A Total Production Index for Washington, D.C.

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Introduction

This article describes the methods and procedures used in computing a new total production index for the District of Columbia.[1] The new index accounts for changes in services production as well as goods production.[2] The index made its public debut in a release issued March 15, 1991, by the Center of Economic and Business Statistics of the University of the District of Columbia. That same day, *The Washington Post* featured the new index on the first page of its business section. In subsequent months, the Center has issued updates of the index under the release's name, *D.C. Economy.*

At the national level, a monthly production index provides a timely measure of cyclical changes in economic output between calendar quarters. Quarterly figures for gross national product provide the most comprehensive measures of production; between quarters, the monthly index of industrial production compiled by the Federal Reserve Board has proved to be an important and carefully watched economic indicator.

At the regional level, timely measures of output are valuable to business and government officials because economic activity in any region can differ significantly from the national average,and because gross state product figures are available only after a long delay. Output indexes compiled by the Federal Reserve Banks have helped meet the demand for regional economic information used in analyzing economic growth and business cycles, and in economic policy formulation. The attention given to the Federal Reserve's *Beige Book* is one example of the interest of policymakers and the public in reports on economic activity around the country.

The District of Columbia economy is different in composition from the economies of surrounding states and the nation as a whole. For example, the government-based D.C. economy has a relatively small manufacturing sector. Manufacturing indexes for Maryland and Virginia therefore provide little guidance about the current state of economic activity in the nation's capital. The D.C. economy also behaves differently, although it is not always as insulated from the national business cycle as is commonly believed. For example, although employment remained relatively flat in the District of Columbia during the U.S. recession of 1974-75, it declined by a larger percentage than U.S. employment over the two recessions of the early 1980s. Also, the booms associated with the D.C. metropolitan area have been much less evident in the city itself. In the past 20 years, for example, employment in the District of Columbia has grown only 20 percent, in contrast to the 89 percent increase in the entire Washington metro area. It is clear, therefore, that although economic activity in the District of Columbia is usually less volatile than in the nation as a whole, it does change in intensity and, sometimes, direction.

Many individual economic indicators are used to help track the D.C. economy. *The Washington Post*, for example, regularly features charts and data for several different economic sectors. It is difficult to extract from them, however, a clear sense of the general condition and direction of the economy of the District of Columbia. That is, no single indicator fits the pieces of the Washington economy together in a coherent fashion. A timely monthly index of total production does that.

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[1] The "Total Production Index for the District of Columbia" is computed by the Center for Business and Economic Statistics of the University of the District of Columbia and was developed by the Center in cooperation with the Federal Reserve Bank of Richmond and from the experience and advice from staff at the Federal Reserve Board in Washington. The work has been facilitated by an advisory panel consisting of economists from each of these organizations, who met from time to time to review progress on the project. The authors thank Tapas Ghosh for valuable research assistance.

[2] The measurement of services production draws heavily on earlier work by Zoltan Kenessey. See, in particular, Kenessey (May 1988; November 1988).

Background on Production Indexes

The definitive history of production indexes has yet to be written. More than 60 years ago, however, Arthur Burns referred to the European production indexes by Neumann-Spallart of 1887 and Armand Julin of 1911, and to William Leonard's 1913 index dealing with extractive industries in America (Burns, 1930).

The Federal Reserve System has a long history of involvement in the measurement and analysis of monthly production developments. From its first issue in 1915, the *Federal Reserve Bulletin* contained business conditions data, including some on production. After January 1919, the *Bulletin* reported, in more extended form, monthly data on the "physical volume of trade" (including production). The Federal Reserve Board introduced indexes of production in the *Bulletin* in the spring of 1922, and in more refined form in the winter of the same year (Federal Reserve Board, March 1922 and December 1922).

Work on indexes of production was also underway outside of the Federal Reserve. Wesley C. Mitchell published an annual index number of production in 1919 (Mitchell, 1919). Mitchell and others at the National Bureau of Economic Research (NBER, incorporated in 1920) played a continuing role in U.S. macroeconomic measurement throughout the 1920s and 1930s and greatly influenced the development of production estimates in general. At Harvard University, Edmund Day produced the Harvard-Census index, also called the Day-Thomas index, by using quinquennial Census of Manufacturers data to adjust annual production indexes (Day, 1920). Walter Steward, who earlier worked at the War Production Board (led by Mitchell) and who became the director of research at the Federal Reserve Board in 1922, was among those who published articles about production index numbers in those days. During the 1920s, the U.S. Department of Commerce also issued various physical volume data and indexes of output, similar to those in the *Federal Reserve Bulletin*, which it published in the *Survey of Current Business*.

In 1927 the Federal Reserve Board introduced a new index of industrial production (back to 1919), which can be deemed the beginning of the more elaborate and advanced work on the subject in the United States.[3] The index was extensively revised in 1940, 1953, 1959, 1971, 1976, 1985, and most recently in 1989. Over the decades, the Federal Reserve established its preeminent role in monthly industrial output indexes (Federal Reserve Board, 1986). Meanwhile, important research efforts were made elsewhere, notably at the NBER. The work by Arthur Burns, Frederick Mills, Solomon Fabricant and others influenced not only the way industrial production was estimated, but also how all other components of the gross national product were measured.

The basic conceptual issues on production indexes developed by the Federal Reserve have been applied with some adaptations for use in specific regional economies. Regional production indexes compiled by the Federal Reserve Banks, principally for manufacturing, go back to the 1950s, with the earliest attempts undertaken at Atlanta, San Francisco, and Dallas. Today the Midwest Manufacturing Index of the Federal Reserve Bank of Chicago, the Mid-Atlantic Manufacturing Index of the Federal Reserve Bank of Philadelphia, the Fifth District Manufacturing Index of the Federal Reserve Bank of Richmond, and the Texas Industrial Production Index of the Federal Reserve Bank of Dallas command interest at the regional level among circles in business, government and academia (Kenessey, 1990).

Nationally, economic policymakers want information about developments in the various sectors and parts of the country. The uneven behavior of regional economies in recent economic expansions and contractions has heightened interest in this kind of information. State and local officials, many of whom are currently faced with budgetary shortfalls, clearly need better information about trends in their area economies. Consumers (and workers) also care a great deal about economic conditions affecting them; the popularity of state and metropolitan business magazines, business journals, and newspaper business sections attests to the public interest in local economic news. To help supplement the supply of state and regional economic information, the Federal Reserve Bank of Richmond calculates and publishes indexes of manufacturing output for each of the five states in the Fifth District (Bechter, et al., 1988).[4] Now, the total output index for the District of Columbia, reviewed here, is available.

Production indexes are coincident, not anticipatory, indicators of economic activity. Nationally, the

[3] *Industrial Production, With a Description of the Methodology*, Board of Governors of the Federal Reserve System, 1986, pp. 17-162.

[4] The Fifth Federal Reserve District comprises Maryland, North Carolina, South Carolina, Virginia, most of West Virginia, and the District of Columbia. The manufacturing index for Maryland incorporates the estimate for the District of Columbia.

index of industrial production is one of the four key coincident economic indicators used in identifying peaks and troughs of business cycles. Regionally, production indexes can be used similarly to provide important confirmatory evidence about the current status of output developments in particular economic areas. Regional production indexes are typically used for comparing the performance of a state or area economy with the national total and with other regions. Such analysis, whether it focuses on performance over time or across areas, usually highlights the movements observed for the most recent periods (months or quarters) in a region's economic activity. Importantly, improved regional measures of output may provide new leading indicators for swings in U.S. economic activity, as some regions may lead (and others lag) national business cycle developments.

The Concept of a Production Index

A production index is an index of the *quantity* of output, free of any influence of month-to-month changes in prices.[5] The focus on quantity precludes an index that compares current with past dollar values of production, as such an index would measure changes in prices and production together, not just changes in production. One alternative would be to measure production in constant dollars. Such an approach, however, would require a monthly set of price deflators for each product or product group. It seems useful, therefore, to adopt a methodology that relies mainly on physical measures of production such as tons of coal or taxi miles. Such physical measures of output do not require deflation to eliminate the effect of price changes. Along with the application of proper weights for aggregation, a production index covering several products can be estimated for each month in a timely fashion.

Most production indexes are of the Laspeyres (base-weighted) type. A Laspeyres quantity index can be expressed as:

$$I_t = \frac{\sum_{i=1}^{N} q_{it}p_{io}}{\sum_{i=1}^{N} q_{io}p_{io}} = \sum_{i=1}^{N} q_{it}\left(\frac{p_{io}}{\sum_{i=1}^{N} q_{io}p_{io}}\right)$$

$$= \sum_{i=1}^{N} \frac{q_{it}}{q_{io}}\left(\frac{q_{io}p_{io}}{\sum_{i=1}^{N} q_{io}p_{io}}\right) = \sum_{i=1}^{N} \frac{q_{it}}{q_{io}} w_{io}$$

where the summation is over the N individual goods and services included in the index, q denotes the quantities produced of these items, p denotes a term—usually price—used in weighting items in the index, t refers to the current period and o refers to the base period. The weight, w_{jo}, assigned to the j^{th} item and term q_{jt}/q_{jo} in the right side of the formula, is that item's share of the value of total output in the base period, or $q_{jo}p_{jo}/\Sigma q_{io}p_{io}$. The weights are held constant over a period of several years until changes in the relative importance of the various items of production have become so extensive that a revision of weights is warranted. Given its constant weights, the production index changes over time, as it should, only with changes in the output of goods and services.

As the right side of the formula shows, a quantity index covering several items can be expressed as a weighted average of the production indexes for individual items. The item weights, or product shares of the base period value of output, add up to 1. The individual and overall quantity indexes are usually expressed as percentages, with 100 the value for the base year.

Application to the District of Columbia

To formulate a production index for the District of Columbia, it was first necessary to decide how much productive activity to include. An index of manufacturing output alone was not likely to be very informative; in the District of Columbia, manufacturing consists largely of printing and publishing and is a small share of total employment, personal income, or production. In the District of Columbia, therefore, where the services-producing sectors dominate economic activity much more than in most of the rest of the country, it was appropriate to design an index of *total* production to include all significant segments of the economy: communications, construction, manufacturing, public utilities, public

[5] It is usually fairly easy to measure the change in output of a single homogenous agricultural or industrial commodity, such as bushels of #1 grade durum wheat, or tons of low sulphur bituminous coal. It is quite another matter, however, even when good data are available, to arrive at a "correct" measure of change in overall production when several commodities or grades of commodities are involved. The problem of adding apples and oranges is usually addressed in an economically appealing fashion by using constant prices along with the dollar values of output in some reference period. But because the reference period is usually fixed for a time, measures of change in overall production are plagued by index number problems—for example, the sensitivity of all index numbers to the choice of weights used in the weighted average. The problem in measuring production or prices intertemporally is further complicated by changes in the types and qualities of items in the "market basket" over time. These problems are addressed elsewhere in the literature on index numbers.

administration, services, trade, transportation, finance and real estate.[6]

Ideally, a total production index for the District of Columbia (referred to hereafter as the DC index) would draw on a broad range of physical output measures that fit neatly into the categories of the Standard Industrial Classification (SIC). In practice, ideal data series are not available. In the District of Columbia, several different agencies compile data for monthly use, and while many of these data do fit into the SIC categories, others do not. Moreover, as there are tens of thousands of different goods and services being produced, it was not practical to try to include all of them explicitly in the index. Instead, selected items of production were chosen to represent the monthly changes in output in various sectors. In selecting representative indicators, an effort was made to include one or more series for each major field of production.

Unfortunately, data on physical units of production were available for only one-sixth of total production, as measured by gross product in the base year. Fortunately, the theory of production suggests an alternative way to estimate physical output in the absence of these data. According to production theory, which has ample empirical support in the literature (e.g., the Cobb-Douglas production function), physical units of output can be expressed as a function of physical units of inputs. Moreover, over relatively short periods of time, a production function can be assumed stable, and the inputs of capital and land can be assumed fixed, with production varying with changes in labor input. Together with benchmark information on output provided by gross product data, therefore, labor input data provide a method to interpolate and extrapolate monthly estimates of production.[7]

Thus, to help construct the DC index where product series were deficient, employment data were used, alone as proxies for quantity series, or as supplements to incomplete quantity series. For example, to measure the production of construction in progress, construction-worker hours are used along with building permits to capture the ongoing nature of the work. Fortunately, labor data are available for all significant productive activities, so employment or production-worker hours by industry can be used as input proxies for production.

When the use of labor is applied as a proxy for production, some account must be made for changes in labor productivity over time. To adjust for the rise in productivity, past increases in average productivity are extrapolated from changes calculated between the most recent years reported by the Bureau of Economic Analysis in its gross product figures for the District of Columbia. For example, if between 1980 and 1986 the change in output of a certain good was 10 percent higher than the change in its labor input, then the average annual increase in labor productivity in the years since was about 1.6 percent, and the monthly increase was therefore assumed constant at about 0.13 percent.

In view of the federal government's very large share (36 percent in 1986) of productive activity in the economy of the District of Columbia, productivity movements of government workers are of particular interest for estimating output changes in the area. Fortunately, an extensive effort by the U.S. Bureau of Labor Statistics (BLS) within the framework of the Federal Productivity Measurement System (FPMS) produced quantitative results relevant to this topic (BLS, 1990). For fiscal year 1988, for example, FPMS covered 342 organizations within 61 federal agencies representing 2.1 million persons, 69 percent of the executive branch civilian work force. About 3,000 different products and services were measured in the system. The majority of the 28 major governmental functions, which compose total governmental activity reviewed, were services-producing areas. Yet, BLS was able to find representative product measures for these areas just as for goods-producing activities.

The BLS study found that output per employee increased at an average annual rate of 1.4 percent in the 1967-88 period and 0.7 percent between 1983 and 1988. This finding suggests that the usual assumption of unchanged productivity of federal employees in estimating government output is untenable. In the context of the DC index, the BLS results provide the productivity factors necessary for estimating output changes in an important segment of the economy. Moreover, future refinements of the DC index may draw on the FPMS experience. The various government product series that the FPMS identified could be utilized to estimate monthly production directly on the basis of output data rather

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[6] Quantifying the output of services can present problems, but is often easier than it might seem at first blush. Haircuts are an obvious measure of barber production, for example, and court cases might be used to index the output of lawyer services.

[7] The manufacturing output indexes created by the Federal Reserve Bank of Richmond use two inputs, employment and electrical power usage, to estimate changes in output. While both are input measures, they are accounted for in physical units, just as is the production series, rather than in monetary terms.

than indirectly via labor proxies related to inputs. Thus, the large percentage share of labor-based series could be reduced and the number of product series increased in the DC index.

In several instances, production indexes are currently represented in the DC index both by an output series and by an input (employment) series. Rail transportation production, for example, is represented both by the number of AMTRAK passengers and by hours worked by railroad employees; telephone production is represented both by the number of business calls and by communications employment; and so on. When an activity is represented by two series, the SIC weight is split on the basis of their relative significance or in 50-50 proportion between the output series and the labor series, respectively.

The DC index is adjusted for workdays and seasonal variations. Workdays within any month vary from year to year, and seasonal variations occur as well. In making the workday adjustments, it was necessary to establish a normal workweek for each production category. Hotels, for example, do not normally close on weekends, while many retail or banking establishments close on Sundays or perhaps on both Saturday and Sunday.

The DC index is a base-period weighted, Laspeyres-type index. Individual production indicators were assigned weights based on their shares of total value added in 1986, the most recent year for which gross state product data are available. The value-added weights are derived from the 1986 Gross State Product figures published by the Bureau of Economic Analysis of the U.S. Department of Commerce.

Results

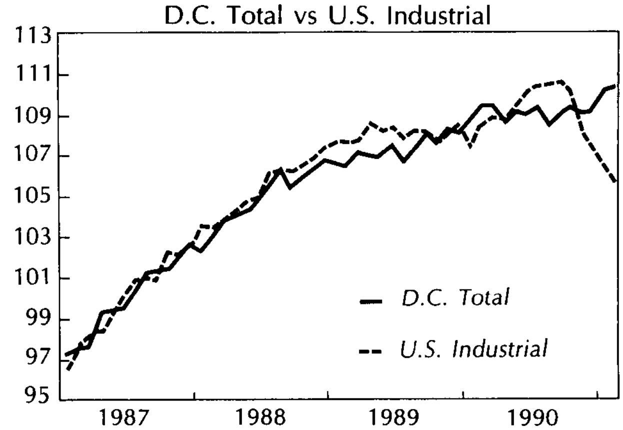
The seasonally adjusted values for the DC index over the past four years are charted here along with the seasonally adjusted values of the U.S. Index of Industrial Production (Chart 1). The DC index shows the behavior of total production in the District of Columbia since early 1989 to have been quite different from the behavior of U.S. industrial production.

Total production in the District of Columbia grew (on a December-to-December basis) at a rate of 4.0 percent in 1988, 1.2 percent in 1989, and 1.1 percent in 1990 despite its essentially flat path over most of that year. Chart 1 indicates that, according to the DC index, the economy of the District of Columbia

Chart 1

INDEXES OF PRODUCTION

D.C. Total vs U.S. Industrial



slowed in 1989, peaked in January 1990, showed no clear trend through December 1990, and rose in early 1991. It should be noted that the index reflects increases in labor productivity assumed in connection with measuring some output components by using labor data proxies.

The DC index covers all goods- and service-producing industries included in the Standard Industrial Classification. Normally, production is classified into four major areas: primary production (agriculture and mining), secondary production (manufacturing and construction), tertiary production (transportation, communications, utilities, retail and wholesale trade), and quaternary production (finance, insurance, and real estate, services and public administration). In the DC index, however, production is classified in three areas—goods, tertiary services, and quaternary services—because primary productive activity (agriculture and mining) is virtually nonexistent in the District of Columbia. Separate tabulations are made also for a total services index which combines tertiary and quaternary production, a private sector index which includes everything but government (federal and local) production, and a public sector index that includes only federal and local government activity. The appendix to this article tabulates the monthly values for all of these indexes from January 1987 through early 1991 (Table 5).

In the DC index, goods production accounts for about 11 percent of total production. This 11 percent is divided mainly between construction (7.1 percent) and printing and publishing (2.6 percent).

Goods production has been volatile in recent years and has exhibited some weakness since late 1988. Chart 2 compares the behaviors of the DC index goods component with the Maryland-D.C. index of manufacturing compiled by the Federal Reserve Bank of Richmond. Construction activity in the District of Columbia dominates the DC goods index, while manufacturing activity in Maryland dominates the MD/DC manufacturing index. It is understandable, therefore, why the two indexes tell different stories about cyclical swings in these respective activities in the vicinity of the nation's capital. In particular, the severity of the recent recession in the D.C. construction sector is clearly evident.

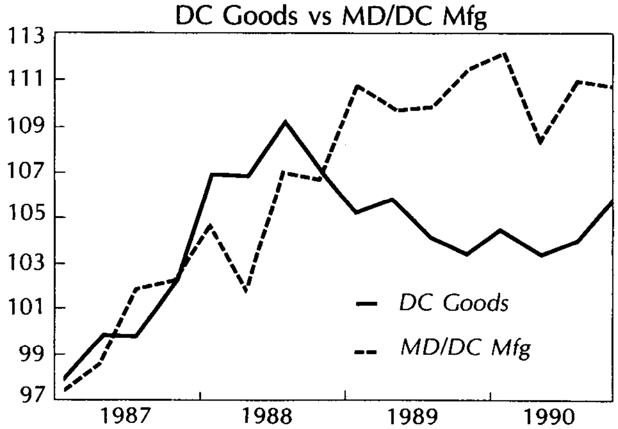
Services production accounts for about 89 percent of total production in the District of Columbia (vs. 68 percent nationally). The growth in D.C. services production slowed to 1.8 percent in 1989 from an annual rate of 4.4 percent in 1988 (December/December). The DC services-production index peaked in January 1990, stayed at or below that peak through the year, and then rose above it in early 1991. By way of comparison, the national services index[8] grew less rapidly in 1988, its growth did not

[8] An experimental index developed by Zoltan Kenessey, circulated by the Coalition of Service Industries.

Chart 2

INDEXES OF PRODUCTION

DC Goods vs MD/DC Mfg



slow in 1989, and it did not stop growing until late in 1990. D.C. services production did decline briefly after July 1990, the month marking the beginning of the recent national recession.

Private production in the District of Columbia was more volatile than government production, as one would expect, partly because private production includes goods production (all government production is by definition services production). The growth in private production was a vigorous 5.1 percent in 1988, then declined to 1.9 percent in 1989 and 1.2 percent in 1990. Not all of the greater volatility in private production was due to goods production; private services production was also somewhat more volatile than government (services) production. Private services production grew an estimated 5.9 percent in 1988 (compared to a 2.5 percent increase in government production), then slowed to 3.1 percent in 1989 and to 0.9 percent in 1990 (compared to growth of 0.1 percent and 0.9 percent in 1989 and 1990, respectively, in government production).

Tertiary services production (wholesale and retail trade, transportation, communication and utilities) and quaternary services production (finance, insurance, real estate, business and personal services, and government) behaved similarly in the District of Columbia over the period studied. The growth in tertiary production was less even than the growth in quarternary production, however, as was exemplified by the sharp decline in tertiary production in late 1990.

The first results for the Total Production Index for the District of Columbia indicate that output in the nation's capital peaked in March of 1990, but stayed roughly flat through the year, even when the U.S. economy went into recession. Components of the DC index generally confirm the stabilizing role played by the high proportion of services production in the District of Columbia. D.C. goods production, which is heavily concentrated in construction, peaked in August 1988 and has remained well below that peak through early 1991. The DC index figures are just estimates, of course; the index likely understates the magnitude of the downturn in economic activity in the District of Columbia because labor productivity in recessions usually declines rather than rises as has been assumed for the entire period.

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Appendix

A Tabular Walk-Through the Calculation of the Total Production Index for the District of Columbia

Table 1

Menu for Calculating a Product Component in the Total Production Index when Physical Units are Used to Measure Output

(1) data:	(2) data:	(3) data:	(4) calculate:	(5) calculate:	(6) data:	(7) calculate:	(8) calculate:
Year & Month (indicated by a "t" subscript)	Physical units of output of product "i" in month "t"	Workdays in month "t" for this product (these change from year to year)	Daily average output of product "i" in month "t" c2/c3, or	Value of unadjusted output index for product "i" in month "t"[1]	(from earlier calculation) Seasonal factor for the month for this product[2]	Value of seasonally adjusted daily output index for product "i" in month "t" c5/c6, or	Component value for product "i" to be included in the Total Production Index[3]
	Q_{it}	A_{it}	$Q_{it}/A_{it} = q_{it}$	$100 \times q_{it}/q_{io} = I^u_{it}$	S_{it}	$I^u_{it}/S_{it} = I^a_{it}$	$w_{io} \times I^a_{it} = TPI^a_{it}$

[1] q_{io} = daily average output of this product in the base year (1987).

[2] The seasonal factor for a month (e.g., March) is the same from year to year, and the same for every day in the month. The seasonal factors were computed using the ratio-to-centered-moving-average method: each month's index was calculated as the ratio of its average value over a four-year period, 1987-90, to the average value of the index during the six months before and the six months after this month in this period. The steps in table columns (6) and (7) can be skipped if the Total Production Index is to be unadjusted for seasonal variations.

[3] The constant weight w_{io} is equal to this product's share of the value of total production in the base year. The value of the seasonally adjusted Total Production Index is the sum of all of its components, or $TPI^a_t = \Sigma TPI^a_{it}$.

Table 2

An Example of a Total Production Index Component—Railroad Transportation—Calculated from Physical Units of Production (Number of Amtrak Passengers)

(1) Year & Month	(2) Number of Amtrak passengers	(3) Workdays in this month	(4) Daily average number of passengers for this month (7822.05 in 1987)	(5) Unadjusted index for this activity	(6) Seasonal factor	(7) Seasonally adjusted index for this activity	(8) The DC index component value for this activity (weight = 0.0022)
1988 10	274,036	31	8839.9 = 274036/31	113.01 = 100 x 8839.9/ 7822.05	1.0125	111.61 = 113.01/ 1.0125	0.25 = 0.0022 x 111.61
1988 11	283,698	30	9456.6	120.90	1.0748	112.48	0.25
1988 12	267,107	31	8616.4	110.15	0.9445	116.63	0.26
1989 01	255,402	31	8238.8	105.33	0.8502	123.89	0.27
1989 02	237,194	28	8471.2	108.30	0.8814	122.87	0.27

Table 3

Menu for Calculating a Product Component in the Total Production Index when Employment Units are Used as a Proxy for Output

(1) data: Year & Month (indicated by a "t" subscript)	(2) data: Employment units used to produce output of product "i" in month "t"	(3) data: Production factor coefficient (accounts for the estimated constant monthly change in productivity for this product)	(4) calculate: Adjusted employment units used to produce output of product "i" in month "t" c2 x c3, or	(5) calculate: Value of unadjusted output index for product "i" in month "t"[4]	(6) data: (from calculations made prior to table construction) Seasonal factor for this product for this month	(7) calculate: Value of seasonally adjusted index for product "i" in month "t" c5/c6, or	(8) calculate: Component value for product "i" to be included in the Total Production Index
	E_{it}	F_{it}	$E_{it} \times F_{it} = L_{it}$	$100 \times L_{it}/L_{io} = I^u_{it}$	S_{it}	$I^u_{it}/S_{it} = I^a_{it}$	$w_{io} \times I^a_{it} = TPI^a_{it}$

[4] L_{io} = average monthly labor input used to produce this product in the base year (1987).

Table 4

An Example of a Total Production Index Component—Construction—Calculated from Employment Units of Production (Construction Worker Hours)

(1) Year & Month	(2) Number of construction worker hours (in thousands)	(3) Construction labor production factor coefficient this month (increases 0.35%/mo.)	(4) Adjusted number of construction worker hours (in thousands for month) (average = 15.032 in 1987)	(5) Unadjusted index for this activity	(6) Seasonal factor	(7) Seasonally adjusted index for this activity	(8) The DC index component value for this activity (weight = 0.0626)
1988 10	14.3	1.081	15.46 = 14.3 x 1.081	102.85 = 100 x 15.46/ 15.032	1.0026	102.58 = 102.8468/ 1.0026	3.66 = 0.0626 x 102.58
1988 11	14.5	1.085	15.73	104.66	1.0116	103.45	3.69
1988 12	14.2	1.089	15.46	102.85	0.9913	103.76	3.70
1989 01	13.8	1.093	15.08	100.31	0.9621	104.26	3.72
1989 02	13.5	1.097	14.80	98.48	0.9701	101.51	3.62

Table 5

Total Production Index for the District of Columbia

Seasonally Adjusted; 1987 = 100

Type/Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Q1	Q2	Q3	Q4	Year
TOTAL																	
1987	97.3	97.6	97.7	99.2	99.4	99.6	100.2	101.3	101.3	101.5	101.9	102.7	97.6	99.4	100.9	102.0	100.0
1988	102.3	103.1	103.8	104.1	104.3	104.8	105.6	106.3	105.5	106.0	106.4	106.8	103.1	104.4	105.8	106.4	104.9
1989	106.6	106.5	107.2	107.0	107.0	107.6	106.6	107.4	108.2	107.7	108.3	108.1	106.7	107.2	107.4	108.0	107.3
1990	109.4	109.4	109.5	108.7	109.2	109.1	109.4	108.4	109.1	109.4	109.1	109.3	109.4	109.0	109.0	109.2	109.2
1991	110.3	110.4															
GOODS																	
1987	98.0	97.7	98.0	99.8	100.2	99.7	99.9	98.4	101.2	100.9	100.1	105.3	97.9	99.9	99.8	102.1	99.9
1988	104.9	106.4	109.7	107.1	105.5	108.3	108.7	111.3	107.8	105.9	108.9	106.6	107.0	106.9	109.3	107.1	107.6
1989	106.7	104.8	103.7	105.6	106.9	105.0	104.5	104.1	104.0	103.7	103.5	103.2	105.1	105.8	104.2	103.4	104.6
1990	104.1	105.0	104.2	103.2	103.4	103.4	104.1	103.8	103.9	106.2	105.9	105.7	104.5	103.4	104.0	105.9	104.4
1991	105.9	105.7															
SERVICES																	
1987	97.3	97.6	97.7	99.1	99.3	99.6	100.3	101.7	101.3	101.6	102.1	102.3	97.5	99.3	101.1	102.0	100.0
1988	102.0	102.7	103.1	103.7	104.1	104.4	105.2	105.7	105.3	106.1	106.1	106.8	102.6	104.1	105.4	106.3	104.6
1989	106.5	106.7	107.6	107.2	107.0	107.9	106.8	107.8	108.7	108.2	108.9	108.7	106.9	107.4	107.8	108.6	107.7
1990	110.1	109.9	110.1	109.3	109.9	109.8	110.1	108.9	109.7	109.8	109.4	109.7	110.0	109.7	109.6	109.6	109.7
1991	110.9	111.0															
TERTIARY																	
1987	97.2	98.5	98.6	98.5	99.6	98.0	99.5	102.5	100.6	102.4	103.1	102.5	98.1	98.7	100.9	102.7	100.1
1988	105.3	104.0	105.9	105.5	106.6	106.5	107.4	107.2	105.9	109.2	107.0	107.6	105.1	106.2	106.9	107.9	106.5
1989	107.0	107.0	107.0	107.4	107.1	108.6	108.1	105.3	109.4	106.3	110.1	108.9	107.0	107.7	107.6	108.5	107.7
1990	108.5	109.3	108.1	109.4	108.0	109.5	108.5	108.9	109.2	107.9	106.4	106.7	108.6	108.9	108.9	107.0	108.4
1991	109.2	107.7															
QUATERNARY																	
1987	97.3	97.4	97.5	99.2	99.2	99.9	100.4	101.5	101.4	101.4	102.0	102.3	97.4	99.5	101.1	101.9	100.0
1988	101.4	102.5	102.6	103.4	103.7	104.0	104.8	105.4	105.1	105.5	106.0	106.7	102.2	103.7	105.1	106.1	104.3
1989	106.5	106.6	107.7	107.1	107.0	107.8	106.6	108.3	108.6	108.5	108.6	108.7	106.9	107.3	107.8	108.6	107.7
1990	110.4	110.0	110.5	109.3	110.2	109.9	110.4	108.9	109.8	110.1	110.0	110.2	110.3	109.8	109.7	110.1	110.0
1991	111.2	111.6															
PRIVATE																	
1987	96.7	97.2	97.2	99.2	99.4	99.9	99.6	100.9	101.4	102.1	102.5	103.6	97.1	99.5	100.6	102.8	100.0
1988	103.0	104.1	105.2	105.3	105.7	106.3	107.6	108.5	107.7	107.9	108.3	108.9	104.1	105.8	107.9	108.4	106.5
1989	108.5	108.3	109.4	109.1	109.4	110.3	109.0	110.0	111.1	110.3	111.4	111.0	108.7	109.6	110.1	110.9	109.8
1990	112.6	112.4	112.6	111.6	112.2	111.9	112.9	112.0	112.1	112.5	112.0	112.3	112.5	111.9	112.3	112.3	112.3
1991	113.6	113.8															
PUBLIC																	
1987	98.3	98.2	98.5	99.0	99.4	99.3	101.2	102.0	101.1	100.6	101.0	101.1	98.3	99.3	101.4	100.9	100.0
1988	101.2	101.6	101.7	102.2	102.2	102.5	102.5	102.9	102.3	103.2	103.5	103.6	101.5	102.3	102.5	103.4	102.4
1989	103.7	103.7	103.7	103.7	103.5	103.5	102.7	103.4	103.6	103.7	103.6	103.7	103.7	103.6	103.3	103.6	103.5
1990	104.6	104.7	104.7	104.2	104.6	104.9	104.2	102.8	104.6	104.6	104.5	104.6	104.7	104.6	103.8	104.6	104.4
1991	105.3	105.3															