *user cost approach*¹⁴ and most other statistical agencies prefer a *rental equivalence approach*.¹⁵ Diewert (2007a) suggested yet another approach: the *opportunity cost approach*, which argued that both the rent that an owner occupied house can get on the market and the cost of the capital that is tied up in the house (plus depreciation less anticipated capital gains) is a form of opportunity cost and hence the “true” opportunity cost of the house is the *maximum* of its rental value and user cost. Diewert (2007) also suggested that statistical agencies should pick their preferred treatment of the services of OOH and put this treatment in their headline CPI and then the various alternative approaches could be made available to users as analytical series.¹⁶ Hopefully, over the next 10 years, we will be able to test these various options and come to some agreement on the way forward.

6. Difficult to Measure Goods and Services

The fact that many services are extremely complex and hence are difficult to measure is not new; in fact, the Voorburg Group was set up specifically to deal with this problem. However, progress seems to be a bit slow.¹⁷ In particular, the following areas require substantial efforts in order to develop methodologies for pricing these services:

- Insurance; i.e., should we take a net or gross claims approach? How exactly do we deal with changes in the risk environment?
- Gambling. Again, the issue here is exactly how do we make quality adjustments for changes in the odds of winning or changes in the amenities that gambling establishments provide.¹⁸
- Bank deposits; what exactly is the price of a savings account? On the firm side, what is the right price for working capital?
- Advertising in general and television and radio advertising in particular. The problems of pricing advertising are of course tied in with the problems of pricing the “cultural” products that are associated with the advertising; i.e., the associated radio or television program.
- Educational services.
- Health services.
- Government public goods.
- Fashion goods such as clothing or automobiles where “newness” is a price determining characteristic.¹⁹

¹⁴ See Gudnason and Jonsdottir (2007) for a description of the Icelandic user cost method.

¹⁵ See Kurz and Hoffmann (2007) for a description of a rental equivalence index for West Germany.

¹⁶ There was some support for this position at the meeting, with Walter Lane in particular voicing his agreement of this strategy. But most participants were silent on this issue and there was no formal vote on these issues.

¹⁷ For some recent progress in this area, see Berndt and Hulten (2007).

¹⁸ See Yu (2008) for a suggested methodology.

¹⁹ See Corrado, Dunn and Otoo (2004) for a hedonic regression model for cars along these lines and see Guédès (2007) for a discussion of clothing as a fashion good. This last paper also shows the connection of this topic with the problems of treating seasonal prices.

- High technology goods such as computers, cameras, video cameras, game boxes, televisions and so on.

7. Household Production

Peter Hill (2006) in his presentation to the London meeting of the Ottawa Group noted that only a small fraction of household purchases are actually consumed without further inputs of household time and other inputs. Hill discussed many of the difficult measurement problems associated with taking into account household production in the context of constructing a more comprehensive CPI:

- Should the final products of the household be valued according to their market sector opportunity costs or according to their costs of production (including household time spent in production)?
- Exactly how should inputs of time spent in household production be valued: by the opportunity costs of their time working in their jobs or by the costs of hiring comparable labour inputs in order to produce the household goods and services for final consumption purposes?²⁰
- How should the value of household capital services be constructed?²¹
- Assuming that the value of household consumption (including home production) is built up from the costs of producing these final goods and services (including the value of household time spent in home production), there remains the problem of splitting up this final demand value into price and quantity components. Hill notes the similarity of this problem to the problem of decomposing the value of nonmarket government production into price and quantity components but he rightly feels that the problems are even more difficult in the household context.²²

²⁰ Hill made the following observations on this point: “To be consistent with general SNA principles, the labour services should be valued using the market wage payable to employees doing the same kind of work, but a case can also be made for valuing at opportunity costs: that is, what the person could have earned by taking paid employment. Valuing at opportunity costs is not favoured in the studies on household production because it makes the value of the labour inputs depend on who does the work rather than the nature of the work done.” Basu’s point about the value of theory seems relevant in this context as well: we need well thought out explicit models of household behavior to guide us in making decisions on how to value household time inputs in home production. Diewert (2001, pp. 231-238) made a start in this direction but much remains to be done.

²¹ Hill favored the use of full user costs to value capital services and not just the depreciation component: “Notice that the SNA does not include the full value of the capital services, the user costs, but only the depreciation component. It is a flaw in the System that should be rectified.”

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²² The major problem in both cases is that productivity improvements should be taken into account. Hill contrasted the problems associated with making these (labour) productivity adjustments as follows: “The same approach might be tried for own account household production, provided the growth in the labour inputs can be measured. This would be several degrees harder than trying to estimate the real growth of the labour inputs in government. There are market transactions for the labour inputs into government so that their real growth can be measured using actual payroll data deflated by wage rate indices. Labour inputs

Hopefully at least some of these problems will be addressed in future meetings of the Ottawa Group.

8. Measurement Problems Associated with International Trade Flows

We have already mentioned that there are some problems with the treatment of international trade flows in the production accounts of the SNA 1993 but that these problems associated with tracing exports back to the industry of origin and imports back to the industry that utilizes these inputs are being addressed in the IMF Export Import Price Index (XMPI) Manual.²³ However, the solution to these problems that is proposed in the XMPI Manual will lead to further demands on PPI price compilers and so it would be prudent to anticipate these demands in the near future.

However, there are other measurement problems associated with international trade flows. In particular, since so much trade is in intermediate goods and services between subsidiaries of multinational firms, the transfer prices that these firms use to value exports and imports between subsidiaries may be driven by tax considerations and hence may not be the “correct” prices from an economic perspective.²⁴ Another problem is associated with accounting for international flows of financial capital: the imputations required to deal with banking services and the use of financial capital are complicated enough in a closed economy but the degree of difficulty is multiplied greatly in the case of open economies. There are also problems associated with exchange rate fluctuations and national versus domestic treatments of outputs and inputs. Finally, finding prices for tourist expenditures also presents some problems.

The above problems seem rather remote from the everyday concerns of price index compilers but since international trade continues to grow more quickly than domestic product in this age of globalization, the measurement problems generated by this increase in traded goods and services will become more important over time.

9. The Problem of Seasonal Goods and Services

The seasonality problem in its starkest form occurs when a good or service is on the marketplace in one month or quarter but is not present in the subsequent month or quarter; e.g., Christmas trees. How can we make month to month price comparisons in this case? Answer: with great difficulty! Chapter 22 in both the CPI and PPI Manuals tries to use modern index number theory in order to answer this question.²⁵ However, the real life example of changing seasonal patterns explained in the paper by Finkel,

into household production have to be estimated from time use surveys. There seems to be next to no evidence about the growth of labour productivity in household production.”

²³ See Diewert (2007b) (2007c).

²⁴ The forthcoming XMPI Manual has a chapter on transfer pricing but much remains to be done.

²⁵ Another good reference on seasonal problems is Alterman, Diewert and Feenstra (1999) who studied seasonality and imputation methods in the context of the U.S. export and import price indexes.

Rakhmilevich and Roshal (2007) shows that the Manual theories are not quite adequate to deal with situation; more work needs to be done.²⁶

10. How Should Core Inflation be Measured?

Measuring core inflation is usually regarded as a secondary activity that can be carried out by central banks or the private sector, using statistical agency data as the primary input into this process; i.e., usually, some volatile categories of expenditure in a country's CPI are dropped or published price relatives for expenditure categories at the most disaggregated level are trimmed in order to obtain more stable measures of underlying inflation in the economy. Thus it would seem that there is no real role for a statistical agency to be involved in constructing these core inflation measures.

However, there is a problem in deciding what exactly is the underlying measure of inflation that the core measure is attempting to predict. Since the typical month to month CPI will have a certain amount of seasonality in it, this unadjusted CPI cannot serve as the target measure of underlying inflation. Thus typically, the unadjusted CPI is seasonally adjusted using some form of moving average time series method of seasonal adjustment in order to form the target underlying inflation index. The problem with this procedure is that it is not entirely reproducible; i.e., different operators of the time series seasonal adjustment procedure will come up with different seasonally adjusted series. As a possible way of resolving this lack of reproducibility, statistical agencies could produce a rolling year CPI based on index number techniques,²⁷ which would lead to a more reproducible target index that would not have "black box" ambiguities associated with it. In any case, it would be useful for statistical agencies to produce rolling year indexes as analytical series since the resulting series would be a nice smooth seasonally adjusted series based on hard core index number theory rather than black box time series methods.

What is the role of the Ottawa Group in all this? The problem is that the credibility of the chosen core inflation measure may be questioned if the central bank itself calculates the measures, especially if the calculations are not readily reproduced or verified externally. Consequently, there is a clear advantage in having such measures calculated independently by the national statistics agency. Thus there is a role for the Ottawa Group in providing some standards for the calculation of core inflation measures. While the credibility of the core measure will be enhanced by its compilation and dissemination by an independent statistical office, the central bank will need to play a lead role in the choice of methodology adopted for the measurement of both headline and analytical core series. This is to ensure that the core inflation measures meet the operational needs of the central banks, especially if the measure are to be part of an inflation targeting regime.

²⁶ One way of dealing with the problem of changing seasonal patterns (due to weather fluctuations or the fact that Easter does not occur in the same month) is to widen the season for these commodities from say a month to a quarter. However, there are some details to be ironed out for this solution; i.e., if part of the index uses a month as the period and part uses a quarter, how do we integrate the two parts into a monthly index?

²⁷ See the paper by Finkel, Rakhmilevich and Roshal (2007) or Chapter 22 in the CPI or PPI Manuals on the details of how to construct rolling year indexes.

Issues in defining core inflation measures and the choosing among them are discussed in Heenan, Peter and Roger (2006) and Silver (2007).

11. New Goods and the Price of Light Problem

The problems associated with valuing the benefits of new goods and services has been with us since the beginning of the Ottawa Group. Many years ago, Hicks (1940; 114) worked out a reasonably satisfactory methodology for dealing with the benefits of new goods in the household context: in the period before the new commodity makes its appearance, estimate a reservation price that would just induce the consumer to demand zero units of the new commodity. This would give us a zero quantity for the new commodity in the prior period along with an imputed price which could then be matched up with the current period price and quantity and normal index number theory could be applied.²⁸ Hausman (1997) (1999) set up some econometric models which actually estimated these reservation prices for some new products.²⁹ Statistical agencies have not embraced these theoretical techniques for estimating the benefits of new products or increased product variety due to the reproducibility problem: different economists will make different approximations and different econometricians will make different functional form assumptions and make different stochastic specifications, leading to a lack of reproducibility in the estimated benefits (in the sense that different econometricians will come up with different estimated benefits).

In spite of the lack of reproducibility problem, it would be useful for statistical agencies (or academics) to undertake some special studies that try to quantify the benefits of new goods and services. An example of such a study is the Nordhaus (1997) study on the price of light. Nordhaus observed that innovations in the provision of lumens led to different forms of delivery of lighting services (from bonfires to candles to kerosene lamps to sophisticated light bulbs) and statistical agencies simply missed the large drop in the price of lumens that occurred over the past century because when a new method of delivering lumens was introduced, statistical agencies basically linked in the new delivery mechanism to show no change in the index. A similar situation has occurred over the past ten years, with email replacing traditional snail mail, but as far as I know, no one has quantified the benefits to households of this switch in the method of delivering messages to friends.³⁰

More generally, I am concerned that the benefits of increased R&D expenditures (which lead to new products) are not being captured adequately in the existing statistical system. In addition to the problems associated with capturing the benefits of new products for households, there are also problems on the production side of the accounts. If R&D leads to a new class of goods, then typically a new plant is built to manufacture the product line. But this new plant cannot be compared to the same type of plant in the previous period, because there were no plants of this type in existence in the previous period.

²⁸ Diewert (1987; 779) (1998; 53) spelled out the details of the Hicksian methodological approach.

²⁹ Hausman (2003) also developed some interesting theoretical approximate methods for estimating the benefits of new products which deserve to be taken seriously.

³⁰ There are similar increments of consumer surplus due to the availability of cell phones.

The current revision of SNA 1993 is going to capitalize R&D expenditures. However, national income accountants have not really figured out how to measure the benefits of R&D expenditures. Instead of measuring the benefits, the capitalized expenditures will simply be depreciated over time according to a somewhat arbitrary rate. However, as can be seen from the remarks in the previous paragraphs, it is not a trivial matter to figure out methodologies to measure the benefits of R&D expenditures.

12. Conclusion

It is of some interest to compare the above list of ten priority areas with the list of priority areas and general themes suggested by the other panelists in this session. Paul Armknecht suggested the following ten areas as priorities for future research:

- Moving from arithmetic or Laspeyres type aggregation at the elementary level to geometric type aggregation.
- Frequency of weight updates; i.e., the CPI Manual suggests an upper bound of 5 years; perhaps this should be reduced to one or two years.
- We should be moving towards acquiring weights to go along with the prices in elementary aggregates.
- New goods and services should be introduced in a timely manner.
- We should be thinking about incorporating internet information on prices and electronic submission of price and quantity data.
- Housing: a housing asset price index should be developed and alternative indexes for the consumption of owner occupied housing services should be made available as analytic indexes.
- We should identify best practices for hedonic quality adjustment.
- There should be more research on the problems associated with seasonal commodities.
- We should try to make improvements to measuring service activities such as medical, financial, insurance and telecommunications services.
- We should make improvements to sample designs; e.g., move away from judgmental sample designs and towards cutoff or probability sample designs.

It can be seen that Armknecht's list has a considerable amount of overlap with Diewert's list with approximately seven out of ten items being common. This is a substantial amount of overlap, considering that Armknecht's background is a "practical" statistical agency one whereas my own background is rather more "theoretical".

Bert Balk was another panelist in this retrospective session on the Ottawa Group and he suggested that over the past 150 years, there were three recurring questions that index number theory addressed:³¹

- How to measure the general purchasing power of money;
- How to decompose a nominal value change into price and quantity components;

³¹ These general themes are developed in much more detail in his forthcoming book, Balk (2008).

- How to compensate households for price changes.

Balk also suggested the following three areas of concentration for the future work of the Ottawa Group:

- Measures for core inflation;
- Price indexes for hard to measure products;
- Analytical families of cost of living indexes.

The final panelist in this session (representing national statistical offices) was Yoel Finkel. He suggested that ensuring the quality of the statistical output of national statistical offices (and the CPI in particular) should be an important priority in our future work.³²

I certainly do not disagree with any of the recommendations made by either Fenwick, Armknecht, Balk³³ or Finkel and I am pleased to see that our recommendations are not contradictory.

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³² Finkel suggests the following papers as a short reading list on the topic: Haworth, Fenwick and Beaven (1997), Finkel and Zioni (2004) and Neideck (2007).

³³ Balk also suggested that the Ottawa Group should expand its existing website so that it would include material from both the Ottawa Group and the joint UNECE/ILO CPI meetings as well as other relevant research and methodological material on price indices. This website would also have links to other related websites that deal with price measurement issues. I also agree with this proposal.

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