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Introduction and Summary

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INTRODUCTION

THE rapid growth of services in the United States and other industrialized nations in recent decades has sparked renewed interest in the heterogeneous group of industries that comprise the service or tertiary sector of the economy. Allan G. B. Fisher and Colin Clark were among the first to devote major attention to this sector in two prophetic books written in the 1930's.[1] Subsequently, other investigators contributed to our understanding with studies of particular service industries or particular aspects of the sector.[2] Nevertheless, the amount of economic research devoted to services has been far from commensurate with the importance of these industries in the U.S. and other developed economies.

Reasons for this neglect in the past are not difficult to find. They include the greater importance of primary and secondary employment at lower levels of real income per capita; the belief of some economists, notably Adam Smith, that only the primary and secondary sectors were "productive"; the difficulty of measuring service output; the

[1] Allan G. B. Fisher, *The Clash of Progress and Security,* London, 1935; and Colin Clark, *The Conditions of Economic Progress,* First Edition, London, 1940.

[2] Some of the major studies include: Milton Friedman and Simon Kuznets, *Income from Independent Professional Practice,* New York, NBER, 1945; Solomon Fabricant, assisted by Robert E. Lipsey, *The Trend of Government Activity in the United States Since 1900,* New York, NBER, 1952; Harold Barger, *Distribution's Place in the American Economy Since 1869,* Princeton for NBER, 1955; George J. Stigler, *Trends in Employment in the Service Industries,* Princeton for NBER, 1956; John W. Kendrick, *Productivity Trends in the United States,* Princeton for NBER, 1961; Bureau of the Budget, *Measuring Productivity of Federal Government Organizations,* Washington, D.C., 1964.

difficulty of obtaining data because of the heterogeneity of activities and the small size of most firms in the service sector; and the large role of nonprofit organizations in the service sector and the difficulty of analyzing their behavior. Thus a combination of intractable conceptual problems, inadequate statistical coverage, and insufficient empirical analysis has served to limit our understanding of the factors affecting production, employment, and productivity in services.

A conference to explore these problems was held in Ottawa in October 1967. This volume presents the conference papers and the comments of the formal discussants. Also presented are comments that have been submitted by other participants and, in a few instances, replies to the discussion by the authors of the papers. The next section provides an introduction to the papers, followed by a broad summary of the present state of knowledge in this area and a discussion of some of the major questions yet to be resolved.

SUMMARY OF PAPERS

The first paper, by Martin Marimont of the U.S. Office of Business Economics, describes how that agency measures the output of finance, insurance, real estate, and services in current and constant prices. The paper also presents growth rates for the post-World War II period for the detailed industries and major industry groups in this sector. On the conceptual side, Marimont emphasizes that the techniques chosen to measure output in particular industries must be consistent with the conceptual and statistical framework of the U.S. National Income and Product Accounts. He notes that the problems of measuring quality are greater for industries producing services than for those producing goods, adding that "the statistics on output and prices for the service industries are more limited than for almost any other industrial area." He suggests that the growth of real output in this sector has probably been understated, and the rise in price overstated, because of these limitations.

Approximately half of the paper consists of detailed descriptions of the estimating procedures used for each of nineteen industries. In twelve instances, the basic approach is to deflate current dollar gross output by some price index. Marimont notes that it is generally easier to obtain highly specified price indexes than to obtain equally good real quantity indexes. Output in seven of the nineteen industries is

based on extrapolating the base year gross product by a "quantity measure" of total output. In practice, four of the seven extrapolations are based on employment. Marimont emphasizes caution in the use of detailed categories and refers to them as worksheet estimates.

One of the discussants, Gordon J. Garston of the Canadian Dominion Bureau of Statistics, is particularly critical of the measures for banking and for credit agencies. The negative contribution to GNP shown for the latter industry seems illogical to him. He observes that the inadequacy of data mentioned by Marimont is international in scope. The other discussant, John Kendrick, believes the most inadequate procedures are those using employment as a basis for extrapolating output. Kendrick says that price indexes can be obtained for some of these areas, and cites his own experimental work in pricing advertising rates. He also presents a detailed approach to a method of measuring the output of life insurance companies. Kendrick suggests that, for insurance, banking, and security brokerage, the Office of Business Economics should set up committees of economists and industry specialists to discuss appropriate concepts and measures of output.

Arthur Treadway's theoretical paper deals with a problem that is present in measuring real output change in any industry, namely, possible bias introduced by the assumption of equilibrium. The core of Treadway's argument concerning disequilibrium is that the firm produces two kinds of output: the conventional type which it sells—the output used in most production functions and measures of productivity; and the accumulation of productive assets to be used in the future—this has internal costs. As Treadway says, "Expansion must be planned and managed and, hence, diverts resources from the production-for-current-sale activities of the firm." He suggests that the bias might be particularly great in the case of services because of their recent spectacular growth.

Treadway also discusses the problems created by the assumption that externalities can be ignored and notes that the growth of some services seems to be the result of the spinning off of functions that used to be performed within manufacturing firms.[3] This spinning off

[3] David Schwartzman's paper, discussed below, notes a reverse phenomenon, with some functions being pushed back from retailing to manufacturing.

is an example of division of labor made possible through the widening of the market. Treadway also speculates about whether the externalities of service industries are likely to be different from those of goods and more likely to be socially beneficial.

A third problem concerns the exclusion of intermediate purchases in calculations of productivity. Treadway notes the smaller importance of intermediate purchases in services than in goods, and suggests that this may bias the measurement of sector productivity trends.

Irving Kravis, in his discussion of the Treadway paper, asks that price and quantity measures be reoriented toward welfare. He is particularly concerned with the scope of economic activity and the treatment of quality change, because "the practice of national income accountants and price index makers has become rigidified around compromises that were necessary and reasonable thirty years ago, but can no longer be justified. What we should aim at doing has not changed; what we now can do has changed."

The next three papers deal with the measurement of production and productivity in specific industries. Melvin Reder, in an attempt to define the output of the medical care industry, begins by calling it anything that medical care insurance will pay for. The bulk of his paper is addressed to two questions: how to measure productivity change in this industry so defined; and how the productivity of medical care is affected by the organization of the industry.

Reder's definition of the industry leads him to suggest that the price can be measured by the price of medical care insurance. He would make adjustment for quality aspects of all kinds and indicates the need for trade-off measurements between changes in life expectancy, reductions in undetected illnesses, increase in improper treatment, etc. As an alternative method for measuring price change, he suggests the cost of treatment of particular illnesses.[4]

Herbert Klarman and Martin Feldstein, the two discussants, are both critical of the price-of-insurance approach because it fails to distinguish between unit price and total expenditure. Upward trends in utilization may be the result of technological innovation, increased availability, changes in taste, etc. These should not show up as price

[4] See Anne A. Scitovsky, "Changes in the Cost of Treatment of Selected Illnesses, 1951–65," *American Economic Review*, LVII, No. 5, December 1967, pp. 1182–1195.

changes. Both discussants are also skeptical of the episode-of-illness approach. According to Klarman, most medical care situations cannot be divided into distinct episodes. Feldstein emphasizes the difficulty of estimating the extent to which differences in medical care are responsible for differences in health status. He points out that the episode-of-illness approach is likely to pick up only process innovation—not product innovation.

Klarman writes that, if the gains in productivity in health come through costless (to the health industry) increases in knowledge, we should not credit the health industry with such gains.[5] Feldstein points out that the level of uncertainty about availability of care is one aspect of the quality of output. He says that reductions in uncertainty through excess capacity should not be considered as a complete loss of productivity. Reder, in his reply, notes that this is a general problem in all productivity measurements—the failure to take account of delivery delay.

The second industry paper, by John A. Gorman of the U.S. Office of Business Economics, compares alternative approaches to measuring the real output of commercial banks. He deals first with a very simple version of a commercial bank, comparing the "liquidity hypothesis" with the "transactions hypothesis." These yield very different results. The first shows large declines, and the second large increases, in output per man-hour during 1948–66.

Gorman mentions the need for a definition of output in banking consistent with the over-all approach to national accounts. He says this requirement forces imputation of bank output as a service rendered to the depositors rather than to borrowers. The problem is approached in two stages: first, Gorman defines output in current dollars; then he searches for an appropriate price deflator. He shows that the liquidity approach is based on the volume of deposits held and that the transactions approach is based on the volume of transactions. They differ, therefore, only as the velocity or turnover differs. When velocity rises, the transactions approach shows more increase in output than does the liquidity approach.

The empirical portion of Gorman's paper presents alternative measures of gross product originating, the implicit price deflators, and

[5] This rule is not followed for agriculture, manufacturing, or other industries.

output per man-hour. A general price index must enter into the deflation procedure for either the liquidity or the transactions approach. Gorman experiments with three different indexes to represent the general price level, and shows that the choice of index makes a considerable difference. The choice between deposits or transactions, however, makes an even bigger difference. Under the liquidity approach, output per man-hour declined 1.5 per cent per annum from 1948–66. The transactions approach shows an increase of 2.8 per cent per annum.

Neither approach takes account of the shift from labor-saving government securities to labor-intensive consumer and mortgage loans, and neither approach considers the quality of the service rendered to either depositors or borrowers.

Gorman concludes by noting that monetary policy has considerable effect on bank output and productivity when measured by the liquidity approach, but does not seem to have much effect when measured by the transactions approach.

Donald Hodgman, discussant of the paper, indicates a strong preference for the transactions approach. He agrees with Gorman's observation that "the vast bulk of observable activities in commercial banks relate to the processing of checks and other transactions: banks would need a very small labor force indeed if nobody ever spent their deposits." According to Hodgman, banks produce "financial services" rather than deposits or loans. These services include: management of the payments mechanism; intermediation between borrowers and lenders; and specialized services such as trust departments and foreign departments.

Hodgman suggests that part of the interest paid by borrowers to banks is for intermediation services, not for liquidity or consumption foregone by the ultimate lender (the depositor). He writes that "from the national accounting viewpoint the portion of interest paid by the borrower to a bank for intermediation should be viewed as the purchase of services by the borrower rather than a capital charge." Hodgman is critical of the failure of the liquidity approach to bank output to capture gains in labor productivity produced by technological innovation in banking. Although he prefers the transactions approach

on both theoretical and empirical grounds, he notes that it is still far from ideal.

David Schwartzman's paper on retail trade is primarily an attempt to analyze the growth of constant dollar sales per man-hour from 1929–63. Major emphasis is given to the role of the growth of transaction size and the decline in the quantity of service per transaction. According to Schwartzman, the latter is induced by the rise in the price of service relative to goods.

He observes that output (measured by constant dollar sales) per man-hour grew at 1.7 per cent per annum. He says that the conventional sources of output growth, such as improvements in quality of labor, increases in capital per man-hour, and economies of scale, do not, on balance, explain any of this increase. The biggest change in retailing was the shift to self-service. Should this be viewed as a technological change or, as Schwartzman sees it, a response to the increased price of labor?[6] He points out that supermarkets were well-known before 1929, and that some of them even went into bankruptcy.

An attempt is made to estimate the demand for retail service by regressions across Standard Metropolitan Statistical Areas. Income and price elasticities are estimated, and Schwartzman concludes that the decrease in the quantity of service in response to an increase in the relative price of service, plus an increase in the average size of transaction, explain about all of the observed increase in output per man-hour.

Yoram Barzel, in his discussion, is critical of the cross-section regressions, and suggests that the price and income elasticities cannot be inferred as indicated. Schwartzman, in reply, agrees that there are some difficulties but defends the reasonableness of the results as estimates rather than as precise measures. Barzel points to the shift to less-skilled personnel in retailing as a probable response to a technological change. Schwartzman replies that part of the decline in service took the form of a shift to less-skilled people because of the elimina-

[6] There is a third possibility; that it was a response to other changes such as the shift to suburban living, the increase in automobile ownership, and an increase in the value of time.

tion of giving advice and information and the concentration on making change and wrapping parcels.[7]

The last two papers are intended to provide a comparative approach to the study of services. In the first, David Worton, of the Canadian Dominion Bureau of Statistics, describes sector trends in the Canadian economy and makes a start on the analysis of these trends, especially in comparison with those of the United States.

In broad outlines, the Canadian experience has been similar to that of the U.S., but somewhat lagged. There was a large growth in the service sector between 1931 and 1961, with virtually all of it accompanied by a relative decline in agriculture. The goods-service productivity differential appears to have been larger in Canada than the U.S.; the faster growth of productivity in the Canadian goods sector appears to be the major source of the difference. The differential in output per man is held to be the major source of the relative growth of service employment. Worton writes that "the sharply differing rates of employment growth between the goods and services sectors in Canada during the postwar years cannot be explained by differences in the rates of growth of sector outputs or of final demand for their products."

An historical paper by Robert E. Gallman and Thomas J. Weiss traces the growth of services in the U.S. in the nineteenth century. They look at the differential trends in output, employment, and output per man. Service output measured in current dollars shows a moderate increase relative to goods and the authors believe that real output shows much the same trend. Employment grew more rapidly in services than in goods, especially before the Civil War and in the last two decades of the century. According to Gallman and Weiss, output per man was at least twice as high in services as in goods around 1840–50, and they suggest that there was some reduction in this ratio over time.

In his comment, Richard Easterlin notes that the paper provides,

[7] My own view is that this is really partly an index number problem with no unambiguous solution. Since the value of the consumer's time has changed, the kind of service that he wants is different from what he wanted in 1929. Given 1929 tastes, living conditions, value of time, etc., present retail services probably have declined in quality. On the other hand, given present conditions, a return to the 1929 type of service might be regarded as a decline in quality.

for the first time, "a plausible description of the over-all dimensions of service versus commodity industries during a long and important period of American economic development," but adds that the figures are not definitive and should be viewed as preliminary. Easterlin develops the proposition that estimates of economic characteristics should be tested against what is known regarding the location of population and demographic characteristics. He tests the Gallman-Weiss estimates for the service sector against trends in urban population, and against the foreign-born female population (to estimate the employment of free white domestics). He also performs some tests involving comparisons with estimates of final services and finds some significant discrepancies. Stanley Lebergott also questions some of the relative productivity levels implied by the Gallman-Weiss estimates of output and employment.

SOME CONCLUDING OBSERVATIONS AND QUESTIONS FOR FURTHER STUDY

On the basis of the papers presented here and the results of our studies at the National Bureau of Economic Research, it is possible to draw a few general conclusions concerning the service industries.

1. Employment grows more rapidly in services than in the rest of the economy. This shift to tertiary employment has proceeded further in the U.S. than elsewhere, but seems to be evident almost everywhere. The last three decades provide impressive support for Colin Clark's oft quoted conclusion concerning the shifting of employment as a concomitant of economic growth. It is not a universal law; there are some exceptions. In his new book, *Modern Economic Growth*,[8] Simon Kuznets presents some figures that indicate a decline in the service sector's share of the labor force in Belgium from 1880 to 1910, and in Sweden from 1870 to 1910; but these are exceptions to a record that covers many nations over many time periods.

2. For advanced countries in recent decades, a shift to service employment is generally found even if we look only at nonagricultural employment. This is certainly true for the United States. In seven Western European countries examined by Maurice Lengellé, only

[8] Simon Kuznets, *Modern Economic Growth*, New Haven and London, 1966.

Switzerland showed a slight decline in the service sector's share of nonagricultural employment between 1950 and 1962.

3. A differential in income elasticity does not appear to be the major explanation of the recent growth of service employment, at least in the U.S. Some of the earlier literature did stress differential income elasticity, possibly because agriculture was relatively more important at that time. There is little doubt that the income elasticity of demand for agricultural products is lower than for the output of the rest of the economy. What is less clear is that the income elasticity of demand for tertiary production is *significantly* higher than that for secondary production. There is probably some differential, and it may be increasing, but in my judgment it is unlikely that it was large enough to account for the dramatic shifts in employment that have taken place over the past few decades.

4. The major explanation for the shift of employment is that output per man has risen more rapidly in agriculture and industry than in services. This conclusion must be slightly qualified because of the well-known biases in the measurement of output. However, as Schwartzman's paper illustrates, these biases need not all run in the same direction. It seems likely to me that we would find a differential in output per man even if we had perfect measures of output. This differential is somewhat smaller when transportation, communication, and public utilities are included on the service side of the ledger.

5. Acceptance of the existence of a differential should not push us to the extreme of assuming a zero rate of advance in output per man in services. This assumption is probably wrong for most service industries. Where we have decent independent measures, output per man in services usually goes up. Moreover, many factors that have increased output per man in agriculture and industry, such as increases in capital per worker and improvements in the quality of labor, were operative in at least a few service industries. Also, the benefits of economies of scale and the growth of transaction size probably helped some service industries. Finally, it is hard to believe that there has been no advance in knowledge concerning the production of services. Significant technological advances in medical care, for instance, come readily to mind.

6. In the United States, since 1929, differential changes in the

quality of labor have been a major factor in explaining differential rates of growth of output per man. This change in quality can be inferred from differential growth of compensation per man in industry and services, and can also be inferred from changes in the demographic characteristics of the workers in the two sectors. A more rapid rate of growth in the quality of labor in industry has been reported for some other countries, but not for all.

7. Over the business cycle in the United States, at least for the postwar period, output and employment are more stable in the services than in Industry, but output per man-hour is less stable.

The following questions have been raised by the papers and by other work currently in progress.

What is the relation between growth and productivity? Numerous studies across industries in manufacturing have consistently indicated a positive relationship. Solomon Fabricant was one of the first to call attention to this.[9] Some of my own work with different retail trades and personal services shows a similar relationship. However, I do not find this relationship across major industry groups or for the eighteen financial and service industries examined by Marimont in his paper. Should this make us suspicious of the output measures?

If there is a correlation between growth and productivity, what accounts for it? One frequently mentioned possibility has the causality running from productivity to growth, with lower prices in the industries that are advancing in technology stimulating demand for the output of those industries. Most of the other possible explanations run from growth to productivity. For example, rapidly growing industries may realize economies of scale which show up as improved productivity. Also, the rapid growth of some industries may stimulate technological change in those industries. Jean Wilburn has discovered some interesting examples of this with respect to beauty shops where increased demand for permanent waves, and then for hair coloring, appears to have given considerable stimulus to technological improvements in these processes.[10] Another possibility is that the rapid growth

[9] See Solomon Fabricant, *Employment in Manufacturing, 1899–1939: An Analysis of Its Relation to the Volume of Production*, New York, NBER, 1942, pp. 88, 146.

[10] Victor R. Fuchs and Jean Alexander Wilburn, *Productivity Differences Within the Service Sector*, New York, NBER, 1967, pp. 56–109.

of an industry in a given period represents an *acceleration* of growth. Thus the average age of capital and labor will tend to decrease and this may explain the apparent rapid growth in productivity during that same period. Arthur Treadway's paper suggests still another possibility. Rapid growth probably means that there were large expenditures for unmeasured output (investment in men and machines for growth) in the initial year and thus there was a large increase in measured output relative to input.

Why has labor quality grown more rapidly in Industry than in the service sector in the United States? One possibility is the union "blackjack" effect. When unions obtain higher wages for their workers, the employer is in a position to hire better quality workers and has strong incentive to do so. Another possibility is sector differences in elasticities of substitution between labor and capital, and between unskilled labor and skilled labor. A third possibility is a bias in the nature of technological change, with technological change in Industry generally resulting in the replacement of unskilled labor, whereas in service it frequently makes possible the use of unskilled labor in place of skilled labor. Industry formerly was a large user of unskilled labor—the service sector used much skilled labor. Are innovative efforts concentrated on saving the most heavily used factor?

What is the elasticity of substitution between goods and services with respect to price? Can it be so high as to outweigh a substantial differential in income elasticity, and thus explain the relative constancy of sector shares of output? To what extent are services and goods complements?

How can we get better measures of output within the framework of the national income accounts? Is significant improvement possible, given more resources? I believe it is, especially via the route of better price indexes, and along the lines suggested by John Kendrick.

What do we need to do to supplement the national income accounts to obtain better measures of output in a welfare sense, granted the deficiencies in our existing measures of real output?

Answers to these and related questions will not only increase our understanding of the service sector, but will make a major contribution to the general area of growth and development.

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