

## GROSS NATIONAL PRODUCT, CANADA, 1870-1926: A NOTE

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In an article entitled "Revised Real GNP Estimates....," in the December 1992 issue of this Journal, the author, Morris Altman, states "In this article, a new set of *real* GNP estimates are produced which build on Urquhart's *nominal* GNP estimates. Serious deficiencies are found to exist with price index numbers used by Urquhart to deflate his nominal GNP estimates. This raised some questions as to their capacity to reflect movements and levels in the actual prices of Urquhart's nominal GNP estimates".<sup>1</sup> Altman basically accepts the validity of the current dollar estimates of GNP 1870-1926, prepared by me and colleagues, but rejects the constant dollar estimates for which I am responsible.<sup>2</sup> He purports to provide, conceptually and practically, enough better real GNP estimates than mine to cast substantial new light on the economic development of the period. A comment about Altman's revision of the real GNP estimates is warranted.

Altman appears to believe that since current dollar estimates of GNP are built up from the production (value added) side of the national accounts they cannot be deflated from the expenditure side, that consequently my price deflators are not appropriate and, in addition, have weaknesses within themselves. Owing to the nature of the arguments behind Altman's criticisms, I can proceed most briefly by telling how the current values of GNP and my constant dollar values were obtained. Gross value added estimates, in current dollars, were made for each of twenty industry groups providing comprehensive coverage of all production and yielding, in aggregate, gross domestic product (GNP) at factor cost. Net interest and dividends paid abroad were subtracted from these factor cost values, and indirect taxes less subsidies were added thereto to provide GNP at market prices; since GNP and Gross National Expenditure (GNE) are conceptually equal (and, with complete data, factually equal), this procedure also provided my estimate of gross national expenditure at market prices (a common practice with historical data). On the expenditure side, all fixed capital formation estimates, including those of public bodies, were derived from independent data as were the small public expenditures on non-capital goods and services and the international current account credits

<sup>1</sup>Altman, throughout, uses the term "nominal" for what are ordinarily called current dollar values.

<sup>2</sup>He raises a point about the interpolation of the value-added items for the wholesale and retail trade and the community business and person service sectors between census years and 1926 (for which years our estimates have been made from basic information) and makes minor changes that I personally would not adopt but are of little consequence.

and debits and balance; the residual (GNE minus the foregoing items) comprises consumer purchases of goods and services and inventory change.<sup>3</sup>

Real GNE, and hence real GNP, was obtained in two parts. Gross non-residential fixed capital formation in constant prices, primarily estimated by Statistics Canada, was obtained by deflation of the current dollar estimates for many categories by relevant capital goods price indexes; real residential fixed capital expenditure, newly estimated by Marion Steele, was deflated by her new residential construction cost index.<sup>4,5</sup> The sum of these was the measure of all real fixed capital formation. The remainder, predominantly consumer expenditure, was deflated by a cost of living index. Real GNE was the sum of these two expenditure items. Ideally, values for public purchases of non-fixed capital goods and services and international current account items, all directly estimated in current dollars from basic data in our case, should have been deflated separately by their own indexes. In fact, they were all deflated by our cost of living index. However, the shortcomings of this procedure are not as great as would appear to be the case at first glance. First a consumer price index may be as good as any index for deflating government expenditure on non-capital goods and services. Second, for the items on international account, a deflation system now used by the U.S. Department of Commerce for obtaining "command-basis" real GNP is most appropriate for estimation of real GNP that is a measure of welfare. In the case of the United States, deflation of exports as well as imports is done by use of the import price index which procedure is the equivalent of deflating the current account balance by an import price index. In Canada's case, in which the current account balance has been predominantly negative in our period, thus leading to an international liability, the appropriate deflation for both exports and imports and hence the current account balance would appear to be the export price index. This measure of the real current account deficit is a measure of the exports that would be required to match the foreign account liability measured in base year export prices. Now it turns out that our consumer price index and an index of commodity export prices (unit values) move pretty much in harmony in our period.<sup>6</sup> Hence, deflation of the international balance on current account by the consumer price index may be reasonably appropriate. Finally, the deflation of inventory change by a different index would be desirable, but we only have inventory measures in the case of livestock and hence do not have suitable current dollar estimates of this item.

An implicit price index of deflation was calculated in the usual manner, but no use of it was made in any way in the actual deflation or any other of my calculations.

<sup>3</sup>Public purchases of non-capital goods and services were typically between 5 and 7 percent of GNP from 1870 to 1913 and returned to 8 percent from 1922 onward. Coincidentally, the negative current dollar balance on international current account approximated the public purchases of non-capital goods and services from 1870 to 1909, rose relatively thereafter, actually becoming positive in the 1920s.

<sup>4</sup>The Statistics Canada data were obtained from a printout of detailed data underlying the published Statistics Canada estimates.

<sup>5</sup>Marion Steele, in the major publication noted below.

<sup>6</sup>The departures of the movements of the cost of living index from the export price index were of note in two periods: in the 1870s the export price index fell much below the consumer price index in value—the average of the export and import price indexes moved about like our cost of living index between 1870 and 1880; in the First World War it rose much above the consumer price index.

Altman dismisses the use of a cost of living index for deflation of GNE (or GNP) less fixed capital formation (p. 457) because, "...in particular, the components of his index are not representative of the components of his nominal GNP series..." (that is, industry group components). Such a criticism is irrelevant, of course. A consumer price index is to deflate consumer expenditure at market prices and not, in any case, the value added in individual industrial categories.

There is, in addition, the quality of the consumer price index itself: the component for 1913-26 is a full-fledged official index and is entirely suitable for my purposes; the component for 1900 to 1912 is likewise a complete index for the years covered (December 1900, December 1905 and 1910-13) and the interpolations for 1901-04 and 1905-09 are not serious matters; finally the component for 1870-99 is admittedly not the most satisfactory, being based on data for a single city and not including a clothing component (Altman omits the fact that a component for rent was added to the originally constructed series).<sup>7</sup> I must leave it to the reader to make a judgment based on the description of the index in my 1986 article (see Altman's "references").

Altman proceeds to deflate components of value added by price indexes of his own choosing except for agriculture.<sup>8</sup> These indexes are predominantly of wholesale prices of gross industry outputs and, in the case of a residual 30 percent of value-added, my implicit price index.<sup>9</sup> Altman then compares his calculations of real value added by industrial groups with calculations that he improperly labels "Urquhart" obtained by his own deflation of value added by the use of my implicit price index (Table 2, p. 464). I, of course, had not made and would not make any such calculation as the latter and Altman's implication that such is done by me (p. 457, 2nd last paragraph) is false.

The use of industry specific wholesale price indexes of gross value of industry product for deflation of value added is a most questionable procedure.<sup>10</sup> Aside from the problem of their representatives, wholesale prices have fluctuated much more widely than end product prices. It is this characteristic of prices that leads Altman to obtain much higher rates of growth of real GNP from 1920 to 1926 and from 1870 to 1980 than I do and hence much higher measures of productivity growth. I am most confident that Altman's results are quite spurious for 1920-26 and reasonably sure that such is the case for the 1870's. At the same time I must note how small the revisions were for other years, given the procedures.

<sup>7</sup>Data collected by the Ontario Bureau of Industries, from a large sample of families for the 1880s, suggest that expenditures on clothing amounted to slightly less than 20 percent of consumer expenditure at that time.

<sup>8</sup>Altman uses McInnis's measure of real agricultural output which, incidentally, does not cover forest products of farms.

<sup>9</sup>Altman's statement that the transportation industry includes only railroads is incorrect; water transport, electric light and power, telephone and telegraph are also included.

<sup>10</sup>The United States Department of Commerce deflates end products on the production side to get a value of GNP equal to that calculated from the expenditure side. Canada includes only deflation on the expenditure side in its main National Accounts publication; it obtains an equivalent total on the product side in connection with its work on input-output analysis.

I must add, that I welcome the use of the new estimates and the production of such revisions as are soundly based. A new volume of some 720 pages, describing in detail the derivation of our estimates, has now appeared for such use.<sup>11</sup>

<sup>11</sup>*Gross National Product, Canada, 1870–1926: The Derivation of the Estimates* by M. C. Urquhart with chapters by Alan G. Green, Thomas K. Rymes, Alastair Sinclair and Marion Steele and contributions by D. M. McDougall and R. M. McInnis, McGill-Queen's Press, Montreal, 1993.