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RURAL HOSPITAL WAGES AND THE AREA WAGE INDEX: 1990-1997

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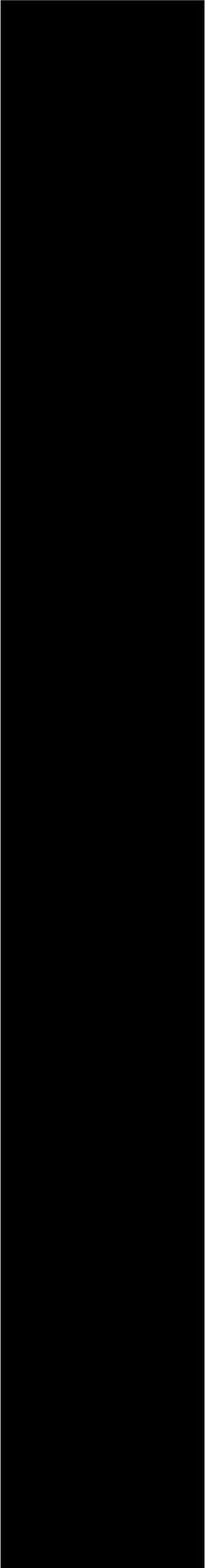
WORKING PAPER SERIES

North Carolina Rural Health Research and Policy Analysis Center

Cecil G. Sheps Center for Health Services Research
The University of North Carolina at Chapel Hill

725 Airport Road, CB #7590, Chapel Hill, N.C. 27599-7590
phone: 919/966-5541 fax: 919/966-5764

Sheps Center World Wide Web Address: www.shepscenter.unc.edu
NCRHRP address: www.shepscenter.unc.edu/research_programs/rural_program



RURAL HOSPITAL WAGES AND THE AREA WAGE INDEX: 1990-1997

Kathleen Dalton, Ph.D.
Rebecca T. Slifkin, Ph.D.
Hilda A. Howard, B.S.

North Carolina Rural Health Research and Policy Analysis Center

Cecil G. Sheps Center for Health Services Research
The University of North Carolina at Chapel Hill

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EXECUTIVE SUMMARY

The North Carolina Rural Health Research and Policy Analysis Center has conducted this study to gain a better understanding of the hospital wage index used by the Health Care Financing Administration (HCFA) to adjust rates for hospital and other services under its prospective payment system (PPS). Over the past ten years HCFA has instituted many changes to both the hospital wage survey and the construction of the index in order to make the index a more fair and timely instrument with which to adjust national payment rates. There is concern among rural health care providers and policy analysts, however, that the index is biased against rural markets, causing systematic underpayments to rural hospitals that do not reflect accurate labor market differences.

We examine both the input data and the resulting index values for the period from 1990 to 1997 to determine if incremental changes have improved the precision and equity of the index as a regional cost adjuster. We find that the urban/rural wage differentials have declined by over 20% since 1990. The majority of the reduction in the differential is attributable to real relative increases in the wages paid by hospitals in rural areas, but a substantial portion of the decline can be attributed to reporting changes in the wage survey.

The index is derived from the ratio of average wages within individual labor markets to the national average wage. HCFA defines urban markets by metropolitan statistical areas (MSA), but it groups all non-MSA counties within a given state into a single rural labor market. We define labor market bias as the presence of geographically identifiable sub-markets that display systematically different patterns in the level and distribution of their hourly wages. We find clear evidence of such a bias in the rural labor markets as initially defined by MSA/non-MSA location. Three distinct rural sub-markets can be identified that are related to community size, but not to adjacency to urban areas. The bias is substantially reduced, however, by rural-to-urban reclassifications that Congress has allowed for certain hospitals and/or counties, as part of an administrative exceptions process overseen by the Medicare Geographic Classification Review Board (MGCRB).

After accounting for the reclassifications, the hospitals located in rural areas with larger urbanized populations still appear to be at a modest disadvantage by being grouped within a single state-level rural market. However, the other side of that same grouping problem works in favor of hospitals in the very rural communities (about one fifth of all the rural facilities), because they receive the benefit of being averaged in with higher-wage hospitals. Over the seven years covered by this study, the hourly wages in very rural hospitals range averaged 18% to 13% lower than the computed mean wage within their respective markets. The systematic difference provides this group with a payment advantage under inpatient PPS relative to their cost of care.

The effect of this payment advantage can be seen in higher PPS inpatient margins for this group when compared with other rural hospitals. At the same time, the relative PPS payment advantage does not seem to be great enough to offset other financial difficulties because this geographic group continues to experience the lowest average operating margins of all Medicare general acute-care hospitals. If the index were to be recomputed using more precisely defined rural labor markets that could eliminate this remaining bias, Medicare payments to the smallest and most vulnerable of our rural facilities would be reduced.

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BACKGROUND

Inpatient Payments under the Prospective Payment System

The majority of short-stay general hospitals in the United States are reimbursed by Medicare under the Prospective Payment System (PPS). PPS hospitals are paid for inpatient care based on the sum of two fixed amounts per Medicare discharge called the standardized payment amounts. Each case receives both an operating payment and a capital payment (see Figure 1). The operating standardized amount is separately computed for hospitals located in large urban areas, and for those located in all other areas (i.e. smaller urban and rural combined). Both the operating and the capital standardized payment amounts are multiplied by a resource weight according to the diagnosis-related group (DRG) that is assigned to each discharge. Other special adjustments are made to the standardized amounts for teaching hospitals (the Indirect Medical Education (IME) percent add-on) and hospitals serving a “disproportionate share” of indigent patients (the DSH percent add-on).

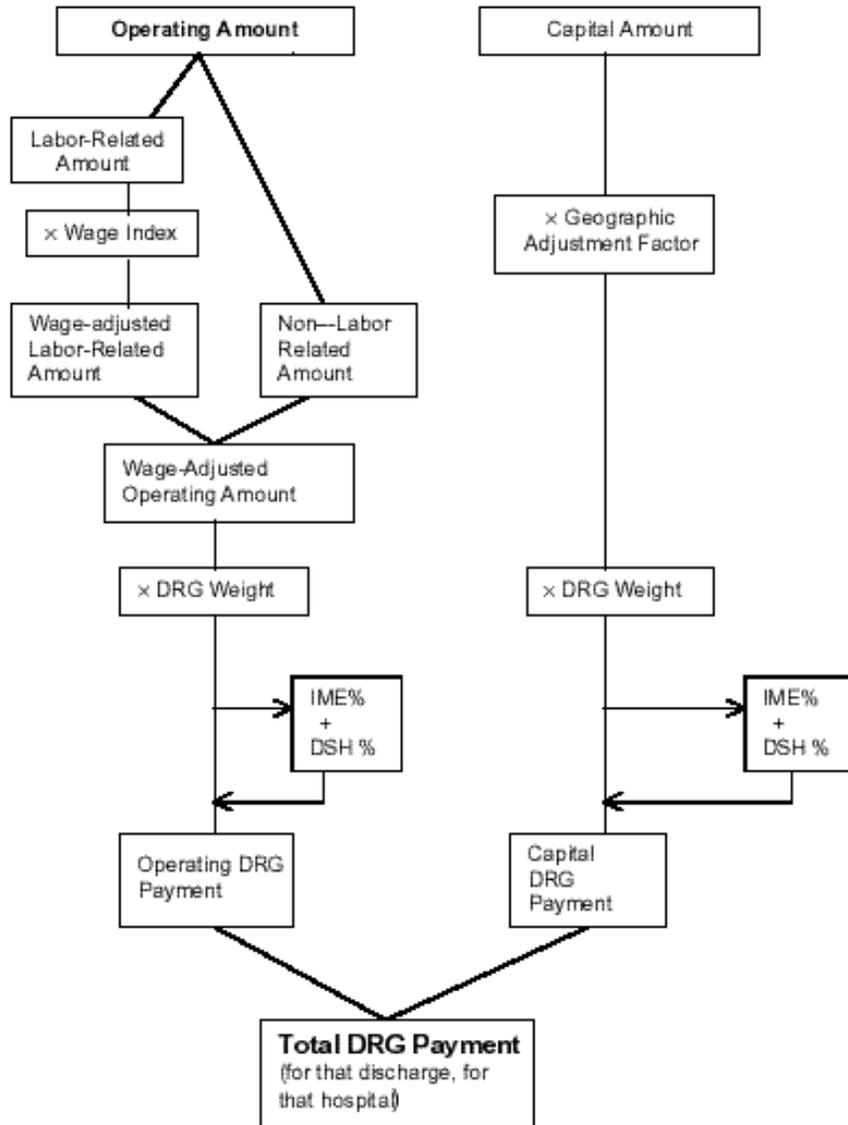
The standardized amount for operating costs is also made up of two components, one that is considered “labor related” and one that is not. HCFA computes its own hospital industry wage index to adjust the “labor-related” component for regional variation in the cost of labor, which is thought to reflect market conditions that are beyond the individual hospital’s control. A new index is computed by HCFA each year, from average hourly wage data reported by hospitals on their Medicare cost reports filed four years earlier. Recently HCFA has also begun to use this same hospital index to adjust rates for skilled nursing, hospital outpatient and home health services under their new Medicare prospective payment rules, although the wage data on which it is based pertains only to hospital services.

The portion of the standardized amount for operating costs that has been identified as labor-related is the same for all hospitals paid under PPS. It has been as high as 75% (during the 1980s) but is currently just over 71%. [For a discussion of the components of the labor-related portion and its affect on rural hospitals, see Appendix 1]. The standardized amount for capital costs is also adjusted by a geographic adjustment factor (GAF), but this adjustment applies to the full capital payment rate. Although the GAF is indirectly derived from wage index data, it has a relatively small effect on total payments and is not the focus of this paper. Figure 1 presents a simplified schematic of how the payment is computed for a given Medicare discharge.

To construct the wage index, hospitals are first grouped into labor markets that are defined either by Metropolitan Statistical Area (MSA) or by state-level aggregates of rural areas that include data for all hospitals located outside of an MSA. Non-MSA hospitals account for approximately 44% of hospitals paid under the PPS system (although only 14% of PPS payments). A special exception process, however, allows hospitals to be re-designated to neighboring labor markets if certain conditions can be met. In the federal fiscal year ending September 30, 1996 (FY 1996), 13% of all rural hospitals were re-designated to urban labor markets for purposes of assigning their wage index.

Within each labor market, a weighted average hourly wage (AHW) is computed from the sum of the wage costs of all hospitals in that market divided by the

Figure 1: Determining PPS Inpatient Payments



sum of the hours worked in all hospitals in the market. The wage index values are then computed by dividing the AHW for each labor market by the national AHW. If a particular wage market has an index value of 0.80, that means that the hourly hospital wages paid in that market area average 20% less than the hourly wages for all PPS hospitals in the Medicare system for that year. Because the index value is less than one, the standardized rate for hospitals in that market will be reduced.

It is important to recognize that under this definition of the AHW, the wage index reflects regional differences in both the price of labor and the mix of occupations and skill levels within a given institution. It is, technically, a “labor cost index” rather than a pure price index. Two hospitals located in the same area and sharing similar pay scales by job classification could have very different average wage costs because they employ a different mix of nurses, technicians and administrative personnel. Further discussion of the conceptual and practical implications of using an index that reflects both sources of variation is provided in Appendix II.

Table 1 shows two actual payment calculations using the rates that were published in the proposed PPS rules for FY 2001. For simplicity, we assume a DRG weight of 1.000 and no teaching, disproportionate share or other special PPS adjustments. We assume a wage index of 1.200 for Hospital 1 and 0.800 for Hospital 2, and that both hospitals are located in a rural or “other urban” areas.

As can be seen from the table, payment will be reduced for hospitals located in an area where the wage index is less than 1.00. Payment will be increased for hospitals in labor markets with an index value that is greater than 1.00.

**Table 1:
Sample Calculation of Operating DRG Payment**

	Hospital 1		Hospital 2	
	Labor-related	Non labor-related	Labor-related	Non labor-related
National Adjusted Operating Standardized Amount	\$2,818.85	\$1,145.78	\$2,818.85	\$1,145.78
× Wage Index Adjustment	<u>1.200</u>	Not applicable	<u>0.800</u>	Not applicable
= Wage-adjusted Operating Standardized Amount	\$3,382.62	\$1,145.78	\$2,255.08	\$1,145.78
Combined Operating Standardized Amount	\$4,528.40		\$3,400.86	
× DRG Weight	<u>1.10</u>		<u>1.10</u>	
= Total Operating DRG Payment	\$4,981.24		\$3,740.95	

WHY IS THE WAGE INDEX IMPORTANT IN RURAL HEALTH POLICY?

In FY 2000 the index values for urban markets ranged from 0.73 to 1.54 and the index values for rural markets ranged from 0.71 to 1.30. Wage index values in rural markets have always been below those in urban markets — in FY 2000 they averaged 21% lower. Because the index has such a powerful effect on the distribution of Medicare payments, it came under close scrutiny when inpatient PPS was first introduced in 1984. There is renewed interest in assessing its validity now that PPS has been expanded into non-hospital areas. In addition, there has been widespread concern among rural health care providers and policy analysts that the index is biased against rural markets, resulting in systematic underpayments to rural hospitals that do not reflect accurate labor market differences.

Criticism of the wage index has focused on three issues:

- accuracy and timeliness of the wage and hour data;
- arbitrary use of geo-political boundaries to define labor markets;
- and

- failure of the index to separate the effects of pure regional wage variation from those of occupational mix.

Many changes made to the wage survey instrument over the last ten years have addressed problems regarding accuracy and precision of wage and hour data. For example, since 1990, wage surveys have been incorporated into the hospital cost reports and are subject to annual audits and updates. The surveys have also been expanded several times to identify wages and hours pertaining to non-PPS activities in order to exclude them from the PPS hourly wage computation. Congress specifically addressed the problem of arbitrariness in the wage market definitions by creating the Medicare Geographic Classification Review Board (MGCRB). Since 1992, this body has reviewed requests on a case-by-case basis (usually from individual hospitals but occasionally from entire counties) to reassign labor markets in situations where the county boundaries clearly do not conform to economically coherent markets. The question of whether the index should reflect regional differences in occupational mix has proven less amenable to consensus. Although the wage data are now adjusted to remove the influence of hospital-based physicians, residents and CRNAs, the question of whether to control for different skill mixes among other groups of employees has yet to be resolved.

OBJECTIVES OF THIS STUDY

The North Carolina Rural Health Research and Policy Analysis Center undertook this study of rural hospital wages and the hospital wage index for several reasons. First, we wanted to examine trends in the urban/rural wage differentials over time. Second, we were interested in whether changes to the data collection and index construction had improved the precision and equity of the index as a national payment adjuster. As part of this objective we specifically investigated potential bias created by the broad rural labor market definitions, and the impact such a bias might have on relative payments to subgroups of rural hospitals. Finally, we were interested in how important the wage index was to the financial performance of rural hospitals, both in terms of their Medicare margins and their overall operating margins.

METHODS

To answer these questions, we examined hospital payment and cost data from Medicare's Hospital Cost Report Information System (HCRIS) for each year from 1990 to 1997. We merged these files with HCFA's standardized hourly wage files (available only through 1996, because of the four-year lag) and with county-level demographic data extracted from the Area Resource Files. We examined hospital hourly wages in urban and rural areas both as defined by HCFA using the Office of Management and Budget's identification of counties within or not within metropolitan statistical areas (MSAs), and also used the rural-urban continuum codes (RUCC), as identified in 1993 by the U.S. Department of Agriculture.

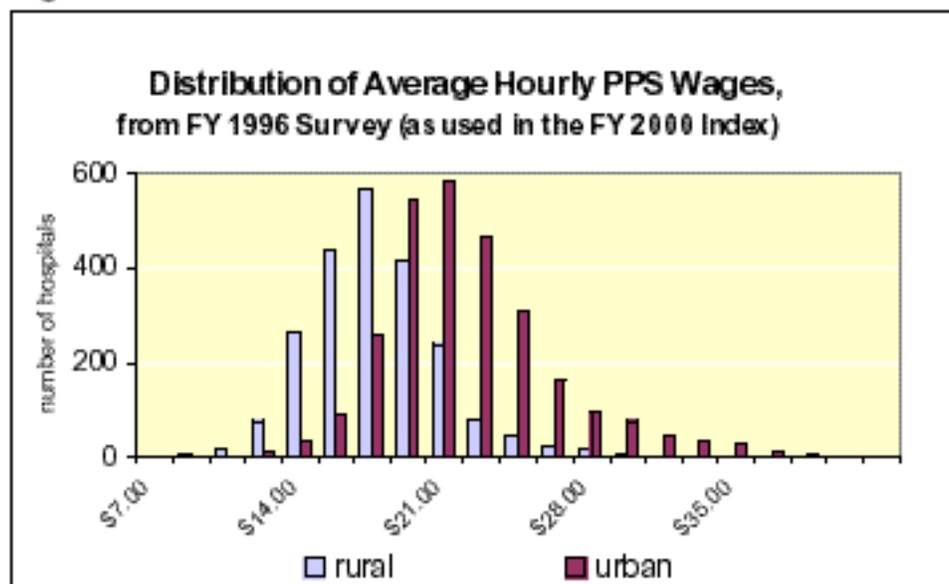
We computed a measure of deviation defined as the percent difference between an individual hospital's hourly wage and the mean hourly wage of its labor market in order to examine patterns of variation in hospital hourly wages within HCFA's defined labor markets. We analyze these deviation measures over time and across levels of "rurality" as identified by the RUCC. Finally, we examine the payment-to-cost ratios for Medicare and for all patient care services across hospitals grouped by RUCC in order to gain some understanding of the influence of the wage index on financial margins.

FINDINGS

Urban/Rural Wage Differentials

In FY 1996, the average reported PPS hourly wage¹ was \$23.29 for hospitals located in central counties of large (population > 1 million) metropolitan areas, and \$16.97 for those located in very rural counties, where fewer than 2,500 residents lived in an urbanized setting. This is a gap of 27% between the

Figure 2:



Source: author's calculations from HCFA standardized hourly wage data

most and the least urbanized settings. Figure 2 presents the distribution of the PPS hourly wages across hospitals grouped by HCFA's definition of urban and rural. On average, hospitals located in non-MSA settings in FY 1996 reported hourly PPS wages that were 21% lower than those reported by hospitals located in urban settings. However, this represents a narrowing of the differential, since throughout the first half of the 1990s, the gap was consistently 25% to 26%.

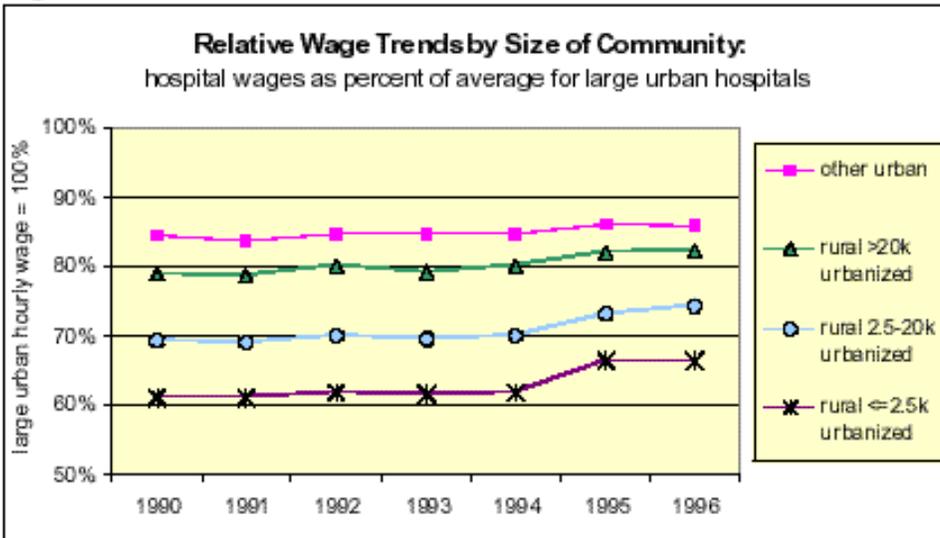
The wage gap began to narrow around 1994. In Figure 3 we have plotted reported PPS hourly wage over a six-year period, averaged across hospitals grouped by community size. The average within each year is expressed as a percentage of the average across all hospitals located within MSAs with populations of 1 million or greater.² From this chart, we can see that relative wage improvements have occurred across all types of rural areas, but the gains are proportionally largest in the smallest communities.

How much of the relative gain in rural wages is due to real gains in amounts paid, and how much to reporting changes in the HCFA survey? To

¹ "PPS hourly wage" is used here to identify the standardized hourly wage computed by HCFA for use in constructing the index. Over the years this statistic has been adjusted to include benefits and some types of contract labor, and to exclude wages and hours of employees in non-PPS settings. Since the definition of "PPS wage" has changed, analyzing trends the actual wages from year to year creates an "apples-to-oranges" comparison problem. For this reason, our trend analyses focus on the relative positions of rural versus urban wages rather than on the actual values.

² For example, in 1990 the average of the PPS hourly wages paid by all hospitals located in large urban areas was \$20.15, while the average was \$12.31 for all those located in rural counties with fewer than 2,500 people living in an urbanized setting. The 'relative wage' is thus 0.61, because $(12.31 \div 20.15) = 0.61$. The relative wage for central large urban counties is set equal 1.00 for each year in Figure 2.

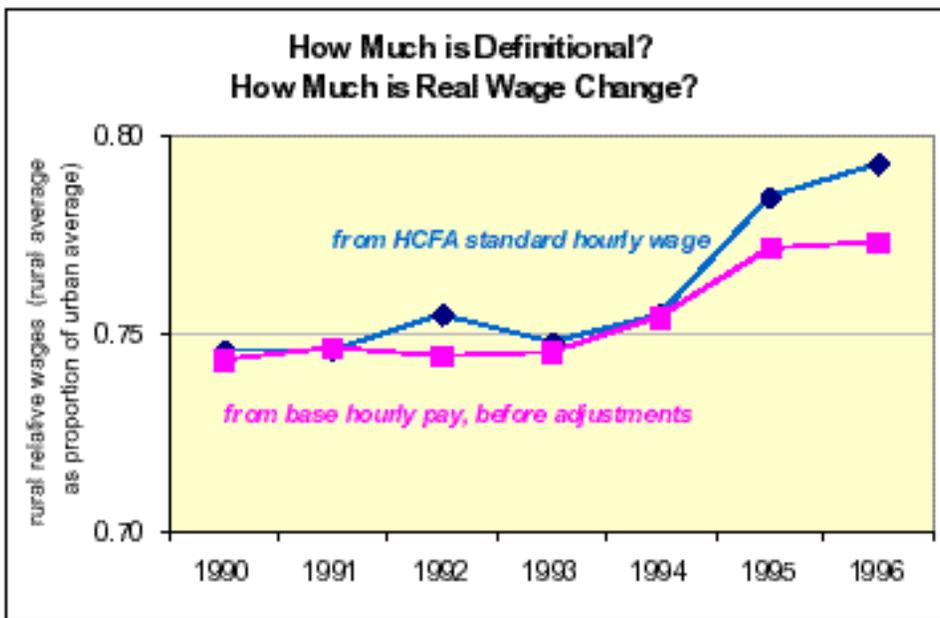
Figure 3:



Source: author's calculations from HCFA standardized hourly wage data

answer this question, we examined similar trends in the raw hourly wages

Figure 4:



Source: author's calculations from HCFA standardized hourly wage data and hospital cost reports

reported by hospitals, as derived directly from their payroll systems before any adjustments have been made to include benefits or contract labor, and before HCFA's required elimination of the wages for non-PPS employees. In Figure 4, we compare the trends of the two types of hourly wage figures. We have grouped the reported wages for all rural hospitals combined, and expressed them as a proportion of the equivalent average wages reported for all urban hospitals combined. Just under one half of the reduction in the wage gap by 1996 may be due to definitional changes, but most appears to reflect real differences in the rates of increase in wages paid in rural areas.

Most of the reduction in the wage gap appears to reflect real differences in the rates of increase in wages paid in rural areas.

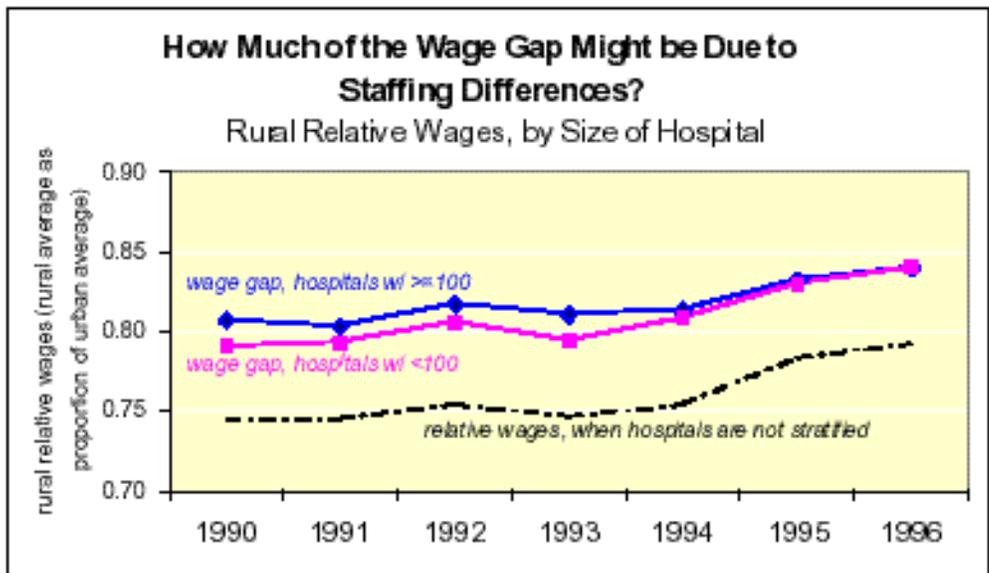
It is important to identify the extent to which the urban/rural wage differentials may reflect differences in the staffing between large and small hospitals, rather than differences in the price of labor in urban and rural markets.

Preliminary data published as part of the proposed FY 2001 index (not shown here) indicate that the gap in PPS wages, but not raw wages, narrowed by another three percentage points from FY 1996 to 1997. This may be attributable to the recent phasing out of teaching physicians and CRNAs from the hourly wage computation. It is important to identify the extent to which the urban/rural wage differentials may reflect differences in the staffing between large and small hospitals, rather than differences in the price of labor in urban and rural markets.

The average hourly wage of any given hospital is shaped both by the prevailing wage structure of its surrounding community and by the mix of occupations it needs and is able to staff for its expected level of care. Smaller hospitals, regardless of location, tend to use a less highly skilled mix of employees. Because rural hospitals tend to be smaller, part of the rural/urban wage differential is attributable to differences in occupation mix as well as differences in local wages.

We can try to separate these two effects by stratifying the sample both by community size and bed capacity. When we do this, we find that the urban-rural differentials are still substantial, even when compared within similar sized institutions. For example, in the FY 1996 data, the average reported hourly PPS wages in rural hospitals with greater than 300 beds was \$18.71, compared to \$22.00 for similar-sized urban hospital. We might expect the mix of occupations to be similar within these two groups, yet there is still a wage gap of 15%. When we look only at hospitals with fewer than 25 beds, the average wages are \$15.99 in rural areas and \$19.56 in urban — a gap of 18%.

Figure 5:



Source: author's calculations from HCFA standardized hourly wage data

These differences within bed-size categories were present throughout the six years of our study period for which we had both types of data. In Figure 5, we plot the overall urban/rural PPS wage differentials from 1990 to 1996 for hospitals grouped by whether they operate greater than or less than 100 beds. From this simple dichotomy, we find that between one-fourth and one-fifth (depending on the year) of the overall urban/rural wage differential may be attributable to factors that are related to hospital size rather than to geographic differences in the labor markets.

Assessing Wage Index Validity

Changes in the predictive ability of the index over time

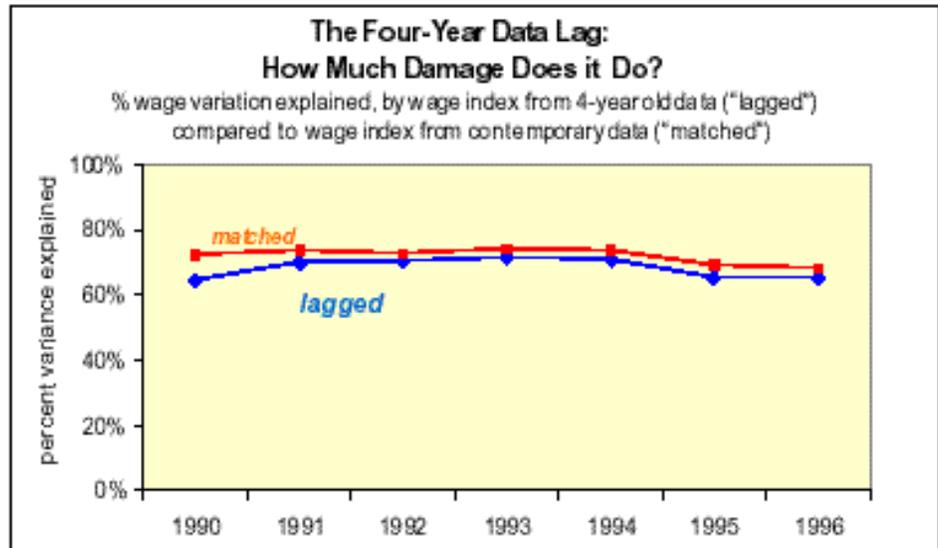
One measure of validity for the wage index is its ability to predict wages at the hospital level. Changes to the wage survey have improved the precision and reliability of the input measure — hourly wages — but such improvements have been accomplished at a cost of significantly increased hospital reporting burdens. The added administrative costs could be justified if the predictive ability of the wage index has improved as a result of a more precisely measured input. This can be tested using standard analysis of variance techniques.

We regressed individual hospitals' PPS hourly wage figures against the final wage index values that were developed from those same figures. Because each year's index is constructed with data collected from a period four years earlier, we matched the independent variable (the assigned wage index) to the dependent variable (hourly PPS wages) for each hospital from the period four years earlier. No clear pattern of improvement can be identified in the percent of variance explained over the period covered by our study. If anything, there is a slight trend in the opposite direction; from FY 1990 to FY 1994 the index explained between 73% and 74% of the variation in hospital wages, but in 1995 it only explained 69%, and in 1996 only 67%. Despite the many improvements made in the measurement of hourly wages, there is no clear improvement in the index as a wage predictor.

We were also interested in knowing how well current period hourly wages can be predicted by the index that is used to adjust payments in the same period — that is, by an index constructed from the data that are lagged by four years. This can help to assess how much damage is done, if any, by not using timely input data. If the index constructed from four year old data explains substantially less of the current period variation in hourly wages than the does the index constructed with wage data that is matched in the same time period, this might be evidence that moving toward more timely data acquisition could produce a more equitable wage adjuster. However, we did not find this to be the case.

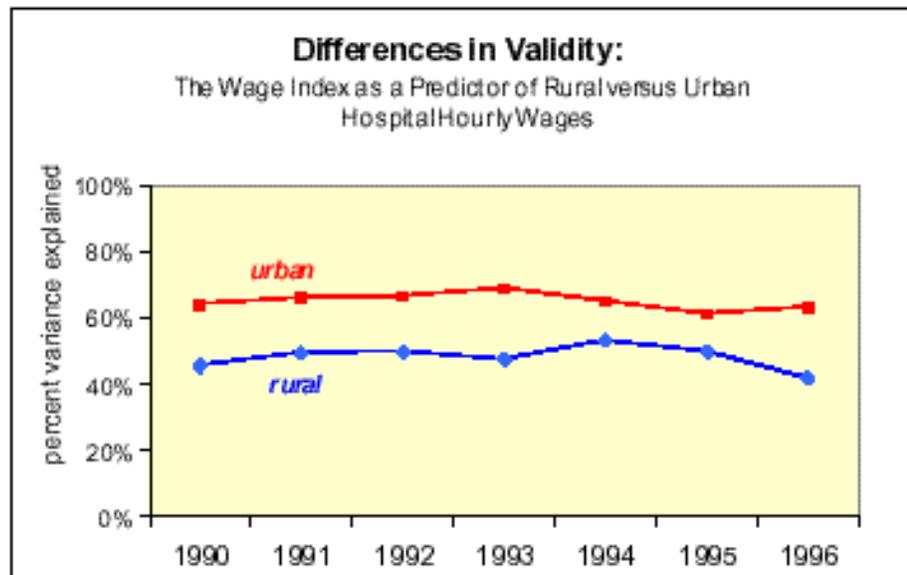
Depending on the year, between one-fourth and one-fifth of the overall urban/rural wage differential may be attributable to factors that are related to hospital size rather than to geographic differences in the labor markets.

Figure 6:



Source: author's calculations from HCFA standardized hourly wage data and Historical Wage Index File

Figure 7:



Source: author's calculations from HCFA standardized hourly wage data and Historical Wage Index File

In Figure 6 we have plotted the percent of variance explained for each year of our study period, comparing the percent variance explained by the “lagged” versus the “matched” index. After 1992 there is very little difference in the predictive abilities of the two index values. The noticeable improvement by 1992 may well reflect the introduction of labor market reclassifications (which were not in effect during 1990 and 1991). We find that, after this apparent adjustment, current period wages are predicted equally well by the index constructed from contemporary wage data as from four year old data. This is not to say that, at the individual hospital level, significant changes in average wage levels do not occur within a four-year period. There are many hospitals within each rural market, however, and significant changes would have to appear across the entire rural market for the lag in the wage data to translate into a problem in the index.

We do find that the index performs consistently better for urban than for rural hospitals, as demonstrated in Figure 7. These results were obtained by running separate predictions for rural and urban hospitals (defined by location, without accounting for reclassifications), and using index values that were matched in time to the hourly wage values. The difference is further explored in our analysis of within-market variation in wages, below.

Measuring Within-Market Deviation

In general, a reduction in the variation of hospital hourly wages within the individual assigned labor markets would be a sign of improved precision in the index. We have examined within-market wage variation (whether systematic or random) to determine if it has been reduced. We found no evidence of reduction in non-systematic variation between 1990 and 1996, in either rural or urban markets, as measured by market-specific coefficients of variation. We are most interested, however, in identifying systematic patterns in this variation — particularly patterns that are attributable to geographic characteristics such as community size or location. The presence of systematic within-market variation would be evidence of bias in the index construction, which could threaten the validity of the index as an equitable basis for adjusting Medicare payments.

We have studied patterns in the deviation of individual rural hospitals' hourly wages from the weighted averages of their assigned labor markets, both pre- and post-reclassification (see box for additional information on the computations). When we examine the pre-reclassification variation across hospitals grouped by rural-urban continuum codes, we find evidence of two distinct urban and three distinct rural sub-markets. This finding is consistent over our study period, although the systematic differences decline somewhat over time.

"Within-Market Deviation" is computed for each hospital for each year:

$$[(\text{Hospital Hourly Wage} \div \text{Market Average}) - 1] \times 100$$

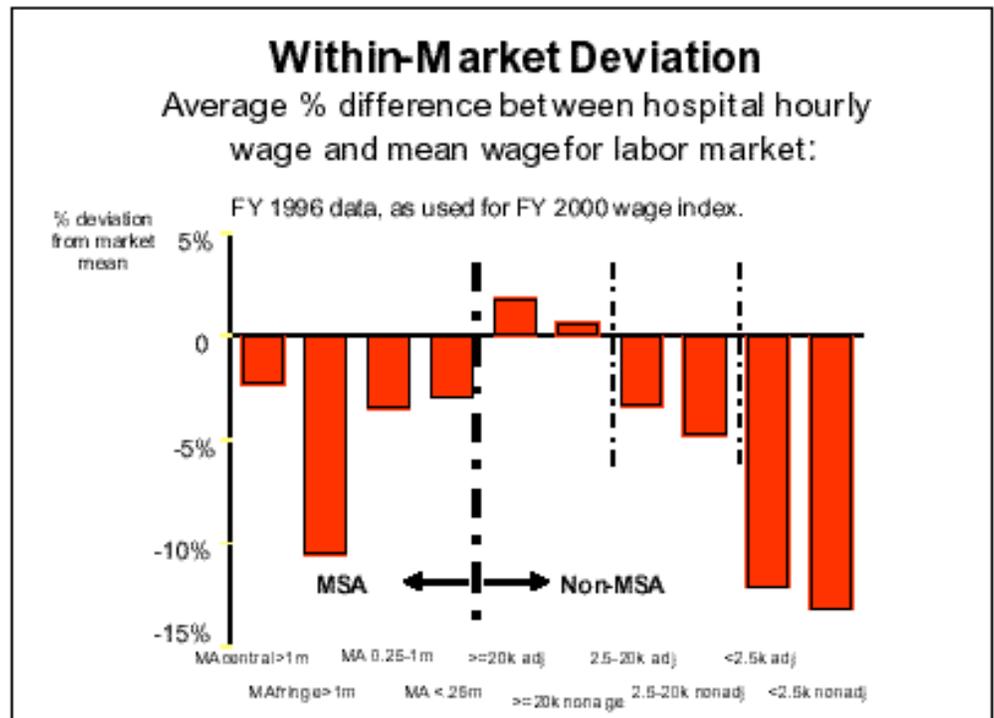
...where **Market Average** is a weighted average hourly wage statistic computed within labor markets. Depending on the analysis, the market average may be computed either before or after accounting for reclassifications.

- negative statistic PPS payment advantage relative to expected resource consumption per case
- positive statistic PPS payment disadvantage relative to expected resource consumption per case

Deviation statistics are summarized by Rural Urban Continuum Codes, as defined by the USDA and identified in 1993, as follows:

- **URBAN:** Counties within Metropolitan Statistical Areas (MSA/SMSA)
 - Central county location, population > 1 million
 - Fringe (suburban) county location, population > 1 million
 - Population 250,000- 1 million
 - Population less than 250,000
- **RURAL:** Counties not within Metropolitan Statistical Areas (MSA/SMSA)
 - Greater than 20,000 living in urbanized setting, adjacent to MSA
 - Greater than 20,000 living in urbanized setting, not adjacent
 - Between 2,500 and 20,000 living in urbanized setting, adjacent to MSA
 - Between 2,500 and 20,000 living in urbanized setting, not adjacent
 - Fewer than 2,500 living in urbanized setting, adjacent to MSA
 - Fewer than 2,500 living in urbanized setting, not adjacent

Figure 8:



Source: author's calculations from HCFA standardized hourly wage data

If a hospital's own hourly wage were below the average within its assigned labor market, its adjusted prospective payment per case would be relatively favorable. Other cost factors could still create a situation where the adjusted payment per case was insufficient to recover costs. However, the wage index would not be the cause of the shortfall.

Figure 8 summarizes the average deviation of hospitals' hourly wages from the AHW of the labor markets in which they are actually located. Predominately negative bars in the deviation graphs result from the fact that the AHW is a weighted average, which means that the larger, higher-wage hospitals have greater influence on the statistic than do the smaller ones. Within each market there are often a few large facilities that have significantly higher wages that bring up the average for the market. The majority of hospitals within most markets, however, are smaller, with hourly wages that are below their market's AHW.³

In Figure 8 we graphed the deviation statistics from the FY 1996 wage survey only, because these are the data used to construct the wage index in place during the most recent (FY 2000) payment year. The graph presents evidence of two urban sub-markets and three rural sub-markets. The urban sub-markets, at the left, are not the focus of this study. It is worth noting, however, that although there is a distinct difference between the wage patterns the central large urban counties and those in their fringe (or suburban) counties, only 160 hospitals were identified in the fringe county group in our FY 1996 sample out of nearly 2,800 urban facilities.

The rural sub-markets appear to be defined by size of "urbanized" population, but not by adjacency to urban areas. These results are consistent with earlier findings in studies conducted for HCFA and for the Prospective Payment Assessment Commission, from hourly wage data collected as far back as in 1984 (Cromwell, Hendricks and Pope, 1986) and in 1988 (De Lew, 1992). We find they are also consistent over the period covered by this study, as shown in the time series version of this same data, presented (for non-MSA RUCC codes only) in Figure 9.

³ Note that if one were to compute a wage index based on simple averages (giving each hospital equal weight within a market) and then construct the same type of graph as appears in Figure 7, the rural bars would be equally divided above and below the 0-line.

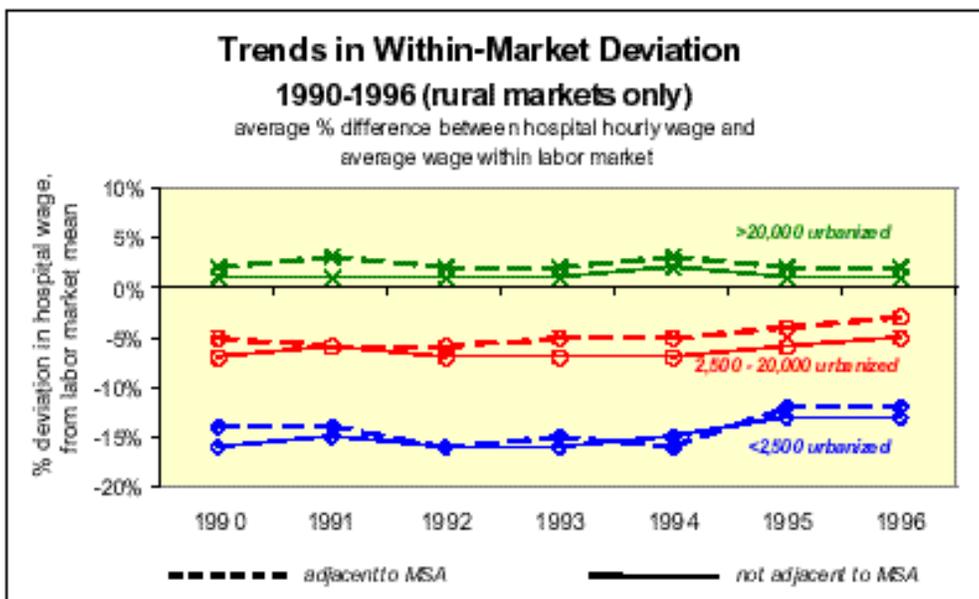
What do negative deviation statistics mean in the context of the wage index? If a hospital's own hourly wage were below the average within its assigned labor market, then a wage index constructed from that labor market would reflect an average input cost that was higher than that individual hospital's own experience. The hospital's adjusted prospective payment per case would be relatively favorable, holding other factors constant. There are, of course, other cost factors to take into consideration, such as capital or other non-labor costs, as well as length of stay or other treatment-related considerations. Any of these could still create a situation where the wage and case-mix adjusted payment per case was insufficient for the hospital to recover costs. The wage index in such a case, however, would not be the cause of the payment shortfall.

Clearly the broad definition of rural labor markets at the state level has the effect of aggregating multiple markets within one payment adjuster per state. The group that is put at a disadvantage from this aggregation is the "barely rural" group, that is, the set of hospitals located in counties with urbanized populations in excess of 20,000. However, this is also the group most likely to qualify for a reclassification to a neighboring labor market. In fact, in recent years redesignations have been approved for 25%-30% of hospitals in the "barely" rural categories and 10%-12% of hospitals in the "moderately" rural (2,500 to 20,000) categories.

There are special regulations governing the construction of the index values that Congress has put in place to protect the lower-wage hospitals that are not reclassified. The wage index is recomputed each year after re-grouping hospitals according to their assignments after the MGCRB decisions. The index values for rural markets, however, are "held harmless" in the computation; post-reclassification values may not be any lower than they would have been

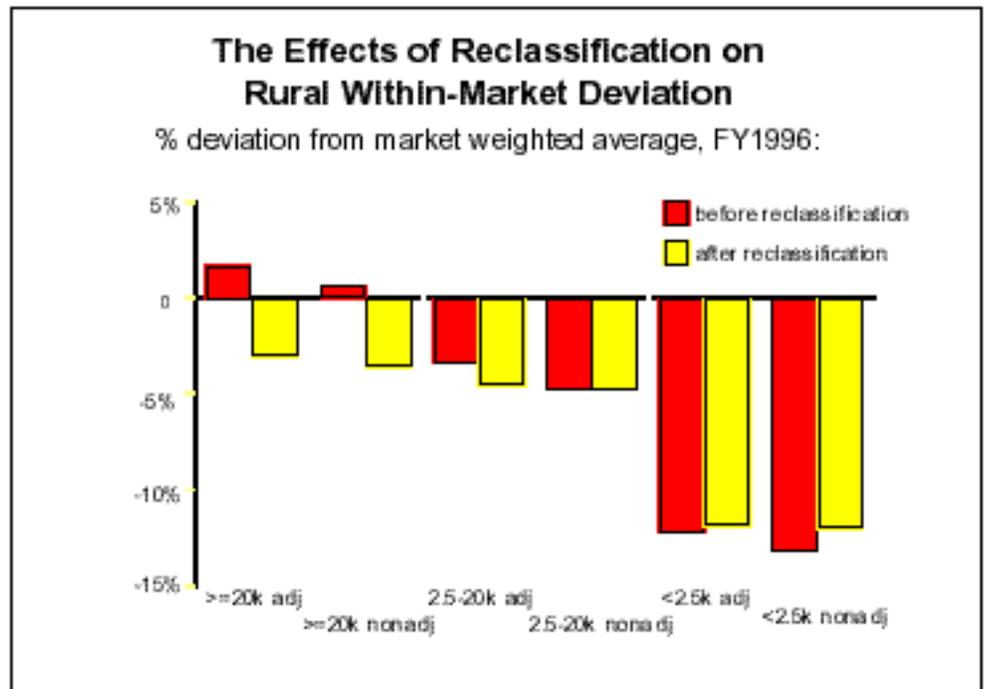
The hospital group that is put at a disadvantage from the aggregation of rural wage markets is the "barely rural" group, that is, those located in counties with urbanized populations in excess of 20,000. However, this is also the group most likely to qualify for a reclassification to a neighboring labor market.

Figure 9:



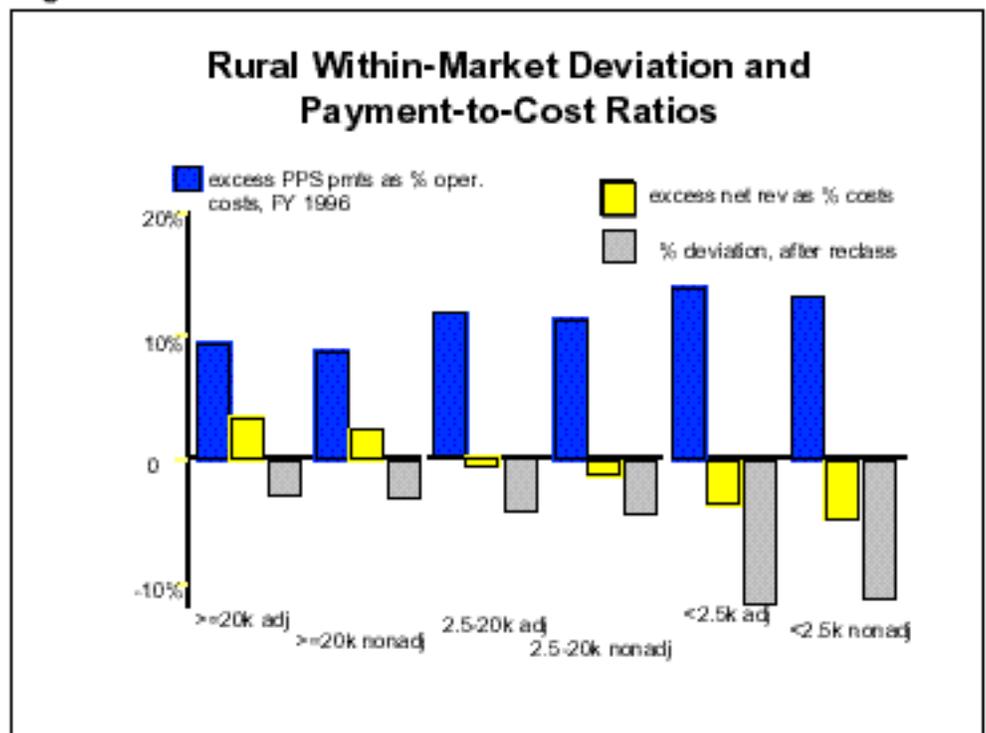
Source: author's calculations from HCFA standardized hourly wage data

Figure 10:



Source: author's calculations from HCFA standardized hourly wage data and Historical Wage index File

Figure 11:



Source: author's calculations from HCFA standardized hourly wage data and hospital cost report files

without the reclassifications. Because of this, calculation of deviation statistics after reclassification requires an extra step. Examining the bias in rural markets after taking reclassification into account, we imputed an equivalent market-level AHW that was effective for each hospital in FY 1996 based on its final assigned wage index value, then recomputed the deviation measures based on this second reclassified AHW. Figure 10 compares the deviation measures before and after reclassification (for non-MSA only) to those presented earlier in Figure 8.

We can see from Figure 10 that the rural bias is reduced, but certainly not eliminated, by the MGCRB reclassification decisions. There is continued evidence of two distinct rural sub-markets. However, the bias that remains works in favor of hospitals in the smallest communities. For example, the PPS hourly wages of these hospitals average 13% below the weighted averages of their assigned labor markets in FY 1996. The wage index that they were assigned in FY 2000, while below the national average, was still higher than it would have been in a more precisely defined labor market.

Assessing the Impact of the Wage Index on Rural Hospital Margins

We constructed a graph that uses the same non-MSA RUCC categories that are used in the preceding section, but which juxtaposes the average deviation statistics in Figure 10 against the PPS inpatient and total operating margins for the same groups of hospitals. Factors contributing to the operating margins of community hospitals are complex and deserve careful study with multivariate modeling. As a preliminary look at the problem, however, the results seen in Figure 11 pose some interesting questions with respect to the influence of the wage index on the financial ratios of rural hospitals.

We know that the wage index has a powerful influence on a hospital's Medicare payment per case; hospitals in areas with low wage index values receive less per DRG-adjusted case than do those in higher wage index areas. But because their costs per case may also be lower, it does not necessarily follow that their Medicare margins (that is, payments relative to their cost per case) are also lower. The effects of the relative payment advantage that we identified from the deviation statistics are clearly reflected in the FY 1996 inpatient PPS margins in Figure 11. Hospitals in communities with fewer than 2,500 urbanized residents had average PPS margins that were as high or higher than any group of non-teaching hospitals except those in the large core urban counties (who enjoy the benefits of very large disproportionate share payments).

Rural hospitals tend to experience more overall financial difficulty than do non-rural hospitals, and it is evident in Figure 11 that very rural hospitals tend to be in worse shape than moderately rural hospitals. From PPS cost report payment and cost data, however, it does not appear that their overall difficulties are associated with inpatient PPS payment ratios, as on average PPS payments for very rural hospitals are greater than operating costs. Although the special payment adjustments made to Sole Community Hospitals are included in these margin statistics, they do not have a strong effect on our findings. We have constructed similar graphs after excluding facilities that receive hospital-specific adjustments to their PPS payments, and find that the results are quite similar.

After MGCRB reclassifications, the rural market bias that remains works in favor of hospitals in the smallest communities.

SUMMARY AND CONCLUSIONS

Since its introduction in 1984, there has been a perception among rural providers and policy analysts that the wage index unfairly reduces Medicare payments to rural hospitals and is a factor contributing to their low operating margins. In our work we have analyzed trends in urban and rural hospital wages, and we have specifically investigated the rural wage markets defined by the index to determine if they systematically disadvantage classes of rural hospitals.

The differential between urban and rural hourly wages has declined substantially since 1990, and that a large part of the decline is attributable to the changes implemented by HCFA in their definition of allowable PPS wages and hours for use in the construction of the index. By the last year of our data, the average PPS hourly wage reported by all rural hospitals was about 21% lower than that reported by all urban hospitals. When we looked at hospitals of similar size, the difference was reduced to 17%.

We find that HCFA's broadly defined, state-level rural labor markets are biased, in that they fail to distinguish between identifiable rural sub-markets with different wage patterns, but that the bias is greatly reduced by the decisions of the Medicare Geographic Classification Review Board. Specifically, we have identified three distinct rural sub-markets that could be defined by community size, though they appear to be unrelated to whether or not the counties are adjacent to metropolitan areas. Geographic reclassification decisions have effectively eliminated one of these two sub-markets. Hospitals in most rural communities (those with fewer than 2,500 people living in urbanized settings) continue to show systematically lower average wage patterns than those of other rural hospitals. The bias introduced by grouping these two sub-markets together in the rural index values, however, works in favor of these facilities by giving them the benefit of being averaged in with higher-wage facilities in larger communities.

Our analysis of rural inpatient PPS margins confirms that the rural markets, as now constructed, serve to protect the inpatient Medicare payments for this sub-group of very small, very isolated hospitals. Hospitals in the smallest communities averaged 33 staffed beds in the 1996 file, compared to 67 in larger rural communities. Their occupancy rate was 27%, compared to 35% in the larger rural communities. In general we would expect these traits to be associated with higher fixed costs and lower PPS payment-to-cost ratios, yet that is not what we find. Hospitals in these areas show PPS margins that are as high as, or higher than, those of other rural areas. Our findings led us to conclude that the structure of the rural wage markets within the hospital wage index has actually protected the PPS margins of the most rural facilities. During this period, the poor financial condition of the very rural hospitals may be *in spite of*, but does not appear to be *because of*, the PPS hospital wage index.

In the years following the Balanced Budget Act of 1997, Medicare PPS ratios have deteriorated and the overall financial condition of these facilities is also likely to have declined. Such trends would not, however, alter our findings with respect to the specific influence of the wage index on these margins.

FUTURE WORK

Further investigation is being undertaken to identify factors that contribute to the apparent disconnect between PPS margins and overall operating margins

due to low payments on other (non-inpatient) Medicare services, compared to low or non-payment for services to other patients. We also hope to examine similar trends in the wages paid in non-PPS settings, particularly in long-term care and other post-acute care areas.

If the wage index is not a significant contributor to the financial problems of rural providers, then we need to turn our attention to finding other explanations. We need to examine patterns of investment in plant and equipment in these very rural settings, and gain a better understanding of the cost of unused capacity. There are still subsets of facilities within each of these types of rural communities that consistently experience losses on their inpatient PPS business. Some of these will have converted to Critical Access Hospitals in recent years, and will no longer be affected by the wage index. For those that cannot qualify for the conversion, however, we need to improve our understanding of the roles of census variation, capacity changes, service mix changes and payer mix in determining their unit costs and their long-range viability within increasingly competitive markets.

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APPENDIX I

What Does HCFA Consider to be "Labor-Related"?

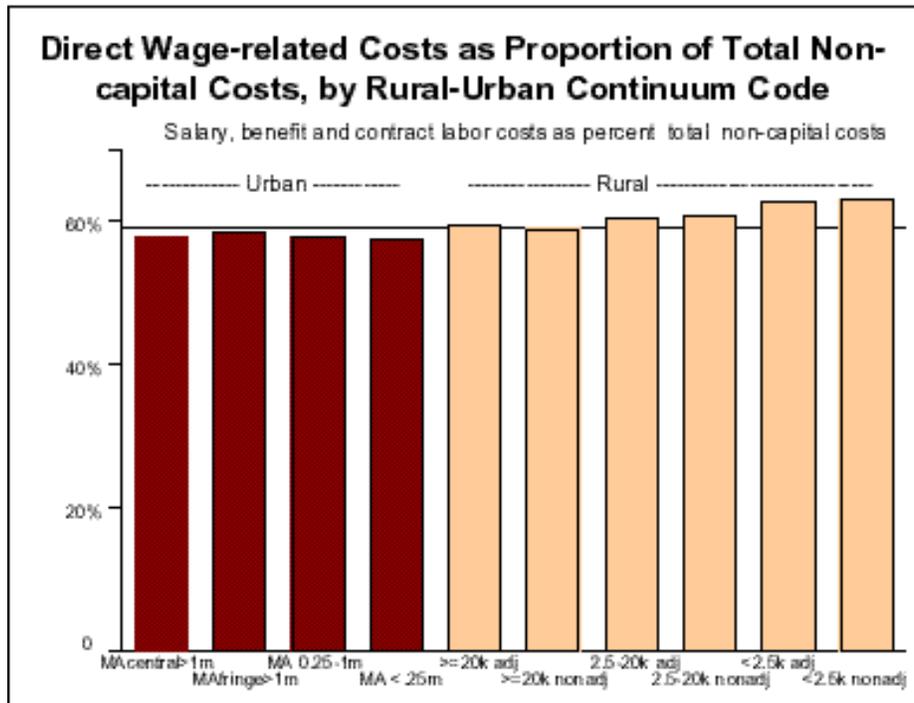
The labor-related portion of the operating amount is derived from the PPS Hospital Input Price Index (also called the hospital market basket) and is computed from the sum of the weights for all labor-related components of the price index. The current figure of 71% is derived from national data from all types of acute, short-stay hospitals across all regions. The most recent revision was in 1997, and it was based on data from 1992. Since FY 1998, the five components of the market basket that are identified as "labor-related" have been:

Wages & salaries	50.244%
Employee Benefits	11.146
Non-Medical Professional Fees	2.124
Postal Services	0.272
<u>"All Other" Labor-Related</u>	<u>7.277</u>
Total	71.066%

The "all other" category includes items such as purchased business and computer and data processing services. Some of the source data are taken from filed cost reports, and some are taken from surveys conducted by the Bureau of the Census. In theory, the wage-related portion should represent the total proportion of expenses that can be expected to vary as regional wage rates vary.

Direct wages and benefits as reported on the hospital wage surveys average only 60% of total non-capital expenses. The ratio is slightly lower in urban hospitals than it is in rural hospitals, as can be seen from the chart below. The percentage of the standardized operating payment amount that is identified by HCFA as labor-related, however, is the same for all hospitals.

Figure 12:



Source: Author's calculations from hospital cost report data and annual wage surveys

There may be a perception among hospital providers in general that the labor-related portion is too high. This may be due in part to the inclusion of the last two market basket components, postal services and “all other” labor related, which are not normally identified as wage-related costs in hospital accounting records. An argument could be made that prices of purchased services do not vary geographically, at least not to the same extent that local wages vary, and that this component overstates the total appropriate labor-related portion. Overstatement would systematically disadvantage hospitals in areas with hourly wages below the national average. If a hospital is located in an area where the wage index is less than 1.00, the higher the labor-related portion is, the more the hospital’s payment is reduced. With the exception of a few states in New England, all rural wage index values are less than 1.00; rural providers should, therefore, be especially concerned that the wage-related portion is defined accurately.

APPENDIX II

Occupational Mix Adjustment

There is a conceptual difference between adjusting PPS payments for regional variation in the cost of labor (reflecting both occupation mix and price) and the price of labor (reflecting price influences only). Unlike prevailing wage levels, occupation mix reflects, at least in some part, a choice made by management. The choice reflects management decisions in the context of the particular mix of patients and services being provided, local labor supply considerations and financial and competitive pressures.

Some analysts have argued that PPS price adjustments should be allowed only for market factors that are beyond management control, and that the wage index should only reflect market differences in the price of labor (Pope 1989; Williams, Pettengill and Lisk 1990; Williams 1991). They have suggested eliminating the effects of occupational differences from the wage index by computing the average hourly wage for each hospital based on a standard or average mix of job categories, rather than on the actual mix experienced by that hospital. The effect of such a change would be a reduction in the total variation in hourly wages as well as a reduction in the urban/rural differential. Pope's 1989 study estimated that PPS payments in rural areas overall might be increased by 2% as a result, but since the urban/rural differential has declined over time, the effect would probably be smaller if estimated with current data.

The economist's attraction to a pure price index in this setting is that it provides a better incentive for the individual hospital to move toward more efficient production by rewarding hospitals with less expensive mixes. However, controlling for occupation mix would also eliminate the sensitivity of the wage index to any regional trends in occupation mix over time. In a labor cost index, if certain markets begin to upgrade their average skill mix relative to other markets, their index value will reflect this. In a pure price index there would be no change.

The PPS wage index cannot be adjusted to control for occupation mix differences unless the cost report wage surveys are revised to collect hourly pay by type of employee. In spite of repeated recommendations to do so from the Prospective Payment Assessment Commission (ProPAC 1991–1994), HCFA has taken a position that the additional data collection costs cannot be justified, and that there is little empirical basis on which to establish an optimum occupational mix to which all hospitals would be standardized (see, for example, 56 FR 25192).