

Measuring input prices for physicians: The revised Medicare Economic Index

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Medicare payments for physician services under Part B were historically restrained by capping prevailing charges using the Medicare Economic Index (MEI). The MEI, an input price index for physician services that incorporates an adjustment for economywide labor productivity, has not undergone a major revision since 1975. The MEI is an important determinant of the annual

volume performance standard that will be used to set aggregate increases in the revised system for paying physicians under Medicare beginning in 1992. The MEI will also be used in establishing the annual changes to the payment conversion factors under the new payment system.

Introduction

Since 1975, the Medicare Economic Index (MEI) has been used to restrain the rate of increase in the prevailing charges of physicians serving Medicare beneficiaries. In 1986, the Health Care Financing Administration (HCFA) proposed certain technical revisions to the MEI. However, the Omnibus Budget Reconciliation Act that year (OBRA 1986) (Public Law 99-509) precluded any changes in the MEI methodology prior to the completion of an analysis to determine its suitability as an appropriate indicator of economic change in physician office practices.

In this article, we present background information on the MEI, including its legislative origins and recent actions by Congress. The revised MEI being proposed is a Laspeyres input price index based on 1989 data. It includes expanded expenditure categories, revised price proxies, and a new method for incorporating economywide productivity changes.

History of the index

Until January 1, 1992, payment for physician services under Medicare Part B is based on a reasonable charge that may not exceed the lowest of: the physician's actual charge for that service, the physician's customary charge for that service, or the prevailing charges of physicians for similar services in the locality. The prevailing charge for a service, before any adjustments, is calculated at the 75th percentile of physicians' customary charges. However, section 1842(b)(3) of the Social Security Act requires that the local prevailing charge for a physician's service not exceed the level in effect on June 30, 1973, except to the extent justified on the basis of appropriate indicators of economic change.

The adjustment for economic change referred to in the law is the price index known as the MEI. The MEI ties increases in Medicare prevailing charges after 1973 to increases in physician practice costs and general wage rates throughout the economy, relative to a 1971 base year. The MEI was first published in the *Federal Register* (1975) on June 16, 1975, became effective July 1, 1975, and has been calculated annually.

Congress mandated the MEI as part of Public Law 92-603, the 1972 amendments to the Social Security Act. Although the 1972 amendments did not specify a particular type of index, the present form of the MEI follows the recommendations outlined by the Senate Finance Committee in its report accompanying Public Law 92-603. The MEI is designed to be an equitable measure of changes in the costs of physician time and the operating expenses of physicians (U.S. Congress, 1972). The MEI is a weighted sum of price changes for various inputs needed to produce physician services. Since its inception, the MEI has consisted of two principal components, one measuring changes in general earnings levels applied to the physician net income portion and the other reflecting changes in physician practice expenses. These two categories have been given weights of 60 percent and 40 percent, respectively, representing an average division of physician gross revenues between practice expenses and net income. Changes in general earnings levels are measured using the rate of increase in average weekly earnings of nonagricultural production and nonsupervisory workers in the overall economy, as measured by the Bureau of Labor Statistics. The general earnings portion of the MEI is further adjusted for changes in worker productivity for the nonfarm business sector (Dutton and McMenamin, 1981). The productivity adjustment is discussed later.

Current index

The physician practice expense portion of the MEI currently consists of six categories:

- Wages and salaries for nonphysician employees.
- Office space.
- Drugs and supplies.
- Automobile expense.
- Professional liability insurance premium expense.
- All other miscellaneous expenses.

Tables 1 and 2 show the weights and price proxies for the current and proposed MEI. Tables 3 and 4 compare weights and price proxies. Although the subcategory cost weights that make up the physician expense portion of the MEI have been revised periodically in updating the index, the overall category weight has been fixed at 40 percent since the MEI was first adopted. Also, the expense categories and price proxies created in 1975 have remained unchanged with one exception—a category for

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physician professional liability insurance premium expenses was added. Previously, this item was part of "all other miscellaneous expenses."

The base year for computing the current MEI is calendar 1971. For a given 12-month period, or fee-screen year (FSY), the rate of increase in the MEI is the change in the index value over that for the prior 12-month period ending in June. Historical, rather than forecasted, changes in the MEI have been used to increase physicians' prevailing charge limits based on the Senate Finance Committee's intent that such increases should follow, rather than lead, inflation. Until 1987, the current MEI was a cumulative index the value of which

at any time depended on previous years' calculations. Thus, any changes in the index required recomputing the MEI back to its 1971 base period. Such changes might include historical data revisions, the addition of a category for physician malpractice insurance costs, the periodic reweighting of the six categories that comprise the physician practice expense portion of the measure, or proposed changes in the price proxies. This recalculation from the base year to the current year insured that the MEI was defined consistently over time, and that year-to-year comparisons were valid. However, changes in the historical values of the MEI resulting from its periodic revision have never been retroactively implemented.

Table 1
Current Medicare Economic Index expenditure categories, weights, and price proxies

Expense category	Weight as percent	Price proxy
Total	100.0	
General earnings (net income)	60.0	Average weekly earnings for production and nonsupervisory workers. ¹
Physician practice expense	40.0	
Nonphysician employees	18.8	Average hourly earnings for finance, insurance, and real estate
Office space	9.2	CPI-W for housing
Drugs and supplies	3.6	PPI for drugs and pharmaceuticals
Malpractice insurance	4.0	HCFA survey of change in average premiums for \$100,000/\$300,000 professional liability coverage for 9 major insurers
Automobile	2.8	CPI-W for private transportation
Other	1.6	CPI-W for all items

¹Net of change in annual output per hour to exclude changes in economywide labor productivity.

NOTES: CPI-W is Consumer Price Index for urban wage earners and clerical workers. PPI is Producer Price Index. HCFA is Health Care Financing Administration.

SOURCE: (*Federal Register*, 1986.)

Table 2
Proposed Medicare Economic Index expenditure categories, weights, and price proxies

Expense category	1989 weights as percent	Price proxy
Total	100.0	
Physician's own time (net income, general earnings)	54.2	
Wages and salaries	45.3	Average hourly earnings for total private nonfarm ¹
Fringe benefits	8.8	Employment Cost Index for benefits, private nonfarm ¹
Practice expense	45.9	
Nonphysician employee compensation	16.3	
Wages and salaries	13.8	Employment Cost Index for wages and salaries weighted for occupational mix of nonphysician employees ¹
Fringe benefits	2.5	Employment Cost Index for benefits, white collar ¹
Office expense	10.3	CPI-U for housing
Medical materials and supplies	5.3	PPI for ethical drugs, PPI for surgical appliances and supplies, and CPI-U for medical equipment and supplies (equally weighted)
Professional liability insurance	4.8	HCFA survey of change in average premiums for \$100,000/\$300,000 professional liability coverage among 9 major insurers
Medical equipment	2.3	PPI for medical instruments and equipment
Other professional expenses	6.9	
Automobile	1.4	CPI-U for private transportation
Other	5.5	CPI-U for all items less food and energy

¹Net of change in 10-year moving average of output per man-hour to exclude changes in economywide labor productivity.

NOTES: Weights may not sum to 100.0 because of rounding. CPI-U is Consumer Price Index for all urban wage earners. PPI is Producer Price Index. HCFA is Health Care Financing Administration.

SOURCES: (Gonzalez, 1990); (Holoweiko, 1990); and (Health Care Financing Administration, 1991).

Since 1984, Congress has set the increases in physician fees under Medicare using the MEI as a reference point.

Background of the revised index

In the August 11, 1986, *Federal Register* (1986), HCFA proposed that the MEI be revised to reflect physician office space and miscellaneous expenses more accurately by substituting revised price proxies. For the price proxy for physician office space, HCFA proposed that the residential rent subcomponent of the housing component replace the mortgage interest subcomponent for the years in which a housing component of the Consumer Price Index (CPI) did not incorporate a measure of rental equivalence. For other professional expenses, HCFA proposed replacing the CPI-W (a CPI series for urban wage earners and clerical workers) with the CPI-U series (a measure of the CPI that includes a broader population base). HCFA believed that these revisions would result in a more appropriate and technically accurate MEI.

As a result of the enactment of OBRA 1986 on October 21, 1986, HCFA's proposed revisions in the MEI were not implemented. OBRA 1986 contained

Table 3
Current and proposed Medicare Economic Index: Expenditure categories and their associated weights

Expense category	Current weights ¹	Proposed weights ²	Percent	
			Current	Proposed
Total	100.0	100.0	100.0	100.0
Physician's own time (general earnings)	60.0	54.2		
Wages and salaries	—	45.3		
Fringe benefits	—	8.8		
Physician practice expense	40.0	45.9		
Nonphysician employee compensation	18.8	16.3		
Wages and salaries	—	13.8		
Fringe benefits	—	2.5		
Office expenses	9.2	10.3		
Medical materials and supplies	3.6	5.3		
Professional liability insurance	4.0	4.8		
Medical equipment	—	2.3		
Other professional expenses	—	6.9		
Automobile	2.8	1.4		
Other	1.6	5.5		

¹*Federal Register* (1986).

²From Gonzalez (1990); Holoweiko (1990); and Health Care Financing Administration (1991).

NOTE: Weights may not sum to 100.0 because of rounding.

SOURCES: See footnotes 1 and 2 of this table.

Table 4
Current and proposed Medicare Economic Index: Expenditure categories and their associated price proxies

Expense category	Current price proxy	Proposed price proxy
Physician's own time (general earnings)	Average weekly earnings for production and nonsupervisory workers, private nonfarm ¹	
Wages and salaries		Average hourly earnings for private nonfarm ²
Fringe benefits		Employment cost index for benefits, private nonfarm ²
Physician practice expense		
Nonphysician employee compensation	Average hourly earnings for finance, insurance, and real estate	
Wages and salaries		Employment Cost Index for wages and salaries, weighted for occupational mix of nonphysician employees ²
Fringe benefits		Employment Cost Index for benefits, white collar ²
Office expenses	CPI-W housing	CPI-U for housing
Medical materials and supplies	PPI for drugs and pharmaceuticals	PPI for ethical drugs, PPI for surgical appliances and supplies, and CPI-U for medical equipment and supplies (equally weighted)
Professional liability insurance	HCFA survey of change in average premiums for \$100,000/\$300,000 professional liability coverage for 9 major insurers	Same as previous entry
Medical equipment	(Category not used)	PPI for medical instruments and equipment
Other professional expenses		
Automobile	CPI-W for private transportation	CPI-U for private transportation
Other	CPI-W for all items	CPI-U for all items less food and energy

¹Net of change in annual output per hour to exclude changes in economywide labor productivity.

²Net of change in 10-year moving average of output per man-hour to exclude changes in economywide labor productivity.

NOTES: CPI-W is Consumer Price Index for urban wage earners and clerical workers. CPI-U is Consumer Price Index for all urban wage earners. PPI is Producer Price Index. HCFA is Health Care Financing Administration.

SOURCES: Freeland, M., Chulis, G., Arnett, R., and Brown, A.: Health Care Financing Administration, Baltimore, Maryland, 1991.

several provisions that affected the 1987 MEI, as well as future updates of the index. These provisions are as follows:

- The percent increase in the MEI for FSY 1987 was set at 3.2 percent (section 9331(c)(1)).
- Revising the MEI to substitute a rental equivalence subcomponent within the housing component of the CPI for any period before January 1, 1985, was prohibited (section 9331(c)(2)).
- For FSYs after 1987, the MEI must be revised to reflect year-to-year economic changes (section 9331(c)(3)).
- In consultation with appropriate experts, the Secretary of Health and Human Services was required to conduct a study to determine the extent to which the MEI appropriately and equitably reflects economic changes in the provision of physician services to Medicare beneficiaries (section 9331(c)(4)).
- The methodology in effect for calculating the MEI as of October 1, 1985, cannot be revised until after completion of the aforementioned study, and then only after providing notice and the opportunity for public comment (section 9331(c)(5)).

The percent increases in the prevailing charge limits were set by Congress for time periods covering July 1984 through December 1991. A fee freeze was in place from July 1984 through April 1986. The MEI increase from May through December 1986 was 4.2 percent. The increase was set at 3.2 percent from January 1987 through March 1988. From April 1 to December 31, 1988, the MEI increase for primary care services was 3.6 percent, and for other services 1 percent. From January 1, 1989, to March 31, 1990, the MEI increase for primary care services was 3 percent, and for other services, 1 percent. From April 1 to December 31, 1990, the MEI for primary care service increased 4.2 percent, and for other services, 2 percent. From January 1 to December 31, 1991, the MEI increased 2 percent for primary care services, and for other services, 0 percent.

Revising the index

In response to the August 11, 1986, *Federal Register* notice, HCFA received several comments regarding the proposed MEI changes. Several commenters expressed concern that the proposed changes in the price proxies for the office space and miscellaneous expense categories of the MEI were designed to reduce the cumulative level of the index and thereby produce budget savings. A few commenters stated that if the MEI is to be corrected, all potential sources of distortion should be addressed. They noted that the recommended modifications would have resulted in an improved measure for capturing economic trends in the provision of physician services, but the proposed revisions were limited in scope. Several commenters stated that a more complete reappraisal of the MEI is overdue. Congress stipulated in sections 9331(c)(4) and (5) of OBRA 1986 that a careful study of the MEI was needed prior to proposing a revised methodology.

In conformance with this requirement and to obtain a broad range of views on potential improvements in the

MEI, HCFA sponsored a conference held March 19, 1987, in Washington, D.C. Participants included representatives from the Federal Government, the Physician Payment Review Commission, the American Medical Association (AMA), and several consulting firms. Although the discussions were wide-ranging and the conference's participants did not reach a consensus on specific modifications to the MEI, it was agreed that the following issues might be considered in any proposed recalculation of the index:

- Adoption of a specific type of index for developing the MEI (Laspeyres, Paasche, etc.).
- Use of more current data to develop reweighted expense categories.
- Development of revised expense categories to more accurately reflect physician and nonphysician inputs in providing services.
- Selection of appropriate price proxies for monitoring the rate of price change in each expense category.
- Development of a more stable productivity adjustment.

Each of these issues is addressed in this article in our reassessment of the MEI.

Adoption of specific index type

The current MEI does not follow the form of a traditional Laspeyres or Paasche price index (Berry, 1981). A Laspeyres index has fixed base-year expenditure weights. However, the relative importance of each expenditure category changes over time as the price proxies for these categories change at different rates. The relative importance can be thought of as a cost weight, adjusted for relative price changes. That is, relative importance is a base-year cost weight cumulatively adjusted for the different relative rates of price growth for each cost category in the input price index from the base year to the present year. Expenditure categories with relatively higher price increases over time have higher relative importance values. The relative importance values thereby reflect differences in the inflation rates of different cost components. However, the current MEI holds the relative importance values of the physician practice expense (40 percent) and general earnings (60 percent) components constant at base-year weights, regardless of any differences in rates of change for physician practice expense and general earnings price proxies (Dutton and McMenamin, 1981; McMenamin, 1987).

In addition, the current MEI is unlike a Paasche index, in which revised expenditure weights are computed each time the index is recalculated (i.e., annually, quarterly, etc.). There are practical reasons for choosing the Laspeyres format. For a Paasche index, new weights are required for each unit of time for which the measure is computed, e.g., each quarter. Adopting a Paasche index means incurring the expense and effort of creating new weights for each update. Because the weights change each time the Paasche is computed, this type of index makes it difficult to separate increases in production costs resulting from changes in prices of inputs and changes in quantities of inputs. A Laspeyres physician input price index would give a better measure of "pure" price

increases for inputs into physician care. That is, it would better indicate how much the cost of producing care increased as a result of price increases in a fixed quantity and mix of production inputs. HCFA's current input price indexes for hospitals, home health agencies, and skilled nursing facilities are all Laspeyres indexes.

A traditional Laspeyres or fixed-weight input price index is constructed in two steps (Wallace and Cullison, 1981). First, a base period is selected. For example, for the prospective payment system (PPS) hospital input price index, the base period is 1987. Next, a set of cost categories such as food, fuel, and labor are identified, and their base-year expenditure levels determined. The proportion or share of total expenditures accounted for by specific spending categories is calculated. These proportions are called cost or expenditure weights. In the next step, a price proxy is selected to match each expenditure category. The purpose of the price proxy is to measure the rate of price change for each expenditure category over time. The price proxy index for each spending category is multiplied by the expenditure weight for that category. The sum of these products (weights multiplied by price indexes) over all cost categories yields the composite input price index for any time period, usually a calendar or fiscal year. The percent change in the input price index is an estimate of price change over time for a fixed quantity of goods and services purchased by a provider.

A Laspeyres input price index is described as a fixed-weight index because it answers the question of how much more it would cost at a later time to purchase the same mix of goods and services that was purchased in the base period. The effects on total expenditures resulting from changes in the quantity or mix of goods and services purchased after the base period are not measured by a fixed-weight index. For example, widespread shifting of the site of a particular type of physician care from a hospital inpatient setting to an office might change the mix and volume of physician inputs over time. However, a Laspeyres input price index, with its fixed base-year weights, would not reflect these changes until the measure is rebased, that is, until revised input cost weights are developed. The characteristic of a fixed-weight index that ignores the possibility of substituting cheaper inputs for more expensive inputs is sometimes referred to as "substitution bias." It is because of both changes in practice patterns and substitution bias that base-year weights must be updated periodically.

Use of more current data

The expenditure weights that comprise the physician expense portion of the current MEI were developed from a special study conducted in 1982 (*Federal Register*, 1986). The study was based on a national sample representing the distribution of non-Federal physicians in the United States and relied on available expense data for calendar year 1977. Because these data no longer reflect current physician practices in purchasing goods and services, we believe use of later data is appropriate.

In developing the revised MEI, two major data sources were available for estimating a current set of weights or cost shares: the AMA Socioeconomic Monitoring System

(SMS) Survey (Gonzalez, 1990) and the *Medical Economics* (ME) survey of practice expenses and earnings (Holoweiko, 1990). Both the AMA and ME surveys are samples, but only the AMA survey is a stratified random sample that is statistically representative of non-Federal physicians in the United States. The AMA data are presented as both means (averages) and medians, whereas the ME data are presented only as medians.

Because of the superior representativeness of the AMA sample and the availability of means, we chose to use the AMA data for developing the main weights (cost shares) for the revised MEI.

Revising expenditure categories

Several criteria were used for choosing the number and composition of alternative expenditure categories. First, all categories should be mutually exclusive of each other and exhaustive of all cost components. Second, the makeup of expense categories should be homogeneous within categories and heterogeneous among categories. Third, the composition of expense categories should correspond to specific available price indexes; that is, the categories should be chosen to map into relevant price data series. Fourth, the number of expense categories should be large enough to accurately capture the separate inflationary processes affecting total practice costs, but not so detailed or disaggregated that reliable data are not available for validly delineating the cost shares. Fifth, preference should be given to obtaining the cost shares from a single data source to the extent that this is feasible. Choosing the number and composition of expense categories involves making tradeoffs among the five criteria just listed.

In developing the revised MEI, we used data from the AMA on mean physician net income and professional expenses to weight seven major expenditure categories. These categories, shown in Table 2, included physician net income (primarily reflecting physician time), nonphysician payroll, office expenses, medical supplies, professional liability insurance, medical equipment, and other professional expenses. For the seven major categories, we determined the proportion that each represents of total practice expenses for self-employed physicians, including net income. These proportions represent the major expenditure weights for constructing a revised MEI. Three of these major categories (physician net income, nonphysician payroll, and other professional expenses) were disaggregated into subcategories reflecting more specific physician expenses. The physician time and nonphysician employee compensation categories were divided into fringe benefits and other compensation based on a special study (Health Care Financing Administration, 1991). The "other professional expenses" category was subdivided into two categories. A weight for professional automobile use was obtained from *Medical Economics* data (Holoweiko, 1990). The final subcategory, miscellaneous expenses, was calculated as a residual. This resulted in 10 separate cost categories for construction of a revised MEI. Table 2 shows all of the revised input price index categories and corresponding 1989 weights. Table 3 compares the proposed weights with current weights.

Selection of price proxies

After the 1989 cost weights for the revised MEI were developed, appropriate proxies to monitor the rate of price change for each expenditure category were selected. Most of the indicators considered are based on Bureau of Labor Statistics (BLS) data and are grouped into one of the following six categories:

- **Producer Price Indexes (PPIs)**—PPIs are used to measure price changes for goods sold in other than retail markets. They are the preferable proxies for physician purchases at the wholesale level. These indexes, which are fixed-weight, measure price change at the producer or intermediate stage of production.
- **Consumer Price Indexes (CPIs)**—CPIs measure change in the prices of final goods and services bought by consumers. Similar to the PPIs, they are fixed-weighted. Because they may not represent the price changes faced by producers, CPIs were used if no appropriate PPI was available, or if the expenditure was similar to that of retail consumers in general, rather than a purchase at the wholesale level.
- **Employment Cost Indexes (ECIs) for wages and salaries**—ECIs for wages and salaries measure the rate of change in employee wage rates per hour worked. These indexes are fixed-weight indexes that measure strictly the change in straight-time hourly wage rates. They are not affected by shifts in industry or occupation employment levels (Nathan, 1987; Schwenk, 1985).
- **Employment Cost Indexes (ECIs) for employee benefits**—ECIs for employer costs of employee benefits include such benefits as Social Security, pension, and other retirement plans, insurance benefits (life, health, sickness, and accident), and paid leave. Like ECIs for wages and salaries, they are not affected by changes in industry output or occupational shifts (Nathan, 1987; Schwenk, 1985).
- **Average hourly earnings (AHEs)**—AHEs permit the measurement of changes in hourly earnings for specific industries as well as for the nonfarm business economy. AHEs are calculated by dividing gross payrolls for wages and salaries by total hours. This category reflects shifts in employment mix and is thus representative of actual changes in hourly earnings for industries or for the economy as a whole.
- **Average weekly earnings (AWEs)**—Like AHEs, AWEs permit the measurement of changes in earnings for specific industries and for the nonfarm business economy. AWEs are calculated by dividing gross payrolls for wages and salaries by total weeks worked. Also like AHEs, this series reflects shifts in employment mix. Changes in AWEs represent actual changes in earnings, as opposed to statistical constructs that hold the mix of employees constant. Changes in AWEs are affected by changes in the length of the work week.

As with choosing the expenditure categories, choosing appropriate wage and price proxies for each expense category necessarily involves making tradeoffs and using professional judgment. The strengths and weaknesses of each proxy variable need to be evaluated using several criteria that can potentially conflict.

The first criterion is relevance. The price variable should appropriately represent price changes for specific goods or services within the expense category. Relevance may encompass judgments about relative efficiency of the market generating the price and wage increases and may include normative factors relating to fairness and national policy objectives.

The second criterion is reliability or low sampling variability. If the proxy wage-price variable has a high sampling variability or inexplicable erratic patterns over time, its value is greatly diminished, as it is unlikely to accurately reflect price change in its associated expenditure category. Low sampling variability can conflict with relevance, because the more specifically the price variable is defined in terms of service, commodity, or geographic area, the higher the sampling variability in many cases.

Timeliness of actual published data is the third criterion. For this reason, monthly and quarterly data take priority over annual data.

The fourth criterion is the length of the time-series data. A well-established time series is needed to provide a solid base from which to forecast future price changes in the series for reliable budget projections.

The Bureau of Labor Statistics price proxy categories previously described meet the criteria of reliability, timeliness, and time-series length. The main issue in selecting price proxies for the revised MEI is relevance. We chose the price-wage proxies shown in Table 2 for the revised MEI. Table 4 compares the price-wage proxies for the proposed MEI with the current MEI.

Physician's own time price proxy

The physician's own time is the single largest cost component in the proposed MEI (54.2 percent, Table 2). The selection of the price proxy for the wages and salary cost category is a major determinant of the rate of change in the MEI. For that reason, we are providing an extended discussion of the selection of the price proxy for the wages and salary component.

The legislative history of the MEI reveals congressional concern that increases in physician charges were a cause, rather than a result, of inflation. The following language from the Senate Finance Committee report accompanying the 1972 Social Security Amendments makes that point clearly:

"The committee . . . believes that it is necessary to move in the direction of an approach to reasonable charge reimbursement that ties recognition of fee increases to appropriate economic indexes so that the program will not merely recognize whatever increases in charges are established in a locality but would limit recognition of charge increases to rates that economic data indicate would be fair to all concerned and follow rather than lead inflationary trends.

" . . . Initially, the Secretary would be expected to base the proposed economic indexes on presently available information on changes in expenses of practice and general earnings levels . . ." (U.S. Congress, 1972).

There is obvious circularity if increases in prevailing charges are linked to increases in charges made by physicians, which are then tied to increases in physician

income. The committee's expectation that the rate of price inflation assigned to the physician's own time portion of the MEI be permitted to increase by an amount consistent with increases in general earnings levels seems to reflect Congress' preference for an equitable external price proxy, that is, a compensation proxy that is based on compensation outside the physician services industry. We examined six principal alternatives for the wages and salary component of the physician's own time cost category.

Use of weekly earnings

Weekly earnings for production and nonsupervisory workers in the private nonfarm economy are used in the current MEI and are consistent with the Senate Finance Committee expectation that the price proxy reflect changes in general earnings levels. As mentioned previously, AWEs are actual payment rates reflecting underlying changes in employment patterns within and across industries. Because the length of the average work week changes over time, the measure is not as stable as AHEs. If the average hours worked per week changes over time, this variation in the amount of actual labor input per week worked influences AWEs.

Use of average hourly earnings

AHEs for production and nonsupervisory workers in the total private nonfarm economy suggest a standard of payment that implies that price increases for the physician labor component should be the same as for workers in the overall economy, that is, general earnings. This option presumes that a fair rate of price increase for the physician's own time category (excluding fringe benefits) should be comparable to that of employees in the general economy and should reflect the changing mix of industry output and employment. This alternative appears to most closely approximate the Senate Finance Committee's reference to general earnings levels. Because earnings are per hour, this alternative reflects a constant quantity of labor input per unit of time, compared with the potentially variable quantity of labor input when AWEs are used. In addition, the use of AHE data is consistent with the Bureau of Labor Statistics labor productivity measures. The proposed MEI as well as the current MEI incorporate an adjustment for labor productivity, so this consistency is noteworthy.

Employment Cost Index, total private

The ECI for wages and salaries of the total private nonfarm economy suggests a particular standard of payment. It implies that price increases for the physician labor component should be the same as that for workers in a hypothetical overall economy in which there are no shifts in the employment patterns of workers. The overall ECI weights nine broad occupational categories and permits measurement of the change in the hourly straight-time wage rate for private industry workers (Nathan, 1987; Schwenk, 1985). ECIs are unaffected by changes in occupational employment shifts or industry output shifts. Therefore, this alternative would not recognize changes in the composition of the work force over time.

Employment Cost Index, private-technical

The ECI for wages and salaries for private professional and technical workers implies that price changes in the physician's own time component, excluding fringes, should correspond to those for private sector professional and technical workers. These workers form one of the nine occupational categories that comprise the overall ECI. Physicians are a tiny subset of this occupational group. The supply and demand characteristics of this broad category appear to be different from the supply and demand characteristics of an efficient market for physician services. Most professional and technical workers are in labor markets in which firms compete for employees. Most office-based physicians are self-employed. Use of this price series would take the MEI away from the general earnings concept specified in the original legislation.

Consumer Price Index rate increase

This alternative suggests that the rate of increase in the physician's own time category, excluding fringes, should be closely related to an economywide cost of living index. Because labor contracts, cost of living allowances, numerous health insurance contracts, and preferred provider organization physician agreements are widely linked to this measure, use of this option has substantial precedence. Unfortunately, an index tied to the CPI can result in financing problems during periods in which consumer prices are rising substantially faster than wages. This disparity occurs because income tax revenues that fund Medicare's payments to physicians largely depend on wage rate increases, but outlays would be a function of the rise in prices as measured by the CPI (Congressional Budget Office, 1981).

Price proxy for salaried physicians

This option relies on an "opportunity cost" approach, in that it suggests price increases in the physician time category (excluding fringes) should be neither greater nor less than what would be obtained among salaried physicians (e.g., those working in Federal institutions or employed in health maintenance organizations [HMOs]). The use of HMO wages would require the use of a proprietary data source for development of the price proxy. In addition, these data may not reflect the market forces we are trying to approximate. Salaried physicians are disproportionately represented by younger physicians and females (Cotter, 1986). Therefore, the levels and rates of change of wages and salaries may be substantially distorted, compared with rates for physicians as a whole in an efficient market. In addition, wage and salary levels and rates of increase for salaried physicians may be influenced by trends in the incomes of fee-for-service physicians. Therefore, we excluded from further consideration use of this price proxy.

Each of the above options implies a different standard of equity. In Table 5, we have presented the fiscal year rates of change for five of the six price variables suggested as options. We were not able to obtain data on HMO wage rates that are comparable to the other five possible wage and salary proxies.

Table 5
Annual percent change in alternative price proxies for the wages and salaries component of physician's own time: Years ending June 30, 1982-95¹

Fiscal year	Current MEI, average weekly earnings, private nonfarm	Proposed MEI, average hourly earnings, private nonfarm	Employment Cost Index		CPI-U for all items
			Private nonfarm	Professional-technical	
Historical			Percent change		
1982	6.6	7.6	8.2	10.2	8.7
1983	4.5	4.9	6.0	6.9	4.3
1984	5.1	4.0	4.9	6.8	3.7
1985	2.9	3.3	4.2	4.6	3.9
1986	2.3	2.8	4.1	4.0	2.9
1987	1.7	2.1	3.1	3.8	2.2
1988	2.9	3.0	3.4	4.4	4.2
1989	3.6	3.8	4.0	4.6	4.6
1990	3.7	4.0	4.3	4.7	4.7
Average					
1982-90	3.7	3.9	4.7	5.6	4.4
1985-90	2.9	3.2	3.9	4.4	3.8
Forecast²					
1991	3.5	4.1	4.7	5.0	6.2
1992	4.1	4.1	4.7	5.5	4.1
1993	3.9	3.5	4.1	4.9	3.4
1994	3.2	3.4	4.0	5.5	3.6
1995	4.0	4.1	4.7	5.5	3.8
Average	3.7	3.8	4.4	5.3	4.2

¹Not fee-screen years.

²Forecasted by DRI/McGraw-Hill, Washington, D.C., Nov. 1990.

NOTES: MEI is Medicare Economic Index. CPI-U is Consumer Price Index for all urban wage earners.

SOURCE: Freeland, M., Chulis, G., Arnett, R., and Brown, A.: Health Care Financing Administration, Baltimore, Maryland, 1991.

We believe there are sound reasons for selecting AHEs for the total private nonfarm economy as the proxy of choice for the physician wages and salaries component of the revised input price index. In our judgment, this alternative most closely comports with congressional intent, as expressed in the Senate Finance Committee's 1972 report. AHEs incorporate a standard that argues that increases in the physician wages and salaries component should be neither greater nor less than the rate of increase in general earnings levels. To the extent that a different price proxy is used that results in a greater increase than that for the average worker, physicians benefit from an implicit income transfer. Conversely, use of a proxy that results in less of an increase in this component than that of general earnings levels would reverse that transfer in favor of workers. AHEs change in accordance with market forces associated with changes in the type and mix of workers. This is not the case with ECIs, because ECIs reflect a fixed composition of the work force at a given point in time. Therefore, the rate of change in an ECI may differ substantially from an actual AHEs measure. Input price indexes used for inflation adjustment and payment often incorporate AHEs variables. For example, the current MEI and the HCFA hospital, skilled nursing facility, and home health agency input price indexes all combine AHEs variables with various other price indexes.

Effect of index revision

Tables 6 and 7 show comparative historical and forecasted annual percent changes for the current MEI and the proposed MEI. (Actual Medicare physician fees were frozen from July 1984 through April 1986. Increase amounts have been set by Congress from 1987 to the present using the MEI year-to-year change as a reference point.) The annual percent change productivity measure, which is used to adjust the current MEI, is shown on a separate line. Table 6 shows the percent changes in the proposed MEI adjusted for annual productivity change. The proposed MEI uses a more stable 10-year moving average of productivity to make the productivity adjustment. The average trends in the current and proposed MEI are very close in both the historical and the forecasted period (within 0.1 of 1 percent) (Table 8). The volatile annual productivity adjustment in the current MEI contributes to annual values of the current and proposed MEI that vary as much as a percentage point in any 1 year. For example, in 1990, the proposed MEI increased 3.6 percent, a full percentage point below the current MEI increase of 4.6 percent. The forecasts of annual percent changes in the current and proposed MEIs do not differ by more than 0.3 percent from 1991 to 1995 (Table 8).

Table 6
Annual percent change in the current Medicare Economic Index (MEI):
Years ending June 30, 1984-95¹

Expense category	Weight as percent	Historical							Forecasted ²				
		1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total MEI ³	100.0	3.2	3.4	2.7	3.7	3.2	4.0	4.6	4.1	3.4	3.8	3.5	4.2
General earnings ⁴	60.0	5.1	2.9	2.3	1.7	2.9	3.6	3.7	3.5	4.1	3.9	3.2	4.0
Nonphysician employment	18.8	5.5	4.3	4.8	4.9	3.6	5.0	4.8	5.0	5.2	5.0	5.0	5.5
Office space	9.2	1.5	3.8	3.7	2.4	3.4	3.7	4.0	4.8	3.4	4.8	4.4	4.3
Automobile	2.8	4.2	3.1	-0.6	-3.6	5.2	4.4	3.6	7.6	4.3	0.8	4.7	5.9
Drugs and supplies	3.6	6.7	6.3	7.0	6.8	6.3	7.9	7.2	6.5	7.8	7.2	7.0	6.8
Liability insurance	4.0	8.9	16.3	21.2	42.7	36.6	20.0	0.3	3.4	3.6	7.7	13.0	14.6
Other	1.6	3.0	3.7	2.6	1.9	4.1	4.6	4.7	6.1	4.0	3.3	3.5	3.8
Productivity		3.0	0.8	1.6	0.7	2.3	1.1	-1.0	0.1	1.5	1.0	1.2	1.2
General earnings (productivity adjusted)	60.0	2.0	2.0	0.6	1.1	0.6	2.5	4.8	3.4	2.5	2.9	2.1	2.8

¹Not fee-screen years.

²Price proxies forecasted by DRI/McGraw-Hill, Washington, D.C., Nov. 1990.

³The total MEI is computed using general earnings adjusted for productivity.

⁴General earnings are presented prior to the adjustment for productivity.

SOURCE: Freeland, M., Chulis, G., Arnett, R., and Brown, A.: Health Care Financing Administration, Baltimore, Maryland, 1991.

Table 7
Annual percent change in the proposed Medicare Economic Index (MEI), by expenditure category:
Years ending June 30, 1984-95¹

Proposed expenditure category	1989 Weight ¹ as percent	Historical							Forecasted ²				
		1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995
Total MEI ³	100.0	4.2	3.5	2.9	3.0	4.1	4.2	3.6	4.0	3.7	3.6	3.7	4.3
Physician's own time ⁴	54.2	4.5	3.6	2.9	2.2	3.2	4.2	4.4	4.5	4.4	3.9	3.6	4.2
Wages and salaries	45.3	4.0	3.3	2.8	2.1	3.0	3.8	4.0	4.1	4.1	3.5	3.4	4.1
Fringe benefits	8.8	7.4	5.6	3.7	3.2	4.7	6.1	6.1	6.5	6.0	5.7	4.7	4.8
Physician practice expenses	45.9	4.9	4.9	4.5	5.4	6.4	5.7	4.2	5.0	4.7	5.2	5.7	6.2
Employee compensation ⁴	16.3	6.1	4.9	4.1	3.5	4.0	4.5	4.8	4.9	5.2	4.8	5.0	5.2
Wages and salaries	13.8	5.8	4.7	4.1	3.5	3.9	4.3	4.3	4.7	5.0	4.7	4.9	5.1
Fringe benefits	2.5	7.9	6.1	4.3	3.4	4.5	6.1	7.1	6.3	5.8	5.2	5.4	5.8
Office expense	10.3	3.0	4.2	3.7	2.5	3.5	3.8	4.1	5.6	3.9	5.0	4.7	4.6
Medical materials and supplies	5.3	5.5	5.3	5.2	6.5	6.2	4.4	6.8	6.0	7.4	6.9	6.2	6.6
Professional liability insurance	4.8	8.9	16.3	21.1	42.7	36.6	20.0	0.3	3.4	3.6	7.7	13.0	14.6
Medical equipment	2.3	3.3	1.2	-0.9	1.9	-1.3	3.4	3.2	2.1	2.9	2.8	2.6	2.9
Other professional expense	6.9	4.3	4.3	3.2	2.4	4.4	4.5	4.4	5.5	4.1	3.9	4.8	5.3
Productivity	—	0.6	0.9	0.9	0.8	0.8	0.9	1.0	1.0	1.1	1.3	1.2	1.2
Productivity adjusted compensation													
Physician's own time	54.2	3.9	2.7	2.0	1.4	2.4	3.3	3.3	3.4	3.3	2.6	2.3	2.9
Wages and salaries	45.3	3.4	2.3	1.9	1.3	2.2	2.9	2.9	3.0	3.0	2.2	2.1	2.8
Fringe benefits	8.8	6.8	4.6	2.8	2.4	3.9	5.2	5.5	5.5	4.8	4.4	3.4	3.5
Employee compensation	16.3	5.5	3.9	3.2	2.7	3.2	3.6	3.7	3.8	4.0	3.5	3.7	3.9
Wages and salaries	13.8	5.2	3.7	3.2	2.7	3.1	3.3	3.3	3.6	3.9	3.4	3.6	3.8
Fringe benefits	2.5	7.2	5.2	3.4	2.6	3.7	5.2	6.0	5.2	4.6	3.8	4.1	4.5

¹Not fee-screen years.

²Price proxies forecasted by DRI/McGraw-Hill, Washington, D.C., Nov. 1990.

³The total MEI is computed using productivity-adjusted wages and salaries and fringe benefits for physician's own time and nonphysician employee compensation.

⁴Wages and salaries and fringe benefits are presented unadjusted for productivity.

NOTE: Weights may not sum to 100 because of rounding.

SOURCE: Freeland, M., Chulis, G., Arnett, R., and Brown, A.: Health Care Financing Administration, Baltimore, Maryland, 1991.

Table 8

Annual percent change in the proposed Medicare Economic Index (MEI) using alternative proxies for the wages and salaries component of physician's own time, and difference from the current MEI: Years ending June 30, 1982-95¹

Fiscal year	Proposed MEI structure with alternative price proxies for physician's own time ²												
	Current MEI using average weekly earnings			Recommended MEI using average hourly earnings		Average weekly earnings		ECI for private nonfarm		ECI for professional and technical		CPI-U	
	Change	Change	Difference	Percent change	Difference between indexes	Percent change	Difference between indexes	Percent change	Difference between indexes	Percent change	Difference between indexes	Percent change	Difference between indexes
Historical													
1982	8.4	8.1	-0.3	7.6	-0.8	8.4	0.0	9.4	1.0	8.6	0.2		
1983	5.0	5.3	0.3	5.1	0.1	5.8	0.8	6.2	1.2	5.0	0.0		
1984	3.2	4.2	1.0	4.8	1.6	4.7	1.5	5.6	2.4	4.1	0.9		
1985	3.4	3.5	0.1	3.3	-0.1	3.9	0.5	4.1	0.7	3.8	0.4		
1986	2.7	2.9	0.2	2.7	0.0	3.6	0.9	3.5	0.8	3.0	0.3		
1987	3.7	3.0	-0.7	2.8	-0.9	3.5	-0.2	3.8	0.1	3.1	-0.6		
1988	3.2	4.1	0.9	4.1	0.9	4.3	1.1	4.7	1.5	4.6	1.4		
1989	4.0	4.2	0.2	4.2	0.2	4.3	0.3	4.6	0.6	4.6	0.6		
1990	4.6	3.6	-1.0	3.4	-1.2	3.7	-0.9	3.9	-0.7	3.9	-0.7		
Average	4.2	4.3	0.1	4.2	0.0	4.7	0.5	5.1	0.9	4.5	0.3		
Forecasted³													
1991	4.1	4.0	-0.1	3.8	-0.3	4.2	0.1	4.4	0.3	4.9	0.8		
1992	3.4	3.7	0.3	3.7	0.3	4.0	0.6	4.4	1.0	3.8	0.4		
1993	3.8	3.6	-0.2	3.7	-0.1	3.8	0.0	4.1	0.3	3.5	-0.3		
1994	3.5	3.7	0.2	3.9	0.4	4.0	0.5	4.6	1.1	3.8	0.3		
1995	4.2	4.3	0.1	4.3	0.1	4.5	0.3	4.9	0.7	4.1	-0.1		
Average	3.8	3.9	0.1	3.9	0.1	4.1	0.3	4.5	0.7	4.0	0.2		

¹Not fee-screen years.

²The price proxy for the wages and salaries component of the proposed MEI (average hourly earnings) was replaced with alternative proxies to test the MEI for sensitivity.

³Price proxies forecasted by DRI/McGraw-Hill, Washington, D.C., Nov. 1990.

NOTES: ECI is Employment Cost Index. CPI-U is Consumer Price Index for all urban wage earners.

SOURCE: Freehand, M., Chulis, G., Arnett, R., and Brown, A.: Health Care Financing Administration, Baltimore, Maryland, 1991.

The average rate of increase in AHEs for the private nonfarm economy for the period 1982-90 was 3.9 percent (Table 5). This compares with the 3.7-percent average increase for AWEs incorporated in the current MEI (Table 5). The average rate of increase for professional and technical workers, which may reflect substantially different market forces than either the physician services industry or the economy as a whole, was 5.6 percent during the same period.

Table 8 shows the annual percent change in the proposed MEI using alternative price proxies for the wages and salary component of physician's own time. The table also shows the numeric difference between the current MEI and proposed MEI using these alternative proxy variables. The proposed MEI, using AHEs as the price proxy for the wages and salaries component of physician time, increased at an average rate of 4.3 percent for the period 1982-90 (Table 8). The current MEI increased at an average rate of 4.2 percent during this same period (Table 8).

Fringe benefits proxy, physician time

The current MEI does not include fringe benefit price proxies for either the physician's own time or for nonphysician employees. We propose using the ECI for fringe benefits for total private industry as the price proxy for fringe benefits. This means that both the wage and fringe benefit proxies for physician's own time

correspond in that they are both derived from price series covering the total nonfarm private sector and are both on a per hour basis. The U.S. Department of Commerce has an aggregate employer benefits series (employer contributions for social insurance plus employer contributions to private pension and welfare funds), but we do not think this aggregate expenditure series is as appropriate for use in an input price index as is the ECI because it is not a per hour computation.

Nonphysician employees occupational wage index

The current MEI uses AHEs of nonsupervisory workers in finance, insurance, and real estate as the wage proxy for nonphysician employees. The occupational structure of this group may differ significantly from that of nonphysician employees. Consequently, we used 1989 Current Population Survey data on earnings and employment by occupation for nonphysician employees in the physician services industry (Bureau of the Census, 1990). These data permitted the development of labor cost shares for five occupational groups shown in Table 9. The Bureau of Labor Statistics maintains an ECI for each of these occupational groups (Nathan, 1987; Schwenk, 1985). Administrative support, including clerical, was the major occupational group (37 percent). Professional and technical occupations were 28 percent of the total.

Table 9
Percent distribution of nonphysician payroll expense, by occupational group: 1989

Employment Cost Index occupational group	Expenditure share
Total	100.0
Professional and technical workers	27.5
Managers and administrators	19.0
Clerical workers	36.8
Craft and kindred workers	0.5
Service workers	16.2

SOURCE: (Bureau of the Census, 1990.)

These labor cost shares were used as weights for the development of a nonphysician employee wage index. We multiplied each of the occupational cost shares by the changes in the occupational ECI for that category. These values were summed to yield an overall rate of price change. The historical (1984-90) and forecasted (1991-95) annual percent changes for the occupationally blended ECIs are shown in the last line of Table 10. Historical and forecasted values of the current MEI proxy and AHEs in physician offices are included in Table 10 for comparison. The percent changes in AHEs in physician offices include the effect of skill-mix shifts. These shifts may have been substantial in the last few years as work formerly done in the hospital is increasingly done in ambulatory settings. These skill-mix shifts are appropriately held constant in this Laspeyres index of nonphysician employee wages and salaries. Skill-mix shifts that reflect rising intensity of outputs in physician offices are automatically paid for by higher charge structures for the more complex mix of service outputs. The forecasted values of the current and proposed price proxies for nonphysician payroll do not differ by more than 0.4 percent from 1991 to 1995.

Nonphysician employees' fringe benefits

As previously discussed, the current MEI does not include price proxies for fringe benefits. Because most nonphysician employees in physician offices are white collar employees, we propose using the ECI for fringe benefits for white collar employees in the private sector.

We think the ECI for white collar workers is a better price proxy than the U.S. Department of Commerce aggregate expenditure series on employer benefits for purposes of this index.

Office expenses

Office expenses include rent or mortgage for office space, furnishings, insurance, utilities, and telephone. We chose the CPI-U for housing as the most appropriate price proxy. The CPI for housing is a comprehensive measure of the cost of housing including rent, owner's equivalent rent, insurance, maintenance and repair services, fuels, utilities, telephones, furnishings, and housekeeping services.

Medical materials and supplies

This cost category includes drugs, outside laboratory work, X-ray films, and other related services. There is no price proxy that includes this mix of materials and supplies. In the absence of separate cost weights for drugs, outside laboratory work, X-ray films, etc., we equally weighted three price proxies associated with the medical materials and supplies just listed. The blend of three price proxies includes the PPI for ethical drugs, the PPI for surgical appliances and supplies, and the CPI for medical equipment and supplies.

Professional liability insurance

This cost category includes costs for professional medical liability or malpractice insurance premiums, including costs associated with self-insurance. The price proxy chosen is a HCFA survey of the change in premiums for \$100,000/\$300,000 professional liability coverage from nine major insurers. However, the survey predominantly reflects the rate changes of one insurer. There have been a variety of medical group-sponsored professional liability funds created in recent years. However, there are no reliable data available on rate increases from these sources. The price proxy used is the best available data source at this time. (Obtaining better professional liability insurance data is discussed later.)

Table 10
Annual percent change in alternative proxies of nonphysician payroll expense: Years ending June 30, 1984-95¹

Proxy	Historical								Forecasted ²				
	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	
Average hourly earnings, offices of physicians	4.6	4.5	4.3	3.2	4.3	6.5	8.3	7.2	5.4	4.8	4.3	4.6	
Current MEI proxy—average hourly earnings, finance, insurance, and real estate	5.5	4.3	4.8	4.9	3.6	5.0	4.8	5.1	5.2	5.0	5.0	5.5	
Proposed MEI proxy—Employment Cost Indexes, wages and salaries, weighted for nonphysician occupation mix	5.8	4.7	4.1	3.5	4.0	4.5	4.3	4.7	5.0	4.7	4.9	5.1	

¹Not fee-screen years.

²Price proxies forecasted by DRI/McGraw-Hill, Washington, D.C., Nov. 1990.

NOTE: MEI is Medicare Economic Index.

SOURCE: Freeland, M., Chulis, G., Arnett, R., and Brown, A.: Health Care Financing Administration, Baltimore, Maryland, 1991.

Medical equipment

Medical equipment includes depreciation, leases, and rent on medical equipment. The PPI for medical instruments and equipment was chosen as the price proxy.

Professional automobile

We use the CPI for private transportation for this cost category, which includes depreciation and upkeep for professional cars. This excludes airline fares, intercity bus and train transportation, and intracity bus and train transportation.

Other professional expenses

This residual category includes such professional expenses as accounting services, legal services, office management services, continuing education, professional association memberships, journals, and other professional expenses. In the absence of one price proxy or even a group of price proxies that might reflect this heterogeneous mix of goods and services, we chose the CPI for all items less food and energy.

Professional medical liability insurance premiums

Professional medical liability insurance premiums were by far the fastest growing expense category in the proposed physician MEI in the 1980s (Table 7). These increases have moderated since 1989. Changes in the cost of medical liability insurance premiums currently are measured based on a HCFA survey of the rate of change in average liability premiums for \$100,000/\$300,000 coverage (or the minimum provided) among nine major insurers. The causes of the large increases in the mid and late 1980s are complex and vary by specialty and geographic location (Dutton, 1986; Task Force on Medical Liability, 1987; U.S. General Accounting Office, 1986). Efforts are under way to improve the professional liability insurance price proxy.

Productivity adjustments

The general earnings portion (i.e., the net income portion) of the current MEI is adjusted to exclude annual changes in economywide productivity. This is accomplished by dividing the rate of increase in general earnings (AWEs in the private nonfarm economy) by an index of the change in output per man-hour of nonfarm business workers. The rationale for this adjustment is that, although increases in general earnings are used to set increases in the physician's income in the MEI, those increases in general earnings are partly the result of changes in worker productivity. Further, if the portion of the increase in earnings resulting from productivity increases were not adjusted for productivity, physicians would be collecting the benefits of productivity increases twice. They would be benefiting from their own productivity increases plus those generated in the general

economy. This double benefit for productivity would occur as follows. As noted, economywide wage increases reflect, in part, economywide productivity changes, because productivity increases permit increases in wage rates that are higher than they otherwise would have been. Thus, the use of economywide wages as a price proxy, without adjustment, would implicitly result in payments to physicians that incorporate the value of general economy productivity increases, independent of the physicians' own productivity increases.

At the same time, under Medicare fee-for-service reimbursement, physicians directly benefit from their own increases in practice productivity. Physicians can increase their income by increasing the number of procedures and services for a given set of inputs or by more efficiently producing the same number of procedures and services by reducing the quantity of inputs. Thus, if the price proxy for physician's own time is not adjusted for productivity, physician revenue would be allowed to increase from their own productivity gains in addition to economywide productivity increases. To avoid this double counting of productivity gains, economywide productivity changes were deducted from the rate of increase in general earnings in the current MEI.

The productivity adjustment employed in the current MEI is volatile, because it reflects unstable annual economywide fluctuations in productivity (McMenamin, 1987). In addition, for years in which productivity in the general economy has declined, the present MEI productivity adjustment has perverse effects. For example, in 1979, earnings increased 8.0 percent, while productivity declined 1.5 percent. Therefore, actual inflation in general earnings was approximately 9.6 percent ($1.08/0.985 = 1.096$), an amount reflected in the calculation of the MEI (McMenamin, 1987).

A revised MEI should incorporate a productivity adjustment that is fair to physicians and taxpayers and sends an appropriate signal to encourage productivity increases. We point out that individual physician practices that achieve gains in productivity benefit financially, compared with those that do not, regardless of any overall productivity adjustment in the MEI.

Two problematic areas with the current MEI economywide adjustment for productivity were previously discussed: volatility in the annual percent changes in productivity and the related effect of negative productivity changes resulting in increases in the MEI. Both of these issues can be addressed by using an average rate of productivity change, rather than an annual change.

Given the high volatility in annual rates of change in productivity, a more stable measure is needed that:

- Keeps the integrity of the official Bureau of Labor Statistics productivity series.
- Is automatically updated for historical revisions and new experience.
- Mathematically "averages out" over selected periods of time.

One approach is to use a historical moving average of productivity changes. We experimented with various periods of time to calculate the moving average. We chose 10 years as a balance between being short enough to reflect relatively recent secular trends in productivity

while not being overly influenced in any 1 year by trends in the business cycle. Because labor productivity is calculated by the Bureau of Labor Statistics using all direct labor inputs, we apply the productivity adjustment to all direct labor inputs in the MEI, including general earnings (net income) and nonphysician compensation. Each of the four price proxies (AHEs in the private nonfarm economy, ECI for benefits of private nonfarm economy, ECI for wages and salaries of nonphysician employees, ECI for benefits of white collar workers) are divided by a 10-year moving average index of labor productivity in the nonfarm business sector.

Conclusion

In this article, we have developed options and recommendations for a revised MEI. Comparable to other input price indexes (market baskets) that HCFA uses in connection with provider payment systems, the proposed Medicare Economic Index is a fixed-weight Laspeyres measure. The revised index was constructed using expenditure categories developed from 1989 data, the latest available at the time of this study, and has more cost categories and price proxies. Changes in AHEs for the total private nonfarm economy are employed as a proxy for the wages and salaries component of the physician time category. In addition, we developed an occupation-based wage index as the price proxy for nonphysician employees. We also added separate cost categories for fringe benefits both for physician time and nonphysician employees. For the productivity adjustment, an integral component of the MEI designed to avoid duplicate payment, a more stable 10-year moving average of output per hour in the nonfarm business economy is being used. The labor productivity adjustment is applied to the direct labor components of the MEI, that is, general earnings (net income) and nonphysician employee compensation. We believe the proposed MEI is technically improved and equitably measures price changes for physician office practices.

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