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Chapter Author: Martin Marimont

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# Measuring Real Output for Industries Providing Services: OBE Concepts and Methods

MARTIN L. MARIMONT

OFFICE OF BUSINESS ECONOMICS,  
U.S. DEPARTMENT OF COMMERCE

THIS paper describes how the Office of Business Economics measures the output of finance, insurance, real estate, and service industries<sup>1</sup> in current and constant prices within the conceptual and statistical framework of the United States national income and product accounts. The output of these industries is here defined and measured only within this framework. For other viewpoints, and to serve different purposes, there are many other definitions—each correct and appropriate within its own domain.

Interest in the industries providing services has increased, in recent years, since they have become an important source of stable growth in total GNP. In 1965, GNP for these industries amounted to \$164 billion or one-fourth of total GNP, whereas in 1948, it was only one-fifth of total GNP. After adjusting for price changes, the output of the industries providing services grew at an average rate of 4.3 per cent a year, well above the 3.8 per cent growth rate of the economy as a whole. Better than average growth of output was also accompanied by a faster than average rise in prices. However, as will be noted later, limitations in the underlying data have probably led to overestimates

NOTE: With the able assistance of Jack J. Gottsegen, Assistant to the Chief, National Economics Division, Office of Business Economics.

<sup>1</sup> As defined in the *Standard Industrial Classification Manual, 1957*, Executive Office of the President, Bureau of the Budget, these industries exclude all government operated activities.

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in the price rise and underestimates in the growth of real output. These limitations become more important as the output of these industries represents an increasing share of total GNP.

The OBE measures the dollar value of the annual contribution of each industry—gross product originating (GPO) or value added—to total GNP. These values are expressed in current market prices and also in the market prices for a base year—1958 in the present series. For the data in fixed prices, changes in value reflect changes in the “real” or physical volume of units of output. In such a system of data, each of the output units produced in a given industry in any year is supposed to be identical in quantity and quality to that represented by the unit of output in the base year.

With reference to “quality,” we have raised one of the most perplexing and controversial problems confronting compilers of indexes of prices and production. It represents even greater difficulties in the calculations for the service industries than for industries that produce goods, where the problems are already very substantial.

The industries that are the subject of this paper do not make a pair of shoes, a refrigerator, or a drill press; all of which are tangible and can be counted, although with varying degrees of ambiguity. Instead, they provide services, that is, they safeguard savings, insure lives, lend money, advertise businesses, audit books, restore health, repair cars, and so on. Conceptual questions that are extremely difficult to answer are raised when one attempts to count such units of output or measure changes in their quality in order to provide a meaningful and consistent measure of their contribution to total GNP. Many answers have been proposed, each capable of yielding significantly different measures of changes in output and price.

The consideration of quality is tightly interlaced with the definition of the unit produced or purchased, that is, the unit which enters the market transaction. In recent literature, much attention has been given to these problems as they arise in the health services. For purposes of measuring output, Griliches and Gilbert have argued whether the doctor produces, or the consumer buys, an office visit or a medical cure. Vast gains in the curative and preventive powers of medicine have occurred, and there have been sharp changes in the observed prices. Griliches would incorporate the medical advances in the out-

put measure; Gilbert would exclude most of them since they are not measurable and would include only those quality improvements which involve increases in costs. He emphasizes that the units of output should be those which are identifiable and quantifiable in the transactions between buyer and seller. Widely different output and price indexes are obtained depending on whether one implements the Griliches view, which stresses efficacy of medical treatment, or the Gilbert view, which counts visits to the doctor's office.

The health controversy dramatizes issues present in all of the service industries: what units are to be counted; what quality changes are to be reflected; what kinds of data are available for the calculations; and so on. The decisions the OBE has made for measuring output of the service industries represent compromises. These compromises rest on the adoption of conventions that seemed to be appropriate to the calculation of real industry GNP and appealing to common sense. The compromises must also be operational; that is, data must be available which would, with a reasonable degree of precision, conform to the conventions adopted.

When estimating the value of today's physical volume of output of goods and services expressed in prices for a base period,<sup>2</sup> the OBE prefers to calculate such values by the deflation of totals in current dollars. Deflation based on highly specified price indexes is believed to be more successful in accounting for shifts among goods and services of different specifications than are other methods for calculating real output. It is generally easier to measure price changes for goods defined within very detailed specifications than it is to measure directly the number of such goods produced. When reliable price measures are not available or cannot be constructed, OBE estimates the real magnitudes by quantity measures.

The statistics on output and prices for the service industries are more limited than for almost any other industrial area. The data may not be available at all. If at hand, they may be unreliable, they may cover only a part of the total activity, they may refer to only a portion of the entire time period, or their definitions may change over

<sup>2</sup> This does not imply, of course, that the current year's technology or taste is consistent with the base year price structure. The issues of appropriate weights and a proper reference period for the weighting scheme are not discussed here.

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time. In addition, the measurement of prices has its own special problems. These include the difficulties in representing quality mentioned above, and other familiar criticisms of the U.S. price statistics. (See NBER's report by the Price Statistics Review Committee.)

One effect of these limitations is in narrowing the range of definitions of output for which measures can actually be constructed. In addition, the reliability of the OBE's industry output estimates at the detailed (unpublished) level is uneven—some being reasonably precise and others less so. In some cases, the lack of suitable data has been dealt with by making assumptions for output per labor input, price relationships, etc. Such assumptions would, of course, have to be kept in mind when using these data for a particular purpose. Clearly, a series based on assumptions for the change in productivity would not be appropriate to an analysis of unit labor requirements.

I doubt that we will soon develop a definition of output for the service industries which is both "true" and operational. We shall have to be content to accept conventions that are not fully satisfying. Nevertheless, it is essential that acceptable conventions be proposed and adopted if we are to improve the usefulness of the output and price data.

However, one can be optimistic about eliminating shortcomings which reflect statistical inadequacies since we can anticipate continuing improvement in the programs for the collection of data. These statistical improvements would result if, for example, the Census Bureau expanded the coverage of its quinquennial censuses to include more industries and initiated surveys to provide, at least, annual data. In addition, perhaps the BLS could extend and refine its price measures in the service areas. Agreed-upon conventions would provide one of the elements essential to the formulation of such new data programs.

### *Output and Prices Since 1948*

Having called attention to the difficulties in measuring real output for the finance, insurance, real estate (F.I.R.E.), and service industries, we can proceed with caution to note the expansion of output and the changes in price for these industries since 1948 (Table 1). We must be especially cautious in the use of data for the more detailed categories,

TABLE 1

Per Cent Distribution of Gross Product by Industry, 1948 and 1965

Industry	Constant (1958) Dollars		Current Dollars	
	1948	1965 <sup>a</sup>	1948	1965 <sup>a</sup>
Finance, insurance, and real estate	100.0	100.0	100.0	100.0
Finance and insurance	27.1	21.4	23.2	22.8
Banking	14.0	9.0	10.5	10.5
Credit agencies, holding, and other investment companies	-0.5	-0.1	-0.2	-0.2
Security and commodity brokers	2.4	2.2	1.4	2.3
Insurance carriers	7.7	7.5	8.6	7.1
Insurance agents, brokers, and service	3.5	2.8	2.9	3.1
Real estate	72.9	78.6	76.8	77.2
Services	100.0	100.0	100.0	100.0
Hotels and other lodging places	6.7	5.8	7.3	5.4
Personal services	12.8	10.3	13.9	9.7
Miscellaneous business services	8.3	13.8	7.2	13.3
Automobile repair, automobile services, and garages	4.4	5.6	4.5	4.9
Miscellaneous repair services	3.3	2.3	3.5	2.4
Motion pictures	5.7	1.9	5.8	2.2
Amusement and recreation serv- ices, except motion pictures	5.2	4.9	5.7	4.9
Medical and other health serv- ices	18.4	22.8	18.6	22.9
Legal services	6.9	5.4	5.4	5.7
Educational services	4.2	5.0	4.4	5.9
Nonprofit membership organi- zations	8.3	8.8	7.8	8.9
Miscellaneous professional serv- ices	6.1	7.9	5.3	8.2
Private households	9.7	5.5	10.6	5.6

NOTE: The industry gross product differs from the like-sounding components of the GNP category "Personal Consumption Expenditures" (PCE). The PCE data represent sales to persons, while the industry output may be sold to any or all of the final markets or to other industries which comprise the intermediate market. The PCE includes the total cost to the consumer for the goods or services while the industry data include only the value added by that industry. The PCE includes all of that good or service purchased by persons regardless of which industry produced it. The industry data include the value added for all goods or services actually produced in that industry.

<sup>a</sup> Figures do not incorporate revisions in GNP shown in *Survey of Current Business*, July 1967.

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most of which were originally intended as "worksheet" estimates in the build-up of the more aggregated published levels.

The gross product for F.I.R.E. and service industries amounted (in current dollars) to almost \$48 billion, or 19 per cent of total GNP, in 1948 and \$164 billion, or 24 per cent, in 1965. In constant dollars, they rose from 21 to 23 per cent of GNP.

Gross product originating in F.I.R.E. totaled \$25.5 billion in 1948 and \$92.5 billion in 1965 (in current dollars). In both years, the real estate industry accounted for about three-fourths, and banking about one-tenth, of the total. In constant dollars, the total for F.I.R.E. rose from \$36.5 billion to \$82.4 billion, with real estate increasing from 73 per cent in 1948 to 79 per cent in 1965, and banking declining from 14 to 9 per cent.

In services, current dollar GPO totaled \$22.2 billion in 1948 and \$71.0 billion in 1965. The proportions represented by miscellaneous business services and medical and health services have increased, while there has been a decline in the shares for personal services, and amuse-

TABLE 2  
Average Annual Percentage Change in Real Product, 1948-65

	1948-65	1948-57	1957-65
Total GNP	3.8	3.8	3.9
Total manufacturing	4.0	3.8	4.3
Finance, insurance, real estate and services	4.3	4.2	4.4
Excluding owner-occupied dwellings and households and institutions	3.6	3.1	4.1
Services	3.5	3.0	4.0
Excluding households and institutions	3.5	2.5	4.2
Finance, insurance and real estate	4.9	5.1	4.7
Excluding owner-occupied dwellings	3.6	3.3	4.0

NOTE: Figures show the average annual compounded rate of change between initial and terminal years of each period. Figures do not incorporate revisions in GNP shown in the *Survey of Current Business*, July 1967.

ments and recreation, including motion pictures and private households. Generally, the same patterns appear in the constant dollar series.

The shifts in the relative share of total GNP accounted for by these industries reflect the wide divergence in their rates of growth during this period. As shown in Table 2, the combined real output of F.I.R.E. and service industries grew at the rate of 4.3 per cent a year from 1948 to 1965 compared with 3.8 per cent for total GNP and 4.0 per cent for manufacturing.

The F.I.R.E. industries have grown considerably faster than the service industries since 1948—4.9 per cent for F.I.R.E., compared with 3.5 per cent for services.

In each grouping, the individual industries displayed a broad range of growth rates (Table 3). For example, the finance and insurance firms expanded less rapidly than did total GNP, largely because of the well below-average pace set by the banks. In contrast, the real estate category grew much more rapidly than total GNP, reflecting the very high rate (7.6 per cent) for the owner-occupied activity (an imputed activity, see below). Within the services, the most rapid pace for 1948–65 was set by business services, auto repair, miscellaneous professional services (which include the wonder child of the postwar era—the nonprofit research organization), and the medical and educational services. At the other end of the range, we find the household industry, which was at the same level in 1965 as in 1948, and the motion picture industry, which was the only one to decline from 1948 to 1965.

There are also considerable differences in the growth of output when we examine separately the periods 1948–57 and 1957–65. The expansion in F.I.R.E. has been slower since 1957, but in services has picked up considerably. Within the faster growing services, particularly sharp increases have occurred in the auto repair industry, amusements, and legal services. Even the motion picture industry's rate of decline was cut sharply from its 1948–57 experience. The F.I.R.E. slowdown after 1957 centered in the insurance carriers and agents, whose recent growth dropped below the pace set earlier.

Like output, the implicit prices for the service-providing industries increased more rapidly from 1948 to 1965 than prices for total GNP

TABLE 3  
Average Annual Percentage Change in Real Product and Implicit Price Deflators, by Industry: 1948-65

Industry	GPO in Constant (1958) Dollars				Implicit Price Deflators				
	1948-65	1948-57	1957-65	1948-65	1948-57	1948-65	1957-65	1948-57	1957-65
Finance, insurance, and real estate and services	4.3	4.2	4.4	3.1	3.7	3.1	3.7	3.7	2.4
Finance, insurance, and real estate	4.9	5.1	4.7	2.8	3.6	2.8	3.6	3.6	1.9
Banking	2.3	2.1	2.4	5.4	7.3	5.4	7.3	7.3	3.4
Security and commodity brokers	4.3	4.2	4.5	6.6	8.8	6.6	8.8	8.8	4.1
Insurance carriers	4.7	6.0	3.2	1.9	0.6	1.9	0.6	0.6	3.4
Insurance agents, brokers, and service	3.4	4.4	2.4	4.8	5.9	4.8	5.9	5.9	3.5
Real estate	5.4	5.5	5.3	2.4	3.2	2.4	3.2	3.2	1.5
Services	3.5	3.0	4.0	3.5	3.8	3.5	3.8	3.8	3.1
Hotels and other lodging places	2.7	2.2	3.1	2.5	2.9	2.5	2.9	2.9	2.0
Personal services	2.1	1.7	2.6	2.6	2.9	2.6	2.9	2.9	2.3
Miscellaneous business services	6.6	6.1	7.2	4.2	5.5	4.2	5.5	5.5	2.6
Automobile repair, automobile services, and garages	5.0	2.7	7.7	2.5	3.7	2.5	3.7	3.7	1.2
Miscellaneous repair services	1.1	0.6	1.7	3.5	4.3	3.5	4.3	4.3	2.7
Motion pictures	-3.0	-4.6	-1.3	4.3	3.4	4.3	3.4	3.4	5.2
Amusement and recreation services, except motion pictures									
Medical and other health services	3.1	1.7	4.6	3.0	2.8	3.0	2.8	2.8	3.2
Legal services	4.8	4.9	4.7	3.4	3.6	3.4	3.6	3.6	3.3
Educational services	1.9	-0.3	4.5	5.3	7.2	5.3	7.2	7.2	3.2
Nonprofit membership organizations	4.5	4.3	4.8	4.2	3.3	4.2	3.3	3.3	5.2
Miscellaneous professional services	3.9	4.2	3.5	3.9	4.4	3.9	4.4	4.4	3.4
Private households	5.0	6.8	3.1	4.6	5.3	4.6	5.3	5.3	3.8
	0.1	1.1	-1.2	3.0	2.7	3.0	2.7	2.7	3.4

NOTE: Figures show the average annual compounded rate of change between the initial and terminal years of each period.

Figures do not incorporate revisions in GNP shown in the *Survey of Current Business*, July 1957.

or for manufacturing industries—3.1 per cent compared with 2.0 and 1.7 per cent. The fastest increases were in the price of the services offered by security brokers, lawyers, and bankers. Prices did not decline in any of the F.I.R.E. and service industries.

F.I.R.E. and service prices rose throughout the period 1948–65, although they increased much more rapidly during 1948–57 (3.7 per cent) than during 1957–65 (2.4 per cent). Nearly all the categories conformed to this pattern; the exceptions were the insurance carriers, motion picture industry, other amusements, educational services, and households.

When changes in price are compared with changes in output for the F.I.R.E. and service industries, no pattern of correlation emerges. This appears to be true for the entire period 1948–65 as well as for the two subperiods.

#### *Industry Gross Product Defined*

As defined within the national income and product accounts, the gross product originating in an industry represents the amount contributed by that industry to the nation's output of final goods and services. An industry's contribution to total GNP may be measured as the amount by which the market value of the industry's total output exceeds the value of the materials and services it buys. Alternatively, it may be calculated as the sum of the industry's factor costs (employee compensation, profits, interest, etc.) and nonfactor charges (depreciation, indirect business taxes, etc.).

The value of GPO in the U.S. accounts is expressed in market prices, and thereby includes indirect business taxes. Such taxes are particularly important components in the output of the real estate, insurance, amusement and recreation industries. For real estate and insurance, the taxes are primarily those levied on property and premiums; in the other industries, they are excise taxes levied on admissions.

While the concepts of GPO apply to F.I.R.E. and service as they do to other industries, implementing the definitions for F.I.R.E. and service requires special procedures to account reasonably for the atypical characteristics of the institutions in these categories. This special treatment takes the form of "imputations." These imputations include in the total output of an industry certain activities which, on a com-

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mon sense basis, should be included but are not under the ordinary rules for national accounting. Usually, this is so because these activities do not appear as market transactions.

The output of the finance industry is significantly increased by the imputation for banks and similar institutions in order to account for services provided without explicit charges. (A more detailed discussion on estimating methods for these institutions appears in the section below.) In calculating the value of total output for insurance companies, the amount for life insurance carriers is represented by operating expenses and for nonlife carriers, by the excess of premiums over benefits. A major component of the real estate industry represents the imputation which creates a rent payment for owner-occupied dwellings. The receipts of nonprofit institutions serving individuals are ignored and the total output of the institutions is equated to their operating expenses.

The OBE uses the sum of factor and nonfactor costs to measure an industry's gross product in current dollars. Gross product derived in this way, however, is not directly convertible into constant dollars (real product) because the factor and nonfactor costs cannot be expressed in quantities and unit prices suitable for this purpose. Under conditions which are closer to the ideal than is true for the industries in this paper, real industry product can be calculated by the double-deflation method. That is, gross product may be adjusted indirectly for price changes by deflating total output and intermediate purchases separately. Such deflation is possible because generally the sales and purchases consist of goods and services which may be factored into quantities and prices. The difference between real total output and real purchases is real gross product.

However, for most industries covered in this paper, data on purchases are not available. In such cases, the OBE has estimated real gross product on the basis of changes in the volume of total output without explicit adjustment for intermediate purchases. Relative changes in total output will be a reliable estimate of relative changes in value added where intermediate purchases are small relative to total output or are a fixed ratio to total output in constant prices.

Where the output series is based on a reliable and consistent time series, it is used to extrapolate base year GPO. For other industries,

the estimating time series may not be an adequate indicator of the real volume of output because, for example, the series is weak statistically or the coverage of the industry by the estimating series varies from year to year. When such problems appear to be substantial, implicit price indexes are calculated and are used to deflate GPO directly. Because the implicit deflator for a given year is derived from the value of output for that year only, it is less affected by the inconsistency over time than is the index of the quantity of output.

In some industries the deflator is derived from net output measures, in others from measures of total output. The deflator calculated from

TABLE 4

Summary Description for Deriving GPO in Service Industries

SIC Number	Industry Title	Derivation of Constant Dollar Series	
		Procedure	Type of Indicator
	Finance, insurance and real estate		
60	Banking	Deflation	Net output
61 & 67	Credit agencies, holding, and other investment companies	Deflation	Net output
62	Security and commodity brokers	Extrapolation	Employment
63	Insurance carriers	Extrapolation	Net output
64	Insurance agents, brokers, and service	Extrapolation	Employment
65 & 66	Real estate	Deflation	Total output
	Services		
70	Hotels and other lodging places	Extrapolation	Total output
72	Personal services	Deflation	Total output
73	Miscellaneous business services	Extrapolation	Employment
75	Automobile repair and services, and garages	Deflation	Total output
76	Miscellaneous repair services	Extrapolation	Employment
78	Motion pictures	Deflation	Total output and earnings index
79	Amusement and recreation services, except motion pictures	Deflation	Total output
80	Medical and other health services	Deflation	Total output and earnings index
81	Legal services	Extrapolation	Total output
82	Educational services	Deflation	Earnings index
86	Nonprofit membership organizations	Deflation	Earnings index
84 & 89	Miscellaneous professional services	Deflation	Total output and earnings index
88	Private households	Deflation	Earnings index

NOTE: SIC refers to the *Standard Industrial Classification Manual, 1957*, Executive Office of the President/Bureau of the Budget. See Appendix for industry definitions.

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total output will be a good indicator of the GPO deflator if intermediate purchases are relatively small, or if the price index of purchases is not too different from the price index of total output.

As indicated in Table 4, real gross product for twelve of the nineteen industry groups is derived by deflating directly the current dollar totals for GPO, and for seven industries by extrapolating the base year GPO by a quantity measure of total output.

### DESCRIPTION OF PROCEDURES

The remainder of this paper contains a detailed description of the procedures used to derive constant dollar gross product originating for each industry.

#### *Banking (SIC 60)*

The constant dollar GPO series for banking is computed by deflating the current dollar GPO totals by an implicit deflator derived from a current and constant dollar series for imputed interest paid. As will be explained below, this deflator is virtually identical to a deflator calculated using full double-deflation. The constant dollar series for imputed interest is developed by the same method used in the corresponding personal consumption expenditure (PCE) series, namely, extrapolating the base year imputed interest by the volume of constant dollar deposits. The implicit price deflator, rather than the output index, is used because the underlying indicator series can represent a varying percentage of total banking activity.

As previously indicated, a major component of the banking industry output is represented by imputed transactions. The value of services performed for which no explicit monetary charge is made is measured by the excess of property income received over interest paid (i.e., imputed sales). Output of the banks also includes explicit service charges. To arrive at GPO in banks, we deduct intermediate purchases from the sum of the imputed and explicit receipts.

In calculating the GPO deflator, only imputed income has been considered. The explicit banking receipts and intermediate purchases are relatively small. Furthermore, they are about equal in amount, and since the latter is subtracted from the former, the contribution of the difference to gross product is negligible. For the Federal Reserve

banks, the comparable measure of output is equal to net current expenses less dividends paid.<sup>3</sup>

Each year's figures for imputed interest are classified by type of deposit for insured commercial, stock, and mutual savings banks. Demand and time deposits for these institutions, as reported by the Federal Deposit Insurance Corporation, are deflated by changes in the price level for all goods and services as measured by the consumers price index (CPI). The constant dollar deposit series are used to extrapolate the base-year imputed interest totals, separately for demand and time deposits, to derive imputed interest in constant dollars. An implicit deflator is calculated from these current and constant dollar series for imputed interest for commercial banks and is used to deflate the current dollar imputed interest payments for Federal Reserve banks. The current and constant dollar imputed interest series by type of bank and by deposit are summed, and the implicit deflator calculated from the combined aggregates of all banks. This deflator is used to convert the current dollar GPO series for banking into a series in constant prices.

In computing the banking deflator, two price elements affect the current dollar value of imputed interest. One element is the "purchasing power" of the dollar; the other is the imputed interest rate. The OBE deflation method, therefore, yields the value that imputed interest would have reached had the purchasing power and the imputed interest rate remained at their base year levels.

The rationale of the banking imputation in the national accounts is the subject of another paper in this Conference<sup>4</sup> and it has been discussed at an earlier Income and Wealth Conference. (See *A Critique of United States Income and Product Accounts*, Volume 22 of Studies in Income and Wealth.) I will only refer to some of the limitations in the data used to arrive at the real output measures.

The OBE tries to measure what the value of current output would be if prices were the same now as in the base period. Consequently, we adjust the volume of time and demand deposits by the CPI. The

<sup>3</sup> This formula gives the same result for imputed interest as total current earnings less current net expenses less dividends paid—the procedure used for the national income accounts.

<sup>4</sup> See "Real Output of Commercial Banks" by John Gorman.

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CPI seems an appropriate deflator for time deposits which represent the foregoing of spending by consumers. However, demand deposits are held to a large extent by business, and the CPI does not seem appropriate for measuring the change in prices of the goods and services which business foregoes. Even for consumer-held deposits, the use of the CPI assumes that savings would be spent on the same mixture of goods and services as represented in the CPI. Would it be more appropriate to use a price index for consumer deposits which gives greater weight to the more luxurious services: autos, stereos, and other similar consumer durables? For business deposits a WPI-related index would seem to be indicated. Of course, there are also the well-known issues underlying the reliability of the CPI and WPI.

In addition, the annual dollar series on interest and deposits used in estimating real output are subject to some limitations. Only insured deposits are used, and these can represent a varying, although major, proportion of total deposits. There is no representation for trust companies not engaged in deposit banking (SIC 604) and establishments performing functions closely related to banking (SIC 605) such as clearing house associations. However, the activities of both of these types of institutions are relatively small.

### *Credit Agencies, Holding, and Other Investment Companies (SIC's 61 and 67)*

The constant dollar GPO series for this industry group is derived in two major parts: savings and loan associations; and all other activities classified in this industry group.

Implicit deflators for net output for savings and loan associations are derived by the same procedure used for time deposits of commercial banks and justified by the same rationale. Current dollar imputed interest is calculated and the constant dollar series is derived by extrapolating base-year imputed interest by deflated deposits. Data for interest received, interest paid, and deposits for savings and loan associations are obtained from the *Combined Financial Statements*, Federal Home Loan Bank Board. Again, the data relate only to insured associations; the remainder is statistically insignificant.

The current dollar GPO is negative for the combination of all the other activities classified in this industry. Negative GPO arises because

the monetary interest received exceeds interest paid by these establishments. However, in this case, there is no imputation of interest paid because these institutions (agricultural, personal, and business credit institutions) do not act as a depository for funds. The activities for these institutions may be expressed by the following formula which includes only the essential transactions to simplify the presentation (no depreciation, business transfers, or indirect business taxes). Gross product originating (*GPO*) is the sum of compensation of employees (*W*), profits (*P*), and interest paid ( $I_p$ ), less interest received ( $I_r$ ):

$$GPO = W + P + I_p - I_r \quad (1)$$

Receipts (which in this case are equal to interest received) less the cost of supplies and services (*S*) and compensation and interest paid, is equal to profits, or,

$$P = I_r - (S + W + I_p) \quad (2)$$

Therefore,

$$GPO = W + [(I_r - (S + W + I_p))] + I_p - I_r = -S \quad (3)$$

To approximate the negative value added figure for these industries, the estimated value added of savings and loan associations, as derived by the procedures described above, is subtracted from the total GPO for industries 61 and 67 combined. The residual (representing services) is then deflated by the CPI for "all services" on the heroic assumption that this price index roughly approximates the changes in the price of business services purchased by these credit institutions.

The sum of the constant dollar figure for this segment of the industry and that for the savings and loan associations is the constant dollar GPO for the industry group as a whole.

*Security and Commodity Brokers,  
Dealers and Exchanges (SIC 62)*

The constant dollar GPO in this major group is estimated by extrapolating the base-year figure by the number of persons engaged in

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production, that is, the full-time equivalent of all employees and proprietors.

The use of a labor series as a measure of total output is subject to the well-known failure of such measures to account for productivity changes. However, the other data are fragmentary or inadequate. While the number and value of shares and bonds sold on all registered exchanges are available, annual information on "over-the-counter" transactions and activities of underwriters are unknown and are a relatively important variable. In addition, the fee structure of security and commodity brokers is complex. To derive a valid deflator, information would be required concerning the total number of odd- and round-lot shares sold, by price range, and by exchanges or markets. Similar information for the "futures" markets would also be necessary.

In any event, is the number of shares and bonds traded, even if properly weighted, a valid measure of output for this industry? How do we account for the free services provided (counseling, safekeeping, etc.)? One might also argue that these services should be considered not as output but as part of the cost of providing the services that are sold.

#### *Insurance Carriers (SIC 63)*

The constant dollar series for this major group is derived by extrapolating the base year GPO using a combination of quantity measures for life and nonlife insurance carriers.

A composite for life insurance carriers is constructed to reflect both the life and nonlife activities of these carriers. Because of the combined savings and insurance functions performed by life insurance, the output of this activity is not measured in terms of premiums and claims. Instead, the output is measured in the national accounts as "expense of handling life insurance." These expenses are deflated by a price index which is a composite of the index of average wages in this industry (75 per cent) and the WPI for all nonfood items (25 per cent). The other activities of the life insurance carriers, principally medical, health, and accident insurance, are measured by procedures identical with those for nonlife carriers.

The nonlife insurance carriers are considered to perform insurance activities only and therefore their current dollar output is measured

by the difference between premiums earned and benefits paid (net premiums). To derive the composite constant series for nonlife insurance, premiums earned, by type of company (stock and mutual) and by twenty-two insurance categories, are compiled from data appearing in *Best's Insurance Aggregates and Averages*, and deflated by an appropriate premium deflator from the CPI. For example, the total for auto insurance consists of separate series (in both mutual and stock companies) for bodily injury, property damage, collision, and auto theft and fire. Net premiums for the base year are extrapolated, for each insurance category, by the corresponding deflated total premiums earned.

These extrapolated totals are summed and combined with the constant dollar totals for life insurance companies to yield the constant dollar series used to extrapolate base year GPO for the industry as a whole.

It should be noted that for the nonlife component, the given year's measure of real output is not affected if that year's ratio of benefits to premiums differs from the ratio for the base year. OBE's procedure avoids the anomaly of showing real output falling when benefits rise faster than premiums. Changes in the "payout rates," however, affect the implicit deflator for the industry.

#### *Insurance Agents, Brokers, and Service (SIC 64)*

The procedure used in this industry is to extrapolate the base year GPO by the number of persons engaged in production. The limitations of a labor input series have been noted previously.

#### *Real Estate and Combinations of Real Estate, Insurance, Loans, Law Offices (SIC's 65 and 66)*

The constant dollar GPO for this industry is derived by deflation, using the implicit deflator of total output.

This industry includes as a major component the imputation for owner-occupied nonfarm dwellings. In accordance with the concepts of the national accounts, persons who occupy their own dwellings are treated as if they were in the real estate business and an amount representing this activity is added to the GPO for the real estate industry.

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The various components of GPO for this industry are classified in three categories, each one deflated separately: (1) tenant-occupied and owner-occupied residential nonfarm—deflated by the CPI for rent; (2) nonresidential nonfarm—deflated by an index of office building rental income (cents per square foot) calculated from data published by the National Association of Building Owners and Managers; (3) farm real estate—deflated by the PCE deflator for farm rent which is based on data from the U.S. Department of Agriculture. The implicit deflator derived from the aggregate of these three categories is used to deflate the GPO for the real estate industry as a whole.

There are no separate calculations for the combination offices since they are relatively small and should have little effect on the group total. Furthermore, speculative builders who (by SIC definition) are also in this industry group have not been accounted for explicitly in the deflation procedure. However, such firms account for only a minor portion of the real estate industry. In the existing data, they are largely classified in the construction industry, at least to the extent of the payroll component of GPO.

### *Hotels and Lodging Places (SIC 70)*

The constant dollar GPO for this industry is derived by extrapolating the base year GPO by constant dollar receipts for room rentals and meals served.

Receipts for the rental of rooms are calculated separately for hotel and motel rooms; trailer space; and clubs, schools, and institutions. Receipts for meals are based on receipts compiled for hotels and motels, and fraternities and sororities. Receipts for room rentals and meals at hotels, motels, tourist courts and trailer parks, and sporting and recreational camps are based on data shown in the Censuses of Selected Services. Estimates for intercensal years are derived by interpolating and extrapolating these census figures by room and meal receipts appearing in *The Annual Hotel Review* compiled by Howorth and Howorth. Lodging at clubs, schools, and other institutions and meals served in fraternities and sororities are estimated from average current costs for lodging and board per student multiplied by an estimate of the number of students using these facilities.

The room receipts total is deflated by a weighted index of the aver-

age rate per occupied room in hotels and motels (85 per cent), as published in the *Annual Hotel Review*, and the CPI for rent (15 per cent). The deflator for meal receipts is the CPI "Meals Away from Home."

*Personal Services (SIC 72)*

The constant dollar measures for this industry are derived by deflating the current dollar GPO by the implicit deflators for total output.

The deflators are calculated from the composite of the current and constant dollar PCE series for seven separate categories: shoe cleaning and repair; cleaning, dyeing, pressing, etc.; laundering in establishments; barber shops, beauty parlors, and baths; funeral and burial expenses; photo studios; and selected miscellaneous services (principally costume and dress suit rentals).

The deflator method is used since changes in the level of the deflated PCE series might not apply to the total for any specific industry in this group because of shifts in the relative importance of industry sales to business. These shifts are most important for cleaning and dyeing plants, rug cleaning establishments, and power laundries. Also, the PCE series include expenditures for services rendered by establishments classified in other industries. Such expenditures could vary in importance over time. The implicit deflator would be less affected by such shifts and therefore is preferred to the extrapolator method.

The current dollar output totals for each of the above series are based on Census totals for 1948, 1954, 1958, and 1963. The data for intercensal years are estimated as follows:

<i>PCE Series</i>	<i>Source for Intercensal Years</i>
Shoe cleaning and repair	Receipts, published by National Shoe Leather Finders Assoc.
Cleaning, dyeing, pressing, etc.	} Payrolls for the industry
Laundering establishments	
Barber shops, beauty parlors, baths	
Funeral services	
Burial charges	State sales taxes levied on funeral directors' receipts
	Number of corpses other than paupers needing burial times the average current price of cemetery lots
Photo studios	Index of disposable personal income
Selected miscellaneous services	Payrolls for the industry

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The current dollar series are deflated by the corresponding CPI's or by price indexes estimated by the OBE for those series for which there are no CPI's.

#### *Miscellaneous Business Services (SIC 73)*

The output of this industry is derived by extrapolating the base year GPO by the number of persons engaged in production.

This industry comprises a wide variety of activities since it includes firms such as advertising agencies, business consulting services, janitorial services, and commercial research and testing laboratories. Using unweighted labor inputs to measure real output, as already noted, is generally unsatisfactory and probably more so in this case than in many others. The OBE is investigating new information from the Internal Revenue Service, trade associations, and other sources hoping to improve the constant dollar GPO estimates for this rapidly growing industry.

#### *Auto Repair, Services, and Garages (SIC 75)*

The constant dollar gross product for this industry is derived by deflating the current dollar series. The implicit deflator is calculated from a composite of current and constant dollar receipts for auto repairs and rentals derived from the corresponding PCE series, adjusted to exclude consumer expenditures for such services provided by establishments classified in other industries.

The current dollar repair and service receipts are deflated by the CPI for "auto repair." The current dollar rental receipts are deflated by the WPI for passenger automobiles, on the assumption that the price of new cars is a major cost element in this industry.

#### *Miscellaneous Repair Services (SIC 76)*

The constant dollar gross product for this industry is derived by extrapolating the base year gross product by the number of persons engaged in production.

Measures of output for this industry are difficult to construct not only because of the heterogeneity of activities classified in this industry group but also because of significant industry classification changes introduced by the 1957 edition of the SIC manual. The series used

for estimating the corresponding personal consumption expenditures are not appropriate since these data reflect total expenditures regardless of whether the repairs were performed in a retail trade store or in a repair shop. Only the services performed by a repair shop are classified in this industry. In addition, the repair shops might also engage in retail trade or repair products owned by businesses, both of which would be excluded from the PCE series.

*Motion Pictures (SIC 78)*

The constant dollar gross product for this industry is derived by deflating the current dollar GPO. The deflator is a weighted index of the CPI for motion picture admissions and the index of average annual earnings for persons engaged in motion picture production and distribution. The weights used are the wages and salaries for each type of activity in the base year.

While the exhibition activities of the motion picture industry may be measured reasonably well by theater receipts, there are no readily available measures for motion picture production and distribution. In addition, deflators would have to be constructed and reliable price changes for receipts are difficult to calculate because of the varying rental practices of producers and distributors. Even the available quantity measures on number of pictures or programs completed, or film footage produced can hardly be considered a suitable indicator of output because of the extremely wide range in quality among movies of enormous variety (color vs. black and white, star cast vs. lesser known, theater vs. industry or TV exhibition, etc.).

*Amusements and Recreation, Except Motion Pictures (SIC 79)*

The constant dollar total for this industry is derived by deflating the current dollar value of GPO. The deflator used is a composite of six current and constant dollar series: admissions to legitimate theaters, opera, and entertainment of nonprofit institutions (except athletics); admissions to spectator sports; amounts spent on commercial participant amusements; pari-mutuel net receipts; commercial amusements, not elsewhere classified; and other recreation, n.e.c. These are the same series used for personal consumption expenditures.

Each of these six series is a composite of separately calculated meas-

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ures; e.g., eight for spectator sports admissions and seven for commercial participant amusements. The following examples illustrate the variety of data used to represent each of the separate measures: the attendance receipts for the World Series, major, minor, and triple-A league games; fees for golf courses, caddies, and golf instructions; and payrolls for theatrical presentations.

The data used to calculate constant dollar output for each of the series also vary. The CPI for "all items" is used to deflate pari-mutuel receipts, commercial amusements, n.e.c., and other recreation, n.e.c. Spectator sports are represented by the number attending major, minor, and triple-A league games, and World Series. Personal consumption expenditures for "commercial participant amusements" are deflated by an index of average annual earnings for employees classified in that industry.

### *Medical and Other Health Services (SIC 80)*

The constant dollar total of this industry is derived by deflation. In general, an implicit price deflator is calculated from the sum of current and constant dollars for the following medical care services: physicians; dentists; other professional medical services (osteopathic physicians, chiropractors, chiroprodists and podiatrists, private duty trained nurses, and miscellaneous curative and healing professions); and privately controlled hospitals and sanitariums.

The above current dollar series are identical with those used to measure personal consumption expenditures. All of these series except for nursing homes, and privately controlled hospitals and sanitariums are based on IRS data; adjusted to a calendar year basis; and, since 1956, further adjusted to exclude government payments other than medicare and workmen's compensation for these private medical services. The source for proprietary hospital and sanitarium receipts is the *Journal of American Hospital Association*; the source for nursing homes is U.S. Department of Health, Education and Welfare.

The current dollar expenditures for physicians and "other professional services" are deflated by the CPI for physicians' fees, and the dental expenditures by the CPI for "dental fees." Current dollar receipts of proprietary hospitals and sanitariums are deflated by the CPI for "hospital daily service charge."

The deflator rather than the extrapolator method is used largely because of the omission of some services: for example, medical and dental laboratories, and optometrists engaged in prescribing and fitting, but not selling glasses.

For nonprofit hospitals and sanitariums, employee compensation is deflated by an index of average annual earnings for hospital employees. This is in accordance with the national account convention wherein the GPO for nonprofit institutions serving the public is defined to consist solely of employee compensation, and their real product calculated by deflating compensation by an earnings index. Consequently, output is measured by labor input for nonprofit institutions.

*Legal Services (SIC 81)*

The constant dollar series for this industry is derived by extrapolating the base year GPO by the PCE constant dollar series for this service.

The personal consumption expenditure series for legal services represents, since 1947, a fixed proportion of the total industry receipts as compiled by the IRS. The trend for the PCE series thus is identical with that for total receipts. The current dollar series is deflated by the index of average annual earnings of full-time employees in legal services on the assumption that changes in fees charged for legal services are related to changes in average annual earnings per full-time employee in legal services. This procedure is used, despite misgivings as to the validity of the assumption, because of the lack of a more reliable indicator of price changes. Since 1964, the CPI provides a price index for "short form wills." However, this index seems too limited to be usable as a deflator for total legal receipts.

*Educational Services (SIC 82)*

The real output of this industry is derived by deflating GPO by an index of average annual earnings per employee. Nonprofit institutions account for about 90 per cent of the total industry GPO.

*Nonprofit Membership Organizations (SIC 86)*

The real output for this industry is derived by deflating the current dollar value of GPO by an index of average annual earnings per

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employee. This procedure is identical with that used to calculate real product in the national accounts.

#### *Museums, Galleries, and Miscellaneous Professional Services (SIC's 84 and 89)*

The output of this industry group is derived by deflating the current dollar GPO. The principal component of the price index is based on annual average earnings per full-time employee for this industry. For the business components of this category, the deflator is a composite of the WPI (commodities except farm and food) and payroll costs.

#### *Private Households (SIC 88)*

The real output for this industry is identical to the household portion of the published "households and institutions" total. The deflator for households is derived from an index of annual earnings per domestic servant.

### APPENDIX TABLE

#### Industry Definitions

SIC Number	Title	Primary Activity
60	Banking	Institutions engaged in deposit banking or closely related functions, including fiduciary activities.
61 & 67	Credit agencies, holding, and other investment companies	Establishments engaged in extending credit in the form of loans but not engaged in deposit banking; and investment trusts, investment companies, holding companies, and commodity trading companies.
62	Security and commodity brokers, dealers and exchanges	Establishments engaged in the underwriting, purchase, sale, or brokerage of securities and other financial contracts on their own account or for the account of others; exchanges, exchange clearing houses and other services allied with the exchange of securities and commodities.
63	Insurance carriers	All types.
64	Insurance agents, brokers, and service	Agents and brokers dealing in insurance, and also organizations offering services to insurance companies and to policy holders.

(continued)

APPENDIX TABLE (continued)

SIC Number	Title	Primary Activity
65 & 66	Real estate and combination offices	Real estate operators, owners and lessors of real property, buyers, sellers, developers, agents, and brokers; as well as offices which are regularly engaged in any combination of real estate, insurance, loans, or the practice of law (and none of these activities constitute its principal business). In the National Income Accounts, the GPO for this industry includes an imputation for owner-occupied nonfarm dwellings. The imputation for owner-occupied farm dwellings is included in the Farm Sector.
70	Hotels and lodging places	Commercial establishments and institutions engaged in furnishing lodging, or lodging and meals, and camping space and camping facilities on a fee basis.
72	Personal services	Establishments engaged in providing services generally involving the care of the person or his apparel, such as laundries, cleaning and dyeing plants, photographic studios, barber and beauty shops, and cleaning and pressing shops.
73	Miscellaneous business services	Establishments rendering services, not elsewhere classified, to business enterprises on a fee or contract basis. It comprises such diverse groups as advertising agencies, window cleaning, and research, development and testing laboratories.
75	Auto repair	Establishments engaged in furnishing automobile repair, rental, and storage services to the general public. Automobile repair shops maintained by establishments engaged in the sale of automobiles and by gasoline service stations are classified in retail trade.
76	Miscellaneous repair service	Establishments engaged in miscellaneous repair services, such as electrical repair shops; watch, clock, and jewelry repair; furniture repair; armature rewinding shops; and other repair shops, not elsewhere classified.
78	Motion pictures	Establishments producing and distributing motion picture films, exhibiting these in commercially operated theaters, and furnishing services to the motion picture industry.

(continued)

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### APPENDIX TABLE (concluded)

SIC Number	Title	Primary Activity
79	Amusements and recreation, except motion pictures	Establishments whose primary function is to provide amusement on payment or admission charge, except motion pictures. It includes dance halls, schools, bowling alleys, golf and country clubs, and other miscellaneous amusements and recreation services.
80	Medical and other health services	Establishments engaged in furnishing medical, surgical, and other health services to persons. Associations or groups primarily engaged in providing medical or other health services to members are included, but those which limit their services to the provision of insurance against hospitalization or medical costs are classified in Major Group 63, insurance carriers.
81	Legal services	Establishments engaged in offering legal advice or legal services on a contract or fee basis, the head or heads of which are members of the bar.
82	Educational services	Establishments furnishing formal academic or technical courses, correspondence schools, commercial and trade schools, and libraries. Schools for the instruction of beauty parlor operators and barber colleges are classified in industry 72, personal services.
86	Nonprofit membership organizations	Organizations operating on a nonprofit membership basis for the promotion of the interests of the members, such as trade associations; professional membership organizations; labor unions and similar labor organizations; and political, charitable, and religious organizations. This major group does not include business establishments organized on a nonprofit basis, such as nonprofit hospitals and similar organizations.
84 & 89	Miscellaneous professional services	Museums, art galleries, and botanical and zoological gardens as well as establishments engaged in performing services not elsewhere classified, such as those rendered by engineers, architects, accountants, artists, lecturers, and writers. Nonprofit educational and scientific agencies are also included.
88	Private households	Private households which employ domestic workers.

## DISCUSSION

GORDON J. GARSTON, Dominion Bureau of Statistics

Some papers just naturally provoke criticism while others stimulate discussion. Mr. Marimont's excellent paper falls in the latter category mainly because it is frank and thorough, but also because it so carefully points out the difficulties inherent in any attempt to quantify the contribution to real GNP of industries providing services.

If the paper has any flaw at all, it is to be found in the lack of detailed discussion of some consequences of using the current dollar measures as a basis for real product measurement. I will return to this point in a moment.

I found the scope of the paper disappointing since I had hoped to see some discussion of the OBE measures for transportation, distribution, public administration, and other service producing industries, as well as those actually covered. This extension would undoubtedly have added considerably to the length of the paper but would have been very worthwhile.

I would also have liked to have seen a discussion of the future plans of the OBE in regard to the annual estimates and to the development of industry-based quarterly estimates of the real GNP. I am sure that many of us would appreciate comments from Mr. Marimont on these matters.

The portion of Mr. Marimont's paper dealing with the definition of real GNP from an industry of origin point of view is, I believe, too limited. Although he provides the essentials of such a definition he leaves readers unsure about his precise definition of output. This is particularly important in relation to the industries covered by the paper where the OBE uses—by convention or necessity—a wide range of input measures of one kind or another, e.g., life insurance and education, in order to approximate output.

Normally, constant price intermediate inputs are deducted from constant price output to yield the desired real GPO. This is done wherever an industry can report sources of operating revenue and purchases of intermediate inputs. This approach is universally followed, at

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least in commercial or profit-motivated industries, with the notable exceptions of banking and the credit agencies, holding, and other investment company industries, where normal (to these industries) revenue and expense items reflected in profits are reversed, with the result that these industries are depicted as negative contributors to the GNP. To avoid this illogical result, imputations are added for institutions accepting deposits. These imputations are primarily based on input concepts and may not be useful for the measurement of real GPO.

The problem is best illustrated by looking at the results of the OBE approach to a real GPO measure for banking. Table 1 of the paper indicates that the constant dollar contribution of banking to real GNP has fallen dramatically compared with its current dollar contribution, and is clearly quite different from other industries. A look at employment data for banking will substantiate the view that if one accepts the validity of the real GPO series prepared by the OBE then one has to accept a sharp and long-term downward trend in the labor productivity ratio. This decline is apparent over the entire two decades covered and, since it is nearly two percentage points per annum on average, it is surely highly suspect.

Perhaps if the OBE had used deflated loans and deposits for projection purposes, instead of deflated deposits alone, an entirely different picture might have emerged. Certainly, on what evidence I could find, loans expanded much more sharply than deposits and, if one were to net the two corresponding gross interest flows, the difference must have risen even faster. This effect would cause the implicit OBE deflator to rise sharply, as it did. I am not certain that one can describe these results in this way, but if Marimont's paper is read literally these results emerge. Gorman's description, as it relates to interest rates, raises some doubts however.

It is even more difficult to accept the fact that industries such as credit agencies, holding, and other investment companies, make a negative contribution to GNP, in spite of the imputation added to savings and loan associations, and that banking would certainly be in the same position were it not for the service cost imputation made there. These phenomena are not logical to me when I attempt to measure output or productivity for such industries. In fact, are we at all justified in calling these activities industries?

In spite of the defense of the OBE approach to real GPO for banks contained in the Gorman paper to be discussed later in this volume, I wonder if, in view of the statistical results, the OBE would not have been better off to use a simple labor input measure for these industries. By presenting such a clear description of methods and results Marimont lays the groundwork for constructive discussion, and I'm sure that he hopes, as I do, that this conference will help lead to a suitable solution to these problems.

I would like to comment briefly on some of the other OBE measures. The insurance carrier measure is a surprising one in the sense that one would expect, in the life insurance component at least, a downward productivity trend due to the nature of the deflator. This deflator is similar to the widely criticized one used for the deflation of investment in new construction. Since the components of the group "insurance carriers" are not given separately one cannot tell if this view is correct. Perhaps the nonlife insurance carrier measure reflects productivity growth and is thus offsetting. What emerges from the over-all group measure is an output index that moves with labor input. Perhaps Mr. Marimont could comment on this point.

There is little that can be said about the other service industry measures. All in all, they depict a rather sad story of incomplete or inadequate statistical data for these growing and important industries, a story that seems to be international in scope. But Mr. Marimont seems to feel, and I agree, that there is some hope for improvement in this area.

Solving such problems is difficult but I cannot agree with Marimont when he states, "I doubt that we will soon develop a definition of output for the service industries which is both 'true' and operational. We shall have to be content to accept conventions that are not fully satisfying." I sincerely hope that this attitude does not prevail as it will surely influence the amount and intensity of research in these difficult areas. We must intensify our efforts if we are to make progress in measuring these increasingly important industries. Certainly Mr. Marimont's excellent contribution will go a long way in provoking the necessary discussion that, hopefully, will lead to the sought after solutions.

JOHN W. KENDRICK, The George Washington University

The paper by Martin Marimont is a useful contribution to the literature on service industry output. Marimont reviews the chief conceptual and statistical problems of estimating real output units and prices, with particular reference to the finance, insurance, real estate (F.I.R.E.), and service industries. He then summarizes how the estimates, despite their shortcomings, behave for the period 1948-65. Finally, he describes the procedures used to derive constant dollar GPO in each of the various F.I.R.E. and service industries against the background of a discussion of the concepts of gross product in this area.

It is the last, and major, section of the paper which is the most useful. Only with a clear and detailed description of current procedures can analysts use the estimates with understanding and due caution, and economic statisticians develop suggestions and plans for improving concepts, data, and estimates. My comments are directed primarily to under-scoring the limitations of the numbers; I shall also try to make some suggestions for their improvement. The critical tenor of my remarks should not be construed to detract from the positive achievements of the Office of Business Economics in an admittedly difficult field nor from Marimont's contribution in laying bare the detailed procedures employed.

I believe that it is a fair evaluation to state that the estimates of real product in the F.I.R.E. and services areas, together with the public sector, are generally the poorest parts of real gross private product. The estimates of real government product are notoriously deficient, but lie outside the purview of the present discussion—although discussion of direct output measures for private service industries has implications for the public sector.

The real product estimates for the entire set of industries are not obtained by the conceptually preferable double-deflation method or, more correctly, by estimation of gross production in real terms, adjusted to exclude the real cost of intermediate goods and services consumed in the production process. We shall need considerably better

census and survey data than are now at hand before this approach can be applied. In the meanwhile, I am not greatly disturbed in principle by the use of gross output measures, or proxies, to extrapolate base-period product originating (value added). In most service industries, intermediate purchases constitute a relatively small ratio to gross production value. This is more likely to be the redeeming factor than possible constancy in the ratio of real intermediate expense to gross output, which we can have no valid reason to expect in the absence of relevant data.

I am much more troubled by the inadequacy of many of the deflators which are applied to the value of production or to value added, and by the inadequate extrapolators used in lieu of deflation. The fault cannot be laid entirely at the door of data gaps; too little thought has thus far been devoted to developing conceptually appropriate units of output for some of the important industries, and more ingenuity could be exercised in devising measures of this output. Beyond this, I am entirely in agreement with Mr. Marimont that the Census Bureau and other non-OBE agencies should be prodded (and financed) to provide more and better unit and value data; as should the BLS provide more and better service-price indexes for deflation. In the meantime, the OBE can be doing some things on its own. In fact, unless the OBE (or someone else with the same interests) specifies the appropriate output units, the Census Bureau cannot be expected necessarily to come up with proper output measures when financing permits, nor can the BLS be expected to know what to price.

The most inadequate procedures, of course, are those which involve extrapolating base-period product by employment, or—what amounts to virtually the same thing—using an average wage-salary as a deflator. These methods, which make no allowance for probable productivity or labor quality change, were used for all or parts of industries which made up a significant percentage of GPO in the F.I.R.E. and services area in 1965.

At the very least, I think that the service industry total should be shown both including and excluding households and private non-profit institutions, so that productivity analysis can be confined to the business sector of services, and to the private business economy. Real product in some of the remaining business service industries is still

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extrapolated by employment, but the effect of the no-productivity-change assumption is considerably reduced.

In some of the other industries, general rather than specific price indexes are used for deflation. In effect, this procedure implies that productivity in the particular industry has moved more or less in line with that in the economy as a whole—again, an hypothesis for which there is no warrant, although it is probably better than the no-productivity-advance assumption.

For those industries in which employment extrapolation or proxy deflators are used, energies must obviously be directed towards obtaining appropriate specific deflators or specific unit output extrapolators. It is encouraging that the BLS recently inaugurated a service price index for short-form wills. There are many other relatively standard services performed by lawyers and other professional (and personal) service people which are amenable to pricing. In the case of lawyers, for example, one thinks of divorce cases, title search, estate settlement (by size of estate), etc.

But while prodding the BLS, the OBE in some instances can be developing indexes from trade associations and other data for other services. (For example, in my current research I required a composite index of advertising rates, which my assistant Jennifer Rowley was able to put together from data found in *Media/Scope*, *Media Records*, and *Printers' Ink*.) I am encouraged that the OBE is investigating possibilities of this sort for miscellaneous business services (SIC 73) generally, and I think that a respectable number of price indicators can be compiled for this and some of the other presently uncovered service industries.

I believe the largest short-term payoff will come in refining and improving the real product measures in the F.I.R.E. group. In the case of insurance carriers, e.g., the measure for life activities derived by deflating "expenses of handling life insurance" by a composite of average wages in the industry (75 per cent) and the CPI for services (25 per cent) would seem to represent a serious oversimplification. A recent study suggests the following chief final services of life insurance, for which output measures should be assembled, by major categories of individual life insurance (ordinary, industrial, credit, and annuity), and by chief types of policies, with separate treatment for

group life, in which there are master policies and individual certificate holders. Possible volume indicators are shown in parentheses after each of the major functions.

- A. Initiation of protection
  - 1. Selling activities (number of policies issued)
  - 2. Selection activities (number of policies applied for)
  - 3. Issuing activities (number of policies issued)
- B. Protection (insurance) function (deflated face value of insurance in force)
- C. Investment function (deflated dollar volume of investment)
- D. Payment of cash benefits
  - 1. Living benefits (number of payments, or cases, of each type)
    - a. Surrenders
    - b. Conversions
    - c. Matured endowments
    - d. Annuities
    - e. Disability, including waiver of premium
  - 2. Death benefits (number of death claims processed)
- E. Rendering of noncash benefits (number of cases of each type)
  - 1. Revivals
  - 2. Transfers
  - 3. Expires
  - 4. Lapses
  - 5. Decreases
  - 6. Withdrawals

The volume indicator for each final service would, of course, be weighted by the estimated base-period cost per unit.

While the above list of activities, and of indicators, is not the best that could be devised, I have been specific in order to indicate the complexity of life insurance operations and to stimulate further thought about it. I would suggest that OBE representatives meet with people from the Life Insurance Association of America, the Institute of Life Insurance, and possibly with a committee of economists from selected companies to discuss the problems of identifying final services, and securing the necessary data for preparing composite measures both for life and non-life insurance.

Before reading John Gorman's thoughtful paper I had suggested that, with regard to banking (SIC 60), a transactions measure be employed instead of, or in addition to, the present liquidity measure. After all, deposits and withdrawals, and debits in the case of demand

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deposits, are services to customers which involve a cost. I would also introduce indicators for subsidiary services rendered by banks, such as sale of travellers checks and other instruments, rental of safety-deposit boxes, and so on.

Here, again, I suggest that the OBE set up a committee consisting of economists from selected banks, and of representatives of regulating agencies, such as the Federal Reserve Board of Governors and the Federal Deposit Insurance Corporation, to discuss the appropriate measures of the various types of final services, and the data available to implement these. The Gorman paper would serve as an excellent point of departure.

The final area I would like to comment on specifically is "security and commodity brokers, dealers and exchanges" (SIC 62). For this industry, the OBE extrapolates base-year product by employment. In view of the rapid spread in recent years of electronic data processing in this as in other financial industries, the OBE must be missing a lot of productivity. Until direct data can be extracted for this segment of the industry, I would strongly urge use of the available data on numbers of shares of stocks and bonds sold in the registered exchanges, appropriately weighted as a composite volume indicator, with a coverage adjustment (possibly based on employment) to include "over the counter" transactions. I can hardly believe that no data exist on the volume of underwritings. Data do exist on odd-vs. round-lot transactions, and I suspect that data on trading in commodity futures could be assembled.

In any case, I again recommend that the OBE technicians work with a panel in this field—representatives of the Securities and Exchange Commission; the New York and American Stock Exchanges; possibly other exchanges; Merrill, Lynch, Pierce, Fenner, and Smith; and possibly a few smaller brokerage and underwriting houses. In addition to developing concepts and existing measures, pressure could be brought to bear on the industry to supply relevant data not now available. Surely the industry would be interested in measures of its own production and productivity, in addition to the contribution it could make to national economic statistics.

*Conclusion.* In short, I recommend that much more work be done by the OBE in the finance and service areas of real GNP. Marimont

indicates that some work is going forward—exploring nongovernmental sources for additional relevant price and quantity data, and encouraging the BLS to collect additional service price data. In addition, I recommend a new look at concepts in a number of the important financial areas in conjunction with industry groups who should be able to help identify final services, assemble available quantity and value data, and possibly furnish relevant data not currently published.

I realize that developmental work of this sort is time consuming and costly. It is even more expensive when government economic statisticians climb out of their ivory towers to consult with industry representatives who should be able to help devise better measures for their industries than the statisticians can develop working in isolation.

Yet the goal of significant improvement in real national product estimates generally, and in the F.I.R.E. and service industries in particular, warrants special effort. As matters stand now, I am very skeptical of the trends and relationships described in Marimont's section on "Output and Prices Since 1948." The OBE numbers undoubtedly understate the growth of real product and productivity in the F.I.R.E. and service groups, and correspondingly overstate the degree of price inflation. The errors are not innocuous; the movements of these variables do influence policy. The sooner we can provide economic policymakers with better statistical tools as background for decision making, the better.

#### COMMENT

NESTOR E. TERLECKYJ, Bureau of the Budget

The life insurance industry offers an opportunity for considering certain implications of measurement of service output in physical terms and includes an identifiable illustration of the internal output component considered in Treadway's paper.

The relevant unit of life insurance service is a durable one; it extends over the entire lifetime of the contract. With outputs measured over shorter units of time, such as a year, interesting questions of dynamics of output measurement arise. Sales and the work entailed in the initial enrollment, for example, may be viewed as an

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internal output, but nevertheless it is a legitimate output since it is a necessary component of the unit of service. Other service elements such as extension of loans, endowments, benefit payments, as well as the sheer extension of insurance protection, i.e., servicing of policies, occur in different years. They can be identified, priced at factor cost, and combined into an index.<sup>1</sup>

### REPLY

BY MARIMONT TO KENDRICK AND GARSTON

One purpose of this Conference is to generate suggestions for sharper definitions of what a service industry produces; definitions which will lead to measures of output that are consistent with the national accounts. The requirement that the suggestions be operational need not limit them to already existing data, but does require that the new data can be acquired within a reasonable time and at a reasonable cost. The comments of both Kendrick and Garston contain suggestions in this direction. From my admittedly provincial point of view, these conditions of consistency and implementability are quite essential; otherwise, pregnant ideas would only end in stillbirths.

Kendrick suggests a very detailed and comprehensive system of data for measuring insurance output. This proposal raises several statistical and conceptual questions. First, only some of the data exists now, and it would be necessary to assemble most of the others. This is a very substantial amount of information to ask for, and I am uncertain as to whether it can be obtained. Second, there is some question as to whether the proposed definition of output is completely acceptable. Kendrick's proposal is based on a very broad view of what should be included in insurance output. Some activities would be included in output that, perhaps, should be excluded, although there are a few

<sup>1</sup> For the results of an attempt to measure the life insurance service extended to veterans by the Veterans Administration in physical terms, see *Measuring Productivity of Federal Government Organizations*, Executive Office of the President, Bureau of the Budget, Washington, D.C., 1964, pp. 163-164, 165-168. Table IV-1-6 on page 188, presents the results of adopting alternative definitions of output for life insurance. The same methodology is applicable to life insurance produced in the private sector.

excluded activities that one might wish to consider including. Kendrick enumerates nearly all the activities that an insurance company performs and considers them all as output. This seems much too inclusive since it would count as output what in other industries is conventionally accepted as part of the cost of producing output. For example, the selling activities of the insurance company are an element of output according to Kendrick, but we do not normally include as output the advertising efforts of the soap manufacturers. I think it might be useful if there were some further discussion of this extension of the boundaries of production.

Other questions are also to be noted. For example, if we include selling activities, should this be, as Kendrick suggests, on the basis of numbers of policies without regard to size of policy or, should the number of policies be weighted by face amount? Payment activities are measured by the number of payments. This contrasts with the treatment of protection activity which is based on the face value of the policy. Furthermore, what do we do with all the "free" services that the insurance company offers? Are they to be classified as output or as costs? You will recall I also raised this issue with respect to stock brokers.

I would prefer to withhold comment on Kendrick's and Garston's proposals for banking, since Gorman's paper treats these matters in full detail. However, I want to note that we do include the subsidiary services rendered by banks, mentioned by Kendrick. We exclude them from our real product calculations only for the sake of simplicity. They are relatively small and would be offset by intermediate purchases in the full implementation of the double-deflation method.

I have mentioned the question of free services by stock brokers. I would also like to hear some discussion of whether output should be measured by the number of stocks or the value of stocks traded. On the other hand, a good series on the value of commissions received and a good deflator of such commissions might yield the best real output series.

To answer the suggestion that enough data be published to allow subtracting "households and institutions" from the service industry total, we do publish this information as part of our regular series on industry gross product.

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I want to assure Garston that I agree completely that intensive efforts are needed to improve both the conceptual and statistical basis for measuring service industry output. My pessimism extends only to our ability at present to formulate and reach agreement on a definition of output that is both "true" and measurable. It is for this reason that I would stress the need, while further work goes on, to develop and adopt definitions that would be acceptable, though short of perfection.

As I indicated, I share the concern over the reliability of the statistics for some of these industries, however, it should be noted that there is a wide variation in the quality of the measures prepared by the OBE. There are a number of industries for which there are good current dollar measures of output as well as adequate deflators or direct quantity indicators. The OBE has made, and continues to make, every strenuous effort it can to recommend and support proposals that would lead to major improvements in the data. In the meantime, it has also made every effort to insure that those who use the OBE measures are aware of their limitations.