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## Foreword

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The cyclical behavior of labor cost per unit of output, the subject of Hultgren's study, has heretofore been dealt with largely on a speculative basis. It is not difficult to list the many factors that may tend to lift or to lower labor input per unit of output when the volume of production rises or falls, or to go on to enumerate the additional factors that may enhance or reduce the pecuniary cost of this labor input. However helpful such a listing may be, it does not answer the question what the net balance among these factors, some of which operate in one direction and some in the other, usually is, and under what conditions it shifts. To get at the answer, to learn to what extent the answer depends on the stage of the business cycle, and to see how these circumstances vary from one industry to another, it is essential to study the record. Hultgren's careful analysis of the statistical facts about productivity changes, and their relation to wage rate and labor cost changes during the short periods encompassed by business cycles, makes a significant contribution to this knowledge.

It is highly useful knowledge. Business cycle analysts have long felt that the behavior of costs, especially in relation to prices and hence to profits, plays a peculiarly important role in the generation of business cycles. Wesley Mitchell expressed this view cogently in 1913, in his *Business Cycles*, but quantitative facts on the subject were scanty then and remained so for many years. Now we have at last a body of statistical data, put in a cyclical framework, on labor cost behavior in the railroad industry and a number of mining and manufacturing industries. From skillful use of these data Hultgren is able to describe, at the end of his report (p. 72), the typical sequence of changes in physical and pecuniary costs during a business cycle. The reader might do well to start his examination of this report with that section. We learn that wage costs per unit of output typically decline only in the late stages of a business cycle contraction

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and in the early stages of the ensuing expansion, and it seems reasonable to suppose, as Mitchell did long ago, that this is one of the factors that brings the contraction to a close and encourages a resumption of expansion. Similarly, the typical increase in costs in the late stages of business expansion seems likely to be one of the factors that, in due course, put an end to the expansion.

The way in which these patterns of cost behavior are attributable to the relative movements of compensation per man-hour, on the one hand, and of output per man-hour, on the other, is one of the most fascinating subjects treated in the report. It appears that widespread increases in production in various industries in the early stages of a general business expansion are associated with widespread increases in output per man-hour, and that the prevalence of such increases, both in output and in output per man-hour, tends to diminish as the expansion nears its end. Hourly earnings, on the other hand, are much less closely related to the behavior of output in individual industries, and increases in earnings tend to become more widespread as a business expansion proceeds. The result is that reductions in wage costs per unit of output are rather general in the early stages of expansion, whereas increases are the rule in the late stages. When a recession begins, reductions in output become typical and so, to a lesser extent, do reductions in output per man-hour. Hourly earnings often continue to rise. Hence costs generally mount. When the reductions in output finally become less prevalent, increases in output per man-hour again become the rule, and this, together with fewer increases in hourly earnings, commonly brings about reductions in costs per unit of output in the late stages of a recession, which continue for a time during the ensuing recovery.

Those who deal with business cycles, either as scientists or as policy makers, cannot afford to ignore Hultgren's findings on these matters. They may well be disturbed, however, by the fact that the fund of reliable statistical information available on a monthly basis is still extremely limited. After thorough search Hultgren found less than a score of manufacturing industries, which produce about 25 per cent of total manufacturing output, for which reasonably comparable monthly data on output, man-hours, and hourly earnings can be had since 1947, and earlier data are skimpier. Even for these industries, the monthly man-hours and earnings figures are limited to those of "production" workers, which excludes a large and growing group of employees—the so-called "non-production" workers—who contribute only less directly to production; and the earnings do not include various "fringe benefits" that nevertheless are a part—an increasing part—of total labor cost. While some estimates and allowances can be made on both counts—and Hultgren undertakes to do so—

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the items are becoming too important to be handled in this approximate fashion.

Moreover, there are large and rapidly growing areas of production and employment outside of manufacturing, mining, and rail transport where figures of the kind used in this report are meager or nonexistent. If current economic decisions are to be guided on the basis of an adequate supply of quantitative facts, an expansion in the volume and an improvement in the quality and timeliness of cost statistics are called for. At the present time, no monthly or quarterly statistics on output per man-hour or on labor cost per unit of output are published currently. All such figures used in the present report had to be specially computed.

Hultgren's study provides some valuable guideposts to the kind of expansion and improvement needed. His study (and related studies made within the past few years by the Board of Governors of the Federal Reserve System, by the Bureau of Labor Statistics, and by others)<sup>1</sup> will also aid in the evaluation of efforts to produce more comprehensive statistics. His detailed work on many individual industries, selected to conform to a high standard of comparability of output and cost statistics, will provide a basis for comparison—a check point—against which estimates that are less adequately founded can be tested. As he points out, the present Federal Reserve index of manufacturing production, when divided by aggregate production worker man-hours estimated by the Bureau of Labor Statistics, provides a less than fully adequate monthly index of output per production worker man-hour in manufacturing because roughly half the industrial coverage of the total output index is obtained by multiplying man-hours data by estimated "productivity factors," which are interpolated monthly from annual data and extrapolated to obtain current observations. Recently the Federal Reserve Board has indicated that the monthly interpolations and extrapolations of productivity factors for these sectors of industry (e.g., industrial machinery, furniture, canned foods) are now adjusted to take into account evidence provided by the changes in productivity in the sectors for which independent data on output are available.<sup>2</sup> Hence the monthly pattern of change in an index of output per man-hour for all manufacturing derived as outlined above will reflect current changes in productivity primarily in those sectors for which independent data on output and on man-hours are available (e.g., primary metals, lumber, petroleum products), but these fluctuations are

<sup>1</sup> See, especially, "Cost-Price Analysis Problems," by Murray Altmann, Federal Reserve Board (1956); "Industrial Activity and Productivity," by Milton Moss, Federal Reserve Board (1957); "Output Measures in Economic Analysis," by Clayton Gehman, Federal Reserve Board (1958); all in American Statistical Association, *Proceedings of the Business and Economic Statistics Section*, Washington, D. C.

<sup>2</sup> See Gehman, *op. cit.*, p. 44.

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likely to be diminished in size since they are amalgamated with the partially interpolated and extrapolated estimates for the other sectors. In view of this situation, and the uncertainty attaching to the monthly estimates of productivity for the "man-hour sector," it would be helpful to have, on a current basis, an index of output per man-hour limited to the "physical product sector" of the index.<sup>3</sup>

Similar considerations apply to a comprehensive monthly index of production worker wage cost per unit of manufacturing output. Such an index can be derived by dividing production worker payrolls by output or by dividing average hourly earnings by output per man-hour. (The two methods are logically equivalent.) If the fluctuations in output per man-hour are understated because of the interpolations or extrapolations used for certain industries, the fluctuations in cost may be understated also, and their configuration during any brief period may be altered. Here again it would be useful to have separate data on payrolls or on average hourly earnings for the physical product sector of the Federal Reserve index, so that monthly cost indexes for this sector could be derived.

It is equally vital to take into account the limitations involved in measuring labor cost in terms of production worker wages alone. Not only have employer-paid costs in the form of social security taxes, private pension plans, medical insurance, etc., increased in recent years, but the number of "non-production" workers in manufacturing and their aggregate salaries have augmented more rapidly than the corresponding figures for production workers. Monthly figures published by the Department of Commerce on total wages and salaries in manufacturing have risen sharply in relation to wages of production workers alone during the post-war period, and they have fluctuated less, also. (See Hultgren's Table 14.) Quarterly data on wage supplements paid by employers in manufacturing, according to Department of Commerce estimates, have risen steadily too, and at a faster rate than wages. Some of the effects of these items on the cyclical behavior of labor costs per unit of output are revealed even by annual data. Thus total compensation of all employees per unit of output in manufacturing declined in 1949-50, 1954-55, and 1958-59, just one year later in each instance than the declines in production worker wage cost per unit of output.<sup>4</sup> That is, the declines in total labor cost came during the first year of recovery in output rather than during the year of contrac-

<sup>3</sup> For such an index see Moss, *op. cit.*, Chart 6, p. 297, and Gehman, *op. cit.*, Chart 11, p. 44. The fluctuations in this index since 1947 resemble rather closely those in Hultgren's "fifteen-industry" index.

<sup>4</sup> See Ruth P. Mack, "Inflation and Quasi-elective Changes in Costs," *Review of Economics and Statistics*, August 1959, 226.

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tion. The declines not only came later but also were smaller, and the intervening increases were larger, in total labor cost than in production worker cost per unit of output. Hence, between 1947 and 1957, total labor cost rose 36 per cent, while production worker wage cost rose only 15 per cent.

Use of the available comprehensive wage, salary, and wage supplements data to obtain monthly or quarterly figures on labor cost per unit of output is hampered by the same problem mentioned before, the use of interpolated or extrapolated output-per-man-hour estimates to obtain total manufacturing output. Here again a breakdown of wages and salaries and supplements to accord with the "physical product" sector of manufacturing output as estimated by the Federal Reserve would be of great value. In lieu of this, those who wish to use a current, comprehensive index of labor cost per unit of output in manufacturing must judge whether the limitations attaching to the implicit measure of output per man-hour in the output index outweigh the advantages conveyed by the use of comprehensive data on costs. Fortunately the matter can be explored with the help of the evidence that Hultgren's study provides.

Another avenue of exploration in the direction of more comprehensive current figures on labor cost per unit of output is provided by the quarterly national income and product statistics. For the numerator of the cost-per-unit ratio the accounts provide estimates of total wage and salary disbursements and other labor income; for the denominator, estimates of real gross national product, i.e., in dollars of constant purchasing power. How adequately these broad figures reflect changes in unit labor costs in the economy at large, and how they might be broken down to provide estimates for various sectors of the economy, is a subject that goes well beyond the area to which Hultgren's report contributes. It is, nonetheless, an area well worth cultivating if we are to expand and refine our knowledge of the role of labor costs in business cycles.<sup>5</sup>

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<sup>5</sup> After this paper had gone to press, the report by Edwin Kuh, "Profits, Profit Markups, and Productivity," Study Paper 15, Study of Employment, Growth, and Price Levels, Joint Economic Committee, 86th Congress, 1st Session, January 25, 1960, became available. This interesting analysis utilizes the national income accounts to develop quarterly estimates of output per man-hour and wage and salary costs per unit of output for the corporate sector of the economy. On most of the points that overlap, the conclusions of Kuh's and Hultgren's studies appear to be consistent, which is reassuring in view of their independent statistical foundation.