Comment on "Chain Price and Volume Aggregates for the System of National Accounts"
(presented by Andrew Baldwin at the SSHRC Conference, July 3, 2004.)

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One of the problems with the test approach to index number theory is that researchers differ in the importance that they ascribe to different tests. Attempts to use the test approach to resolve controversies over the choice of index number formula may, therefore, end in differences of opinion over which objectives are most important.

The current version of the SNA recommends use of the Fisher index formula. However, in this paper Andrew Baldwin argues for the use of the Edgeworth-Marshall index number formula instead, because it satisfies additivity (the real components add up to the real total) and because its treatment of the two time periods being compared has certain symmetry properties. These advantages may be important enough to warrant a choice of the Edgeworth-Marshall formula in some circumstances, but as a general proposition, I believe that the advantages of the Fisher index formula are more critical. The Fisher index allows a statistical agency that produces both real volume measures and price change measures to have a unified approach; because this formula satisfies Fisher's factor reversal test, it can be used consistently both for price indexes and for volume (quantity) indexes. Furthermore, the problem of the non-additivity of Fisher indexes can be remedied by publication of additive contributions to change based on the van IJzeren decomposition formula (see Reinsdorf, Diewert and Ehemann, 2001). Finally, an appropriately symmetric treatment of time periods is not achieved by the Edgeworth-Marshall index when rapid changes occur in real GDP or in the price level. For example, if a small open economy experiences a strong contraction precipitated by a collapse in the foreign exchange value of its currency—a scenario that is, regretfully, not unrealistic—the Edgeworth-Marshall price index will tend to adopt the market basket of the Laspeyres index. It will therefore tend to give high weights to imported goods that have become so expensive that no one can afford to buy them anymore. Similarly, high inflation will cause the Edgeworth-Marshall volume index to largely adopt the Paasche weighting scheme, which often tends to give exaggerated importance to items with unusually low real rates of growth. The Fisher index, in contrast, is immune to these problems.

On the other hand, I can support and endorse many of the recommendations and insights in the discussion of sub-annual values of chained indexes in section 5 of the paper. For example, benchmarking quarterly estimates to more stable and reliable annual estimates when the latter become available is likely to improve their quality and to reduce the long-run index's susceptibility to chain drift. Yet even though BEA—unlike Statistics Canada—does benchmark to annual totals, the author identifies a logical inconsistency in

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[1] The views expressed in this note are those of the author and should not be attributed to the Bureau of Economic Analysis.

BEA's approach and makes some suggestions for improvements.[2] For example, the proposal to use the "geometric mean fixed price" (GMFP) index in equation (5.2) and its "geometric mean fixed basket" (GMFB) counterpart is quite interesting. In particular, the GMFB index uses annual quantities from years t and t+1 as weights in the Laspeyres and Paasche index components of the Fisher price index. As the author points out, the GMFP and GMFB indexes do not satisfy the factor reversal test, so if we want consistency between our price indexes and our volume indexes, we will have to choose between these formulas. I find annual quantity totals, which are the weights in the GMFB formula, more appealing, since in principle quantitie s are additive over time. If the GMFB formula is used for the quarterly price indexes, then the quarterly volume indexes will have to be calculated implicitly as the deflated expenditure change.

Reference

Reinsdorf, Marshall B., W. Erwin Diewert, and Christian Ehemann, "Additive Decompositions for Fisher, Törnqvist and Geometric Mean Indexes," *Journal of Economic and Social Measurement* 28 (2002): 51–61.

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[2] Note that the quantitative effect of the theoretical weakness in BEA's procedures that this section of the paper criticizes is small, so the benefit of improving these procedures would be more theoretical than practical.