

**THE EFFECT OF CHANGE IN  
PPS PAYMENT STATUS ON  
RURAL HOSPITAL PERFORMANCE**

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## Table of Contents

ABSTRACT .....	ii
INTRODUCTION .....	1
PPS and Rural Hospitals .....	4
Sole Community Hospital .....	6
Rural Referral Centers .....	8
Medicare Dependent Hospital .....	9
Other Initiatives .....	10
Evidence Regarding the Financial Performance of Rural Hospitals Under PPS .....	11
DATA AND METHODS .....	13
Measuring Rural Hospital Performance .....	13
Operating Margin .....	14
Current Ratio .....	15
Current Asset Turnover Ratio .....	15
Patient Revenue Per Discharge and Per Patient Day .....	16
Average Length-of-Stay .....	17
Data .....	18
Statistical Methods .....	21
RESULTS .....	26
Descriptive Results .....	26
Multivariate Results for Hospitals Selecting Special Payment Status .....	29
Independent Variables .....	32
Average Revenue Per Discharge .....	35
Average Revenue Per Patient Day .....	36
Average Length-of-Stay .....	38
Operating Margin .....	38
DISCUSSION .....	41
REFERENCES .....	44

## ABSTRACT

This study uses data from 1985-1991 to examine the financial impact of rural hospital decisions to change their PPS payment status to become a Rural Referral Center (RRC), a Sole Community Hospital (SCH), or a Medicare Dependent Hospital (MDH). Selection of a special payment option was not found to affect overall hospital operating margins, current ratios, current asset turnover ratios, or revenue per discharge for these hospitals. In the case of hospitals choosing to be reimbursed as an MDH during the first year of the program, lengths of stay increased while revenue per patient day declined. These results suggest that some rural hospitals may respond to increased Medicare reimbursement under special payment options by changing the services they offer or their charges for other patients.

## INTRODUCTION

The restructuring of Medicare played a prominent role in the 1995 Congressional budget debate and once again raised the question of how rural hospitals should be paid under Medicare's Prospective Payment System (PPS). The impact, potential and real, of that system on the financial health of rural hospitals has been a matter of concern since its inception. In anticipation that rural hospitals might face financial difficulties under the PPS, special payment options were designed for "Rural Referral Centers" (RRCs) and "Sole Community Hospitals" (SCHs). When early studies of the impact of PPS reported that the finances of rural hospitals were affected to a greater degree than urban hospitals (Smith and Piland 1990), HCFA payment policies were modified to allow "Medicare Dependent Hospitals" (MDHs) to receive payment as SCHs beginning in 1991. As Table 1 indicates, 9.6 percent of rural hospitals were classified as RRCs, 15.5 percent as SCHs, and 21.1 percent as MDHs for payment purposes by fiscal year 1991.

Rural hospitals that selected special payment status under PPS presumably did so because they expected their Medicare revenues to increase. This study covers the period from 1985-1991, the last two years of PPS phase-in and the first five years that it was fully operational. It seeks to understand the relationship between the selection of special payment status, with the increased Medicare revenues it implies, and the overall financial performance of rural hospitals. The results should provide insight into the behavioral responses of rural hospitals that moved into special payment

**Table 1**  
**Number of Rural Hospitals Reimbursed Under Special Payment Arrangements, by Year Number (%)**

	1985 (2,713)	1986 (2,690)	1987 (2,662)	1988 (2,611)	1989 (2,561)	1990 (2,523)	1991 (2,478)
SCHs	251 (9.3%)	252 (9.4%) 11 converters	329 (12.4%) 99 converters	318 (12.2%) 37 converters	317 (12.4%) 2 converters	325 (12.4%) 29 converters	383 (15.5%) 108 converters
RRCs	159 (5.4%)	160 (6.0%) 3 converters	207 (7.8%) 50 converters	220 (8.4%) 36 converters	220 (8.6%) 1 converter	226 (9.0%) 29 converters	239 (9.6%) 28 converters
MDHs	NA	NA	NA	NA	NA	NA	523 (21.1%)
Other Rural	2,319 (85.5%)	2,295 (85.3%) 12 converters	2,143 (80.5%) 19 converters	2,094 (80.2%) 64 converters	2,045 (79.9%) 2 converters	1,996 (79.1%) 43 converters	1,360 (54.9%) 57 converters

status during the study period. Are the increased Medicare revenues received by the movers reflected in improved overall financial status, including profit margins? Or, do the increased revenues result in little overall impact on profit margins and other financial performance measures, as would occur if these revenues were used to develop new (not necessarily profitable) services demanded by medical staff members or the community at large? It is important to emphasize that the analysis in this study focuses on changes in status and their effects on financial performance. It does not address whether hospitals reimbursed under special payment options, as a group, fare better or worse than other rural hospitals.

The first section of the article reviews the design of PPS and discusses theories about its possible impact on rural hospitals. It also describes the nature of the special payment categories, and how payment procedures under these categories have evolved over time. The second section reviews selected empirical studies of the financial performance of rural hospitals under PPS, distinguishing between these efforts and the research approach taken in this study. The third section describes the measures of financial performance adopted for the empirical analysis and presents trends in these measures over time. This is followed by a discussion of the statistical methodology, the independent variables, and the multivariate results. A concluding section discusses alternative interpretations of the findings, as well as the limitations of the analysis.

## **PPS and Rural Hospitals**

The implementation of Medicare's Prospective Payment System began on October 1, 1983 (Burke 1993). Under PPS, Medicare patients are classified on discharge into approximately 480 (varies over time) Diagnosis Related Groups (DRGs) created based on major diagnosis, complications, surgery, resource use, length-of-stay, and other factors. Hospitals are paid a fixed, national standardized amount per Medicare patient with a given DRG, with some adjustment for the hospital's location, local wage rates, and other hospital specific factors. In the first four years of PPS (FY 1983-1986), a hospital's payment was a blend of hospital-specific costs of care and a standardized payment for all hospitals including the above adjustments.

As Glandon and Morrissey (1986) point out, "PPS fundamentally changed the financial incentives facing hospitals, but left physician (and patient) incentives unchanged" (p. 166). Under PPS, hospitals could profit financially from reductions in lengths-of-stay for Medicare patients, changes in case mix of cases treated, or from other measures that reduced resource use in the hospital. However, physician cooperation was necessary to shorten hospital stays or reduce in-hospital resource use. Therefore, Glandon and Morrissey (1986) expected that hospitals would differ in their capacity to adapt to PPS, and consequently that the form of that adaptation would differ across hospitals. In particular, they speculated that the relative success of hospitals under PPS would depend to a great extent on local market conditions, because these conditions would influence the ability of hospitals to alter physician practice behavior.

This observation seems particularly relevant for rural hospitals. In rural areas, the physician's practice is more likely to be centered on a single hospital. Under these circumstances, the financial success of the hospital should be of great concern to the rural physician, and the physician should be relatively receptive to making the changes in practice style that are required to support the hospital financially; that is, to work cooperatively with the hospital to shorten lengths-of-stay for Medicare patients under PPS. However, the reverse of this argument is that rural hospitals with relatively small medical staffs are heavily dependent on a few physicians for admissions and, fearful of losing those physicians, may exert only limited pressure on medical staff members to change their practice styles. Simply sharing information with rural physicians may not be sufficient to achieve physician behavior modifications (Cleverly and Harvey 1992).

Even if rural physicians agreed in principle to work with hospital administrators to reduce patient lengths-of-stay, their ability to do so in practice could be limited if there were not adequate programs and services available to meet the post-discharge needs of these patients. These programs and services may be difficult to develop or sustain in rural areas. As a consequence, "Rural hospitals have difficulty in shifting their service delivery focus (e.g from inpatient to outpatient services) due to community expectations and a limited resource base" (Smith and Piland 1990, p. 142).

In fact, at the time PPS was implemented, there was considerable concern that rural hospitals might not be able to respond to the program's financial incentives by



shortening lengths-of-stay or otherwise reducing the costs of an inpatient admission. Lower basic payment rates for rural, as compared to urban, hospitals heightened concerns over the possible financial impact of PPS on rural facilities. When PPS was enacted, the calculation of separate standardized payment amounts based on historical costs resulted in a 20 percent lower standardized rate for rural than for urban facilities. Actual payments per case were over 40 percent lower due to differences in wages and case mix (Kuchler 1990). While HCFA argued that these differences accurately reflected variation in the real costs of providing care, rural hospitals argued that the methodologies used to construct these payment differentials were flawed, (e.g., wage index adjustments did not reflect that rural hospitals competed in urban areas for nurses and other personnel) and that the resulting reimbursement rates for rural hospitals were inadequate. If these arguments were true, rural hospitals would experience financial problems under PPS both because their ability to reduce costs was limited and because their Medicare payment rates were inappropriately low. In response to legislative concerns, two special payment categories were created under PPS in an attempt to mitigate its potentially negative financial impact on some rural hospitals.

**Sole Community Hospital.** The first of these categories--the Sole Community Hospital (SCH)--actually was in existence prior to PPS. In 1983, 259 existing SCHs were moved into the PPS classification and criteria were developed to certify new SCHs. The purpose of SCH payment status was presumably to reduce the risk exposure for those rural hospitals where alternative sources of inpatient care were not

readily available to community residents. To qualify as a SCH, a facility was required to be located: (1) more than 50 miles from other hospitals; or (2) between 25 and 50 miles from another hospital with no more than 25 percent of residents of the hospital's service area being admitted for care at other hospitals or other hospitals being inaccessible for more than one month per year; or (3) 15-25 miles from another hospital and other hospitals being inaccessible for more than one month each year (Freiman and Cromwell 1987). Federal legislation in 1989 (OBRA 1989) relaxed these eligibility requirements somewhat, reducing the 50 mile limit to 35 miles.

According to the original payment rules, once a hospital was qualified as a SCH, it could be reimbursed indefinitely at 75 percent of a hospital-specific value (constrained by TEFRA 1982 payment methodologies) and 25 percent of the federal regional rate. During reporting periods 1983-1989, the SCHs base payment could be increased if there was a significant increase in operating costs due to the addition of new inpatient facilities or services. Also, SCHs could receive augmented payments if they experienced decreases in discharges exceeding five percent of discharges in the prior fiscal year. OBRA 1989 changed the payment options for SCHs. After its passage, they were paid the higher of: (1) the original formula based on 1982 costs trended forward; (2) the same formula updated to 1987 costs trended forward; or (3) the federal PPS rate for rural hospitals (Goody 1993). This new payment formula did not take effect until April, 1990 (Kuchler 1990), and the proposed 1995 budget bill would leave it substantially unchanged (Senate Finance Committee 1995). Interestingly, a large proportion of SCH hospitals in any given year appear to be paid

in the same way that rural hospitals not in special payment categories are reimbursed (option 3 above). For instance, Komisar (1991) reports that in 1991 forty percent of SCHs were paid using regular payment procedures under PPS.

From the beginning of PPS, all hospitals had their capital expenses reimbursed at 100 percent of costs. Starting in 1988, however, non-SCH hospitals had only 85 percent of their capital costs reimbursed. (Beginning in 1991, capital costs for hospitals other than SCHs were rolled into PPS rates over a ten year phase-in period.)

On a case-by-case basis, after the 1988 change, rural hospitals could evaluate whether it was more profitable to stay with the national DRG rate and receive less for capital expenses or to receive SCH payments (options 1 or 2) and the actual cost for capital expenses. For hospitals with lower historical costs than the national DRG rate, but recent major expenditures for remodeling or construction, selection of SCH payment status could become attractive under the revised capital rules. In 1985, there were 251 hospitals with SCH status. Over the period of 1985-1991, there was a net gain of 132 rural hospitals selecting SCH status, with a net gain of 65 in the 1988-1991 period, after the change in the capital cost reimbursement regulations under PPS (Table 1).

**Rural Referral Centers.** A second special payment category for rural hospitals was established under PPS for a quite different purpose. Some large rural hospitals that attracted patients from a broad area and offered a relatively complex mix of services were eligible to apply for designation as Rural Referral Centers. Criteria initially proposed for a hospital to be classified as a RRC were relatively vague. In

1984, however, HCFA proposed that potential RRCs must meet two required conditions, and one of three others. The applicant was required to have a Medicare case mix index of at least 1.03 and to have at least 6,000 discharges in the most recent reporting period. It was also required to have: (1) a medical staff composed of more than 50 percent specialists; or (2) more than 60 percent of its discharged patients reside more than 25 miles from the facility; or (3) at least 40 percent of its patients be referred by physicians not on the hospital's staff (Hendricks and Cromwell 1989). Since 1984, these proposed criteria have been altered several times, with the alterations intended to make it easier for rural hospitals to qualify as RRCs (Komisar 1991).

Payments for RRCs are based on the standardized amount for hospitals in urban areas of one million or fewer residents modified by the rural area wage index. Presumably, this is appropriate because these hospitals are more similar to urban facilities than to other rural hospitals. As a consequence, RRCs typically have received a higher level of payment than other rural hospitals, but less than urban hospitals. In 1995, they began to receive a payment equal to the standardized amount for urban hospitals (Senate Finance Committee 1995). In 1985, 159 hospitals received payment as RRCs. From 1985-1991, there was a net gain of 80 hospitals in this payment category.

**Medicare Dependent Hospital.** Continuing concern about the impact of PPS on rural hospitals lead to the establishment of another special payment category by OBRA 1989--the Medicare Dependent Hospital (MDH). Beginning in April 1990, and

extending for a period of three years, a hospital could be classified as an MDH if it: (1) had 100 or fewer beds; (2) was not already classified as a SCH; and (3) had at least 60 percent of its inpatient days attributable to Medicare beneficiaries in 1987-1988 (Komisar 1991). Once classified as an MDH, the hospital would be paid according to the reimbursement formula applied to SCHs. The MDH provision of PPS expired in July 1994, but the 1995 budget bill contained language that would reinstate it (Senate Finance Committee 1995). In 1991, the first year it was available, 523 rural hospitals chose classification as MDH hospitals for payment purposes. Payments to about 55 percent of these hospitals were calculated at the regular PPS amount, so that only 45 percent received an increase in payment due to their new MDH status (Komisar 1991).

**Other Initiatives.** In addition to creating these special payment categories, Congress and HCFA took several other steps to respond to the reimbursement concerns of rural hospitals. Some of these involved modifications in PPS payment provisions over time. For instance, Komisar (1991) observes that, "...since 1988 the Congress has generally set separate update factors for urban and rural standardized amounts, thereby substantially reducing the urban/rural differential in these amounts" (p. 13). Also, OBRA 1989 increased the payments that RRCs and SCHs received under the Disproportionate Share Adjustment process that compensates hospitals for the costs associated with treating lower income patients.

In 1988, HCFA instituted new rules that allowed rural hospitals located in counties adjacent to MSAs to apply for an adjustment in the wage-index value used to compute their PPS payments. This was in response to arguments made by some

rural hospitals that they competed with urban hospitals for employees and, therefore, that a wage index adjustment based on wages in rural areas was inappropriate (Wellever 1994). Ultimately, only 31 rural hospitals (termed "Lugar" hospitals) were reclassified as urban facilities for the purpose of calculating wage-index values.

### **Evidence Regarding the Financial Performance of Rural Hospitals Under PPS**

Because of the concern about how rural hospitals would fare under PPS, there were a number of early efforts to measure the impact of PPS on their financial performance. In summarizing the published literature on rural hospital performance from 1984-1986, Smith and Piland (1990) conclude that admissions for Medicare and non-Medicare patients declined, length-of-stay for Medicare patients declined, and rural hospitals were more likely than urban facilities to have low profit margins. The profit margins of rural hospitals under PPS appeared to improve substantially in the late 1980s. In 1989, Komisar (1991) reports that average profit margins for rural facilities exceeded those of urban hospitals (4.7 percent versus 3.6 percent). Among both rural and urban hospitals, Komisar (1991) found that larger hospitals had better profit margins; Davis, et al. (1990) reported the same relationship in a study of Kansas hospitals covering the period 1983-1987.

Rizzo (1991) conducted a multivariate statistical analysis of rural versus urban hospital financial performance for the years 1984-1987 using three measures of financial performance: the ratio of total revenues to total costs, the ratio of total patient care revenues to total costs, and the ratio of revenue deductions to total costs.

The primary focus of his study was estimation of the relationship between Medicare patients as a percent of total patients and these financial measures. Rizzo (1991) found that greater Medicare involvement in rural hospitals, measured by this percentage, was associated with a lower patient care revenue to cost ratio, with the opposite relationship pertaining in urban hospitals. But, a high level of Medicare involvement was not significantly related to the ratio of total revenue to total cost. Thus the degree of Medicare involvement did not appear to have a detrimental effect on the overall profit margins of rural hospitals. Rizzo (1991) also reported that larger hospitals and hospitals with higher occupancy rates in both urban and rural areas had better financial performance.

Among his independent variables, Rizzo included an indicator variable that identified whether a rural hospital was the only hospital in its county. While this variable is not a direct measure of whether a hospital was reimbursed by Medicare as a SCH, it is interesting that the indicator was not significantly related to any of the measures of hospital financial performance.

The Komisar (1991) study is the only effort to date that compares hospital financial performance disaggregated by special payment status. The primary goal of Komisar's study was to simulate the impact of different Medicare reimbursement policies, or anticipated policies, at three points in time (1984, 1991, and 1995) on the distribution of PPS payments and on rural hospital PPS, and overall, profit margins. As part of her analysis, she calculated actual profit margins for rural hospitals in 1989. Actual overall margins were highest in RRCs (5.8 percent), followed by SCHs (4.4

percent) and other rural hospitals (4.3 percent). Profit margins were lowest in 1989 for hospitals that would subsequently qualify as MDHs (1.6 percent).

## **DATA AND METHODS**

### **Measuring Rural Hospital Performance**

The Hospital Financial Management Association has developed 29 different ratios for assessing the financial performance of hospitals. These ratios overlap considerably in their construction and can be grouped into five broad categories; profitability, liquidity, capital structure, activity, and other. Typically, in studies employing multivariate analysis, measures selected from three to four of these categories are used as dependent variables in a regression framework (e.g., Brecher and Nesbitt 1985; McCue and Furst 1986; Levitz and Brooke 1985; Valvona and Sloan 1988; Friedman and Shortell 1988; and Mennemeyer and Olinger 1989). As described above, Rizzo (1991) investigated the determinants of three financial ratios for rural hospitals. Davis, et al. (1990) used data on Kansas hospitals from 1983-1987 to track changes in seven financial ratios: operating margin, non-operating revenue, return on equity, current ratio, long-term debt to equity, total asset turnover, and days in patient accounts receivable. Cleverly and Harvey (1992) used 1988 data on rural hospitals to identify low and high performing groups of hospitals based on rate-of-return on equity and also investigated the relationship between rate-of-return and a set of variables reflecting hospital management strategies.



In this study, we examine three financial ratios: a measure of profitability (operating margin), a measure of liquidity (current ratio), and a measure of activity (the current asset turnover ratio). Three other indicators also are examined that relate to the possible behavioral responses of rural hospitals that select special payment status: inpatient revenue per patient day, inpatient revenue per discharge, and average length-of-stay.

**Operating Margin.** The operating margin is the proportion of operating revenues that the rural hospital retains after paying its operating expenses. It is useful in assessing a hospital's overall financial "bottom line" and reflects services provided to both Medicare and non-Medicare patients, but does not include non-operating sources of hospital income. The operating margin should reflect differences in revenues due to classification in a special payment category as well as differences in costs. Cost differences could occur, all else equal, if being in a special payment category "shelters" a rural hospital from the full cost containment incentives of PPS. Some theories of hospital behavior suggest that the preferences of physicians or employees receive the greatest weight in the decision making of hospital administrators. In this case, hospital managers could respond to the augmented payments under special payment categories by increasing services or not aggressively negotiating with physicians to reduce lengths-of-stay for Medicare patients. If costs rose to meet revenues, in this case, operating margins would not differ between hospitals moving into special payment categories and other rural hospitals. McCue and Furst (1986), Friedman and Shortell

(1988), and Mennemeyer and Olinger (1989) all used some form of operating margin as a measure of hospital profitability.

**Current Ratio.** The current ratio (defined as the ratio of current assets to current liabilities) is a widely used measure of hospital liquidity (Levitz and Brooke 1985; McCue and Furst 1986; Mennemeyer and Olinger 1989). High values for this ratio imply that the hospital has sufficient cash plus relatively liquid investments to meet its short-term obligations. It is not at risk of insolvency in the near term.

Medicare payment rules could have either positive or negative effects on the hospital's current ratio. As Medicare revenues increase for hospitals selecting special payment categories, some of these additional revenues may be held as cash or other assets to improve the overall liquidity position of the hospital and reduce its risk of financial insolvency. This would be reflected in higher current ratios for these hospitals. Alternatively, as suggested above, these revenues may be expended to meet the demands of physicians or employees, or to address community expectations regarding services that should be provided by the hospital. In this case, rural hospitals selecting special payment categories might not exhibit higher values for their current ratios.

**Current Asset Turnover Ratio.** The current asset turnover ratio is defined as total operating revenue divided by current assets, with higher values generally regarded as favorable. However, very high values could reflect inadequate liquid assets and possible short-term operating problems.

Participation in PPS special payment categories could increase this ratio by improving the revenue stream for hospitals. But, if rural hospital managers seek to maintain a target level for this ratio for the reasons noted above, then there may be no difference in its values for hospitals selecting special payment status versus other rural hospitals.

**Patient Revenue Per Discharge and Per Patient Day.** Inpatient revenue per discharge is defined as the total of all revenues (Medicare and non-Medicare) from the provision of inpatient services in a given year divided by the number of discharges from the hospital during that year. Patient revenue per day is calculated by dividing total revenue by patient days.

Participation in a special payment program clearly is expected to increase revenues per discharge for Medicare patients. If numbers of Medicare discharges are not affected, it seems likely to increase overall rural hospital revenue per discharge. However, this depends in part on the hospital's pricing policy. Rural hospitals could use these increased revenues (relative to what they would receive under standard PPS payment procedures) to limit increases in rates for private patients. Then, participation in a special payment category would not be associated with higher overall inpatient revenues per discharge. Similar arguments can be made with respect to revenues per patient day, with the complicating factor that this measure also depends on the impact of special payment categories on length of stay. A second possibility is that movement into special payment status has a minimal affect on actual Medicare

revenues received. Again, the result would be no detectable change in overall revenues per discharge or per day.

**Average Length-of-Stay.** Average length-of-stay is calculated by dividing total inpatient days by the number of discharges in a given year. If rural hospitals pursue profit or surplus maximizing strategies, then the higher payment levels presumably associated with special payment categories would have little effect on the incentives of hospital managers to reduce lengths-of-stay. Regardless of the payment level, it would always make sense for hospitals to control lengths-of-stay to the maximum degree possible under PPS. However, if rural hospital managers are concerned with maximizing the incomes of physician staff members as well, and if longer lengths-of-stay create opportunities for increased physician incomes, then the prediction is not so clear. The same is true if higher payments allow hospitals to meet the demands of rural communities to provide employment opportunities for rural residents. Higher payments under special payment categories may allow hospitals to "break even" with longer lengths-of-stay, a strategy which could increase income potential for medical staff, justify overall higher staffing levels for the hospital, and reduce the risk of premature discharge of patients. The additional revenues generated through participation in special payment categories also could reduce pressures on rural hospitals to develop the outpatient treatment alternatives needed to facilitate earlier discharges of Medicare patients.

## Data

The data used in this study covers a seven year period (1985-1991), with short-term, general, non-federal facilities adopted as the unit of analysis. Table 2 lists the variables and their sources. A rural hospital was defined as a facility located outside of a Metropolitan Statistical Area. The data contains information from the following sources: the Prospective Payment System Minimum Data Set (PPS II-VIII), the American Hospital Association (AHA) annual survey, the HCFA Provider Specific Files, the Medicare Case Mix Index Files, and the Area Resource File (ARF). Short-term, general, non-federal hospitals were identified using the definitions provided in the PPS Minimum Data Set. The cost-reporting periods captured in the PPS files do not coincide with calendar years or with the government's fiscal year because they are based on the accounting year used by each hospital (Fisher 1992). For instance, 1985 PPS data (PPS II) cover cost reports beginning in October, 1984 and continuing until October, 1985. PPS data were merged with the closest year covered in the AHA survey; for example, PPS II was merged with the AHA survey containing 1985 data. Data from the Provider Specific Files and the Medicare Case Mix Index Files were merged with this data set using PPS identification numbers. State and county codes were used to append market characteristics data from the ARF.

The resulting data set was modified for analysis by eliminating all hospitals from each year that did not report a full twelve months of data for that year. This resulted in a loss of 1,052 cases from a total of 18,338. Hospitals also were eliminated that did not possess a PPS identification number (68 cases). If there was a negative value

**Table 2**  
**Definitions of Variables**

	Construction	Data Source
<b>Dependent Variables</b>		
Operating Margin	(Net Patient Revenues - Total Operating Expenses)/Net Patient Revenues	PPS
Current Ratio	Total Current Assets/Total Current Liabilities	PPS
Current Asset Turnover	Net Patient Revenues/Total Current Assets	PPS
Revenues Per Facility Patient Day	Net Patient Revenues/Total Facility Inpatient Days	PPS
Revenues Per Facility Discharge	Net Patient Revenues/Total Facility Discharges	PPS
Average Length-of-Stay	Total Facility Inpatient Days/Total Facility Discharges	PPS
<b>Independent Variables</b>		
Swing Bed Program	Coded 1 if participates	PPS
Lugar Hospital Year	Coded 1 if participates Coded 1 for 1986-1991, 0 for 1985	HCFA PPS
Percent of Population Over 65	1985, 1990; other years estimated based on constant rate of change	ARF
Population Density	1985-1988, 1990; 1989 estimated at midpoint of 1988 and 1990; 1991 projected using 1985-1990 trend	ARF
Per Capita Income	1985-1989; 1990 and 1995 projected based on 1985-1989 trend	ARF
Unemployment Rate	1985-1990; use state level unemployment rate change from 1990-1991 to estimate county level 1991 rate	ARF
Poverty Rate	Percentage of persons below poverty level in 1979 used for all years	ARF
Area Wage Index	Calculated yearly by HCFA	HCFA
Distance to Nearest Hospital	Estimated road distance to nearest hospital, constructed from latitude/longitude coordinates	Private Vendor

**Table 2 (continued)**

	<b>Construction</b>	<b>Data Source</b>
<b>Independent Variables (continued)</b>		
Distance to Nearest Urban Hospital	Estimated road distance to nearest hospital located in a metropolitan county, constructed from latitude/longitude coordinates	Private Vendor
Beds	Total beds available in the facility	PPS
Case Mix Index	Case mix index as calculated by HCFA	HCFA Case Mix Index Files
Profit Status	Coded 1 if for-profit, 0 otherwise	PPS
Public Hospital	Coded 1 if publicly-owned hospital; 0 otherwise	PPS
Teaching Affiliation	Coded 1 if member of council of teaching hospitals of the Association of American Medical Colleges, 0 otherwise	AHA
System Affiliation	Coded 1 if in a multihospital system, 0 otherwise	AHA
Service Index	Hierarchical scale ranking hospitals 1-17, depending on the level of their most complex service	AHA; Adams, et al, 1991

Note: PPS = HCFA Hospital Cost Report Information; ARF = Area Resource File; AHA = American Hospital Association

for a financial ratio where only positive values were permitted, or a value was grossly out of range or missing, then the hospital was dropped from the analysis of that particular dependent variable.

## **Statistical Methods**

The analysis uses data from rural hospitals over a seven year period. If the analysis relied solely on comparisons of hospitals in a single year, there would be a danger that the estimates of the impact of a special payment category would be biased because of the effect of omitted local- or hospital-specific factors that were confounded with program participation. Having payment category data on hospitals over a seven year period, including data on hospitals prior to their decision to select special payment status, makes it possible to control for the influence of stable, time-invariant site or hospital characteristics that are potential confounding factors (Campbell and Stanley 1963). If the analysis relied solely on time series methods, the estimated impact of program participation might be biased by the attribution of the effect of other temporal changes (such as the gradual reduction in the urban/rural basic PPS payment differential) to being in a special payment program. Using both time series and cross-sectional data in the analysis reduces the chance of making incorrect inferences about the effect of selecting a Medicare special payment option on the financial performance of rural hospitals. The time series aspect allows each hospital to serve as its own control, eliminating the effects of stable factors confounded with



program participation. The cross-sectional and time series variation in status allows estimation of time trends.

Data on all of the measures of performance, with the exception of operating margin, exhibited substantial skewness. In part, this skewness reflects skewness in the size of rural hospitals. To reduce the sensitivity of the results to skewness, a natural logarithmic transformation was applied to these measures, with the exception of operating margin. The financial ratios also displayed considerable kurtosis, in part due to extreme values. Where there was an obvious data entry error resulting in an extreme value, it was fixed; where the cause of the error leading to an extreme value was not obvious, the observation was deleted from the analysis of that particular financial measure.

The focus of the analysis is on the overall performance of the classes of hospitals that became SCHs, RRCs, or MDHs during the study period, not on the performance of a typical hospital moving into a given payment category. The class as a whole may have a positive operating margin, while that of the typical (or median) member may be negative or less positive (as is evident in comparing Table 3 and Table 4 values, as discussed below). To obtain the average outcome of the class as a whole, sampling weights are used that are equal to the denominator of the ratio, in the case of the financial ratios. The variance-covariance matrix and other inference statistics are corrected using the Huber (1967)/White (1980) consistent estimator, which also corrects the inference statistics for other forms of heteroscedasticity.

Table 3

## Comparison of Group Averages for Financial and Operational Measures of Rural Hospital Performance

		1985	1986	1987	1988	1989	1990	1991
Profitability:	Operating Margin							
	SCHs	.0069	.0065	-.0289	-.0066	-.0068	-.0254	-.0085
	RRCs	.0841	.0315	.0153	.0295	.0117	.0168	.0254
	MDHs	NA	NA	NA	NA	NA	NA	-.0337
	Other Rural	-.0071	-.0271	-.0259	-.0250	-.0145	-.0112	-.0012
Liquidity:	Current Ratio							
	SCHs	2.369	2.325	2.377	2.220	2.260	2.242	2.287
	RRCs	2.698	2.733	2.636	2.516	2.439	2.411	2.458
	MDHs	NA	NA	NA	NA	NA	NA	1.899
	Other Rural	2.368	2.353	2.241	2.224	2.165	2.108	2.242
Activity:	Current Asset Turnover Ratio							
	SCHs	2.728	2.756	2.759	2.832	2.756	2.903	2.848
	RRCs	2.903	2.739	2.675	2.902	2.864	2.941	2.978
	MDHs	NA	NA	NA	NA	NA	NA	3.047
	Other Rural	2.773	2.737	2.845	2.843	2.867	2.896	2.923
Operations:	Inpatient Revenue Per Patient Day							
	SCHs	431.1	432.1	462.2	511.4	560.8	620.6	687.7
	RRCs	480.6	529.0	568.8	640.8	732.1	842.4	934.3
	MDHs	NA	NA	NA	NA	NA	NA	376.0
	Other Rural	347.7	375.1	389.6	432.1	474.6	517.8	595.9
	Inpatient Revenue Per Discharge							
	SCHs	2974	3341	3684	3949	4532	5082	5772
	RRCs	3315	3465	3711	4134	4608	5176	5880
	MDHs	NA	NA	NA	NA	NA	NA	5025
	Other Rural	2577	2891	3202	3601	3995	4527	5091
	Average Length of Stay							
	SCHs	6.08	6.81	7.16	6.90	7.27	7.42	7.35
	RRCs	6.34	6.42	6.49	6.38	6.47	6.48	6.39
	MDHs	NA	NA	NA	NA	NA	NA	10.86
	Other Rural	6.96	7.23	7.67	7.87	8.05	8.14	7.88

NA: Program Not Available

Table 4

## Comparison of Median Financial and Operational Measures of Rural Hospital Performance

	1985	1986	1987	1988	1989	1990	1991
Profitability:							
Operating Margin							
SCHs	-.0278	-.0301	-.0550	-.0516	-.0465	-.0398	-.0251
RRCs	.0338	.0125	.0136	.0091	.0102	.0100	.0179
MDHs	NA	NA	NA	NA	NA	NA	-.0490
Other Rural	-.0240	-.0410	-.0415	-.0351	-.0324	-.0308	-.0116
Liquidity:							
Current Ratio							
SCHs	2.547	2.337	2.279	2.348	2.300	2.261	2.493
RRCs	2.567	2.543	2.604	2.651	2.528	2.427	2.379
MDHs	NA	NA	NA	NA	NA	NA	2.272
Other Rural	2.530	2.450	2.403	2.379	2.367	2.316	2.347
Activity:							
Current Asset Turnover Ratio							
SCHs	2.863	2.933	2.912	3.002	2.944	3.067	2.984
RRCs	3.028	3.160	3.110	3.176	3.081	3.171	3.193
MDHs	NA	NA	NA	NA	NA	NA	3.128
Other Rural	2.972	2.944	3.023	3.043	3.060	3.095	3.123
Operations:							
Inpatient Revenue Per Patient Day							
SCHs	451.6	473.5	509.9	559.2	570.3	635.6	715.6
RRCs	478.2	526.8	569.1	640.8	728.7	818.9	912.0
MDHs	NA	NA	NA	NA	NA	NA	537.3
Other Rural	377.1	412.33	441.8	491.1	528.6	581.23	693.47
Inpatient Revenue Per Discharge							
SCHs	2840	3237	3718	4063	4519	5201	5791
RRCs	3006	3355	3567	3856	4325	4951	5533
MDHs	NA	NA	NA	NA	NA	NA	4918
Other Rural	2442	2723	3013	3407	3407	4282	4972
Average Length of Stay							
SCHs	5.170	5.590	5.675	5.710	5.871	5.960	5.662
RRCs	5.985	6.104	6.101	6.081	6.100	6.221	6.062
MDHs	NA	NA	NA	NA	NA	NA	6.330
Other Rural	5.474	5.580	5.727	5.804	5.911	5.873	5.548

NA: Program Not Available

The time series aspect of the data introduces the possibility of autocorrelation across observations on an individual hospital that could result in inefficient estimates and biased inference statistics. To correct for this problem, a fixed effects model was used to estimate special payment status effects. Under the fixed-effects approach, the data are transformed by taking the deviation of each variable from the mean of that variable for that hospital (Maddala 1971). This removes any stable, unobserved, site-specific effects that could be correlated with the indicators for special payment category (with the group of hospitals not participating in a special payment category constituting the omitted category in the specification of this variable.)

A limitation of the fixed effects approach is that it is not possible to investigate relationships between hospital or market characteristics that do not vary over the time period of the analysis (e.g. region) and the dependent variables; such variables are "differenced away" under the fixed effects model specification. When there are minor changes over time in independent variables, permitting estimation of coefficients for these variables, the results have limited usefulness. For instance, small changes in the number of beds may occur within specific hospitals over time, making it possible to estimate the impact of number of beds on a dependent variable. But, because variation in number of beds is limited, it is problematic to generalize from the estimated effect to moderate or large changes in numbers of beds across hospitals.

In contrast to these limitations, the fixed effects approach has one large advantage over random effects models, which have been used at times by other researchers in analyzing hospital financial data (e.g. Hoerger 1991; Mennemeyer and

Olinger 1989). It does not assume that the error term is uncorrelated with the regressors. Random effects models make this assumption, which implies that there are no omitted variables that are correlated both with the other regressors and the error term. This obviously is a strong assumption. It seems very likely that unobserved factors could be correlated with the presence of hospitals in a particular payment program. If this were the case, the estimated coefficients for the program variables, using the random effects model, would be biased, while the fixed effects model would provide unbiased estimates of payment program impacts. Given the advantages and disadvantages that are associated with these approaches, the fixed effects model provides the safest point estimate of the effects on rural hospitals of switching to a special payment category under PPS.

## **RESULTS**

### **Descriptive Results**

Summary values for the six measures of hospital performance used in the study, covering the period from 1985 through 1991, are presented in Tables 3 and 4. Table 3 compares the group averages for four groups of rural hospitals: sole community hospitals, regional referral hospitals, Medicare dependent hospitals, and other rural hospitals. To obtain the group averages, each measure was weighted by its denominator, which is equivalent to using the ratios of the sums across a class of hospitals (that is, as if the current ratios were constructed by summing all current assets reported in a hospital grouping and dividing by all current liabilities). These

values are calculated using all hospitals in each category in a given year. Table 4 compares the median values for the performance measures. Because they rely on comparisons of medians, the results in this table down-weight the influence of extreme values or larger facilities. As a result, the values in Table 4 are typically smaller in absolute value and exhibit less year-to-year fluctuation than the group averages reported in Table 3.

With respect to the financial ratios, the average operating margins for RRCs exceeded those for other rural hospitals throughout the study period, as did their median values. RRCs were consistently profitable, while rural hospitals in other payment categories were not. Median operating margins appeared to improve gradually from 1987-1991 (Table 4). In 1991, the only year in which the MDH classification was operable, rural hospitals in this category experienced lower operating margins than other rural hospitals. The relatively large improvement from 1990-1991 of the operating margins of the "other" rural hospitals could be due, at least in part, to the movement of some rural hospitals with low operating margins out of the "other" and into the "MDH" category. Measures of liquidity and activity were relatively stable over time within the four groups of rural hospitals, although there appeared to be a secular decline in the current ratio for RRCs.

Values for the measures of hospital revenues and length of stay differ between Tables 3 and 4 for non-RRC hospitals. This is due to a "swing bed" effect in the data. Swing bed days and revenues are included in these numbers to provide a complete picture of the facilities. (In the subsequent multivariate analysis, a control variable is

introduced for the presence of swing beds.) The RRCs do not qualify for the swing bed program, while a large percentage of hospitals in the other categories do participate in this program. Consequently group averages for length-of-stay are relatively high, and revenue per day relatively low, as reported in Table 3. Table 4, which reports median values, reduces this "swing bed" effect; median hospitals are not likely to be hospitals with very long lengths-of-stay due to swing bed patients. The Table 4 data exhibit different patterns of growth in revenue and length-of-stay for the hospital groups. For SCHs, length-of-stay increased by 9.5 percent from 1985-1991, while revenue per patient day rose by 58.4 percent and revenue per discharge by 100.4 percent, unadjusted for inflation. In contrast, in the "other" rural hospital category, length-of-stay was relatively stable, while revenues per day rose by 83.9 percent and revenue per discharge by 103.6 percent. Similarly, lengths-of-stay were also stable in RRCs, with revenues per day increasing by 90.7 percent and revenue per discharge by 84.3 percent. Clearly, there is some suggestion that the operations of SCH hospitals evolved in a different pattern than other rural hospitals during the first seven years after PPS was implemented. Their average length-of-stay increased and, as could be expected, their revenues per day increased at a slower pace. It is also worth noting that there was no trend of decreasing length-of-stay in any of the groups of rural hospitals over time (Table 3), even though PPS presumably created financial incentives encouraging such reduction. It may be that secular trends in declining hospital admissions resulted in sicker patients requiring longer lengths-of-stay, and that this masked PPS-induced length-of-stay reductions in the aggregate data.

While the data in Tables 3 and 4 are useful in understanding trends in the performance of rural hospitals in different PPS payment categories over time, they do not directly apply to the subset of rural hospitals that is the focus of this study, which consists of hospitals that moved into special payment status from 1985-1991. As Table 1 indicates, a large proportion of these moves occurred in 1987 and 1991. Tables 5 and 6 contain data on hospitals that changed status, with each measure reported for the years prior to the change (1986 and 1990). (A move to MDH payment status was not possible in 1987, so there are no table entries for this year for MDH hospitals.) Clearly, these data suggest that MDH performance measures were substantially worse than comparable measures for other rural hospitals in 1990, the year before the MDH option became available. Hospitals that entered the MDH program in 1991 were less profitable than other rural hospitals in 1990, had lower current ratios, and less inpatient revenue per day and per discharge.

### **Multivariate Results for Hospitals Selecting Special Payment Status**

Tables 7-10 present coefficient estimates for the impact of selecting to participate in a special payment category on (log) revenue per discharge, (log) revenue per patient day, and (log) average length-of-stay and operating margin. In order to shorten the discussion, the empirical results pertaining to current ratio and asset turnover ratio are not presented. There were no consistent and significant impacts on these two financial ratios relating to movement into any special payment category.



Table 5

**Comparison of Group Averages for Financial and Operational Measures of  
Rural Hospital Performance for Hospitals Selecting Special Payment Status**

		1987	1991
Profitability:	Operating Margin		
	SCHs	-.0054	-.0036
	RRCs	.0317	NA
	MDHs	NA	-.0388
	Other Rural	-0.346	-.0080
Liquidity:	Current Ratio		
	SCHs	2.202	2.293
	RRCs	2.731	NA
	MDHs	NA	2.069
	Other Rural	2.311	2.105
Activity:	Current Asset Turnover Ratio		
	SCHs	2.817	2.935
	RRCs	2.713	NA
	MDHs	NA	2.879
	Other Rural	2.751	2.945
Operations:	Inpatient Revenue Per Patient Day		
	SCHs	393.7	594.1
	RRCs	476.6	NA
	MDHs	NA	387.3
	Other Rural	367.0	546.4
	Inpatient Revenue Per Discharge		
	SCHs	2986.4	4528.5
	RRCs	3073.3	NA
	MDHs	NA	4176.0
	Other Rural	2680.7	4279.2
	Average Length of Stay		
	SCHs	7.585	7.623
	RRCs	6.449	NA
	MDHs	NA	10.60
	Other Rural	7.283	7.814

NA: Program Not Available

NOTE: The year of the column heading is the first year that a hospital is reimbursed under a new payment status. The table entry is based on data from the prior year for all hospital categories, including "other rural" hospitals. Estimates for RRCs in 1991 are not presented because of the small number of hospitals converting to RRC status in that year (see Table 1).

The results of several different model specifications are presented in each table. The most parsimonious specification contains only the constant terms and indicator variables for program participation (with no special payment program participation as the omitted category), swing bed certification, and Lugar hospital status. This specification is modified with the sequential addition of groups of variables capturing time trends, market characteristics, and hospital characteristics (see Table 7). This approach makes explicit the sensitivity of the program impact estimates to model specification. Several hospital and market characteristics that are included in studies using random effects models did not enter into the fixed effects model because they were invariant over time for individual hospitals (e.g. region).

**Independent Variables.** Three issues relating to the inclusion, or exclusion, of specific independent variables in the estimated models merit discussion. A potentially important factor affecting the financial health of small rural hospitals, but not related directly to PPS payment policies, was the expansion of HCFA's "swing bed" program during the 1980s. Rural hospitals that qualified for the program used their vacant acute care beds to "...provide subacute long-term care to patients who are more difficult to place in community nursing homes owing to their intense needs for medical and highly skilled nursing care" (Shaughnessy, Schlenker, and Silverman 1988). The "swing bed" program was authorized by Congress in 1980 and applied to hospitals with fewer than 50 beds. OBRA 1987 made the program available to hospitals with

Table 7

**Estimates of the Effects of Movement into PPS Payment Classification on  
Log Patient Revenue per Discharge : Fixed Effects Model 1985-1991**

Independent Variables	Model Specification			
	1	2	3	4
PPS Payment Category				
SCH	.1429** (.102/.184)	-.0101 (-.031/.011)	-.0093 (-.030/.012)	-.0103 (-.031/.011)
RRC	.2568** (.223/.291)	.0020 (-.015/.019)	.0030 (-.014/.020)	.0020 (-.015/.019)
MDH	.3602** (.334/.387)	-.0069 (-.032/.018)	-.0035 (-.029/.022)	.0075 (-.017/.032)
Other Payment Adjustments				
Swing bed program	.3480**	.0249**	.0222**	.0239**
Lugar Hospital	.4149**	.0221	.0253	.0267
Year				
1986		.1028**	.1125**	.1074**
1987		.2047**	.2271**	.2185**
1988		.3118**	.3636**	.3502**
1989		.4257**	.4940**	.4772**
1990		.5460**	.6266**	.6117**
1991		.6794**	.7713**	.7537**
Area Characteristics				
Population over 65			-.0012	-.0005
Population per square mile			.0005	.0003
Per capita income			$1.54 \times 10^{-5}$ **	$-1.74 \times 10^{-5}$ **
Unemployment rate			.0015	.0015
Average wage index			.3519**	.3621**
Distance to nearest hospital			-.0006	-.0005
Distance to nearest urban hospital			-.0005**	-.0004**
Hospital Characteristics				
Beds				-.0121
Case mix index				.2508**
System affiliation				-.0122
Service index				-.0013
Constant term				
Observations	16,883	16,883	16,883	16,883
R-squared	.13	.66	.66	.67

Note: For the payment categories, the 95 percent confidence interval is in parentheses.

\*\* = significant at .01

\* = significant at .05

up to 100 beds. For eligibility purposes, the number of beds is determined by multiplying the number of licensed acute care beds in the hospital by the occupancy rate in the previous year. Prior to 1987, there were 2236 rural hospitals eligible for the program, with about 40 percent of eligible hospitals participating in 1986 (Shaughnessy, Schlenker, and Silverman 1988). The 1987 OBRA eligibility expansion increased the number of hospitals eligible for the swing bed program by 640. The importance of the swing bed program was that it provided rural hospitals with the ability to discharge a patient from acute care, where reimbursement was fixed on a per-stay basis by PPS, and receive ongoing payment for providing care to the patient in the "swing bed." A binary variable is included in the model specifications to control for the presence of swing beds in a rural hospital.

Analysts such as Rizzo (1991) have included Medicare patient days as a percent of total patient days as an explanatory variable in their analyses of the impact of PPS on hospital analysis. There are several reasons why inclusion of such a measure would be inappropriate in this study. First, and foremost, if special payment status were designed to benefit hospitals with a higher proportion of Medicare patients, then it would be difficult to separate the "program effect" from the "Medicare proportion effect" if both were included as independent variables. Second, the focus of the analysis is on the total effect of special payment status, not on the way in which those payments might effect performance through their effect on other variables. This argues for adoption of a reduced form model that does not include the "Medicare

proportion" variable. Third, if included, the "Medicare proportion" variable would be endogenous and therefore its coefficient would be biased.

Average hospital length-of-stay was not included as an explanatory variable in the analysis of the financial ratios, although it has played this role in other studies. If participation in a special payment program affects length-of-stay over time, then a part of the "program effect" could be attributed to the length-of-stay variable. As with the "Medicare proportion" variable, length-of-stay could be viewed as endogenous to the model. Again, this argues for a reduced form approach to model specification, and the explicit study of changes in length of stay as a function of payment category.

**Average Revenue Per Discharge.** In Table 7, the impact of program participation on patient revenues per discharge is assessed using a fixed effects approach. Only the hospitals that changed payment status during the study period have non-zero values for the RRC, SCH or MDH indicator variables. The estimated effects are therefore for hospitals that moved into a payment category and reflect whether or not those hospitals have larger or smaller revenues per discharge as a result of the move. The fixed effects approach does not generate estimates of the effect of payment status on hospitals that did not change status. Thus, for example, the results pertain to the effect of SCH on new SCH participants, but not to the effect of SCH on all such hospitals, old and new.

The results do not indicate that movement into a special payment category had a significant effect on patient revenue per discharge, once control variables for year are added to the model (Model 2). Case mix index and the average wage index are

related, in the positive direction, to revenue per discharge, while per capita income and distance to the nearest hospital are negatively related. Clearly, the year variables make the greatest contribution to explaining variation in revenue per discharge. The fixed effects model explains 67 percent of the variation in inpatient revenue per discharge, after removing hospital specific effects that do not vary over time.

**Average Revenue Per Patient Day.** Estimates of the impact of selecting a special payment category on inpatient revenue per patient day (Table 8) are subject to the same qualifications in interpretation as was the case for the estimates for average revenue per discharge. The results support the hypothesis that overall average hospital revenues per patient day increase for the groups of hospitals that moved into RRC status, but this effect becomes statistically insignificant in the fully-specified model. A somewhat different picture emerges for hospitals selecting MDH status. The MDH coefficient is significant and positive in column 1, but becomes negative and significant as additional independent variables are added. In the fully specified model, the results indicate that movement into payment status resulted in a decrease in revenue per patient day. As expected, adding swing bed capability reduces average revenue per patient day and revenues (unadjusted for inflation) increase over time. Area and hospital characteristics that are positively related to revenue per day in the fully specified model include: population over age 65, population density, average wage index, distance to the nearest hospital, case mix index, service complexity, and affiliation with a hospital system. The model explains 60 percent of the variation in inpatient revenue per patient day.

Table 8

**Estimates of the Effects of Movement into PPS Payment Classification on  
Log Patient Revenue per Day: Fixed Effects Model 1985-1991.**

Independent Variables	Model Specification			
	1	2	3	4
PPS Payment Category				
SCH	.1257** (.086/.165)	-.0056 (-.031/.020)	-.0032 (-.029/.022)	-.0076 (-.034/.019)
RRC	.2291** (.197/.261)	.0207** (.003/.038)	.0166* (-.001/.034)	.0093 (-.007/.026)
MDH	.2414** (.215/.267)	-.0779** (-.104/-.052)	-.0759** (-.102/-.050)	-.0638** (-.086/-.041)
Other Payment Adjustments				
Swing bed program	.2404**	-.0271**	-.0249**	-.0403**
Lugar Hospital	.3659**	.0390**	-.0281	.0068
Year				
1986		.0621**	.0631**	.0549**
1987		.1437**	.1450**	.1327**
1988		.2473**	.2498**	.2366**
1989		.3260**	.3283**	.3172**
1990		.4372**	.4396**	.4294**
1991		.5660**	.5674**	.5577**
Area Characteristics				
Population over 65			-.0199**	.0085*
Population per square mile			.0020** 5.00E-06	.0028** -6.09E-07
Per capita income			-4.9x10 <sup>-5</sup>	.0017
Unemployment rate			.0257	.1624*
Average wage index			.0000	.0011*
Distance to nearest hospital			-.0005*	.0003
Distance to nearest urban hospital				
Hospital Characteristics				
Beds				.6073**
Case mix index				.3357**
System affiliation				.0309**
Service index				.0033**
Constant term	---	---	---	---
Observations	16926	16926	16926	16926
R-squared	.09	.52	.52	.60

Note: For the payment categories, the 95 percent confidence interval is in parentheses.

\*\* = significant at .01

\* = significant at .05

Table 9

**Estimates of the Effects of Movement into PPS Payment Classification on  
Log Average Length of Stay: Fixed Effects Model 1985-1991**

Independent Variables	Model Specification			
	1	2	3	4
PPS Payment Category				
SCH	-.0002 (-.020/.020)	-.0120 (-.032/.008)	-.0131 (-.033/.007)	-.0079 (-.028/.012)
RRC	.0194** (.006/.032)	-.0067 (-.020/.007)	-.0022 (-.016/-.011)	-.0015 (-.015/.012)
MDH	.0415** (.013/.070)	.0290* (-.001/.059)	.0289* (-.001/.059)	.0374** (.008/.067)
Other Payment Adjustments				
Swing bed program	.0805**	.0460**	.0411**	.0596**
Lugar Hospital	.0338**	-.0036	.0071	.0203*
Year				
1986		.0330**	.0426**	.0458**
1987		.0541**	.0785**	.0820**
1988		.0520**	.1016**	.1058**
1989		.0749**	.1434**	.1452**
1990		.0754**	.1582**	.1608**
1991		.0653**	.1616**	.1637**
Area Characteristics				
Population over 65			.0120**	.0062
Population per square mile			-.0008	-.0018**
Per capita income			-2.1x10 <sup>-5</sup> **	-1.8x10 <sup>-5</sup> **
Unemployment rate			.0021	-.0012
Average wage index			.2094**	.1546**
Distance to nearest hospital			-.0001	-.0014**
Distance to nearest urban hospital			-.0010**	.0006**
Hospital Characteristics				
Beds				.4907**
Case mix index				-.0679*
System affiliation				-.0256*
Service index				-.0021**
Constant term				
Observations	16908	16908	16908	16908
R-squared	.01	.02	.03	.11

Note: For the payment categories, the 95 percent confidence interval is in parentheses.

\*\* = significant at .01

\* = significant at .05



pressure by allowing lengths-of-stay to increase. It may be that this result will change over time as MDH hospitals fully adjust to their new payment status.

One possible explanation for the lack of statistically significant relationships between movement into a special payment category and standard measures of rural hospital financial performance was suggested in the discussion at the beginning of this article. That is, the additional revenues generated through special payment provisions could be expended through a variety of avenues such as reduced rates for other payers or the expansion of outpatient services. If revenue increases are not large, these types of behavioral responses could leave operating margin, lengths-of-stay, and revenues per discharge and per day relatively unaffected. A hospital's financial situation could be strengthened by these actions, which were precipitated by selection of a special payment classification, but the benefits would not be captured in standard measures of inpatient performance. It would be useful for future research to address whether rural hospitals choosing special payment status under PPS were more likely to subsequently expand services or develop new services that were not profitable in the short-run but served the needs of their stakeholders. In this vein, Shortell, et al. (1986), in their study of hospitals in multihospital systems, found that a substantial portion (as high as 28 percent) of out-of-hospital services provided by hospitals in "low competition" hospital markets could be considered "unprofitable".

A second possibility, which complements the "behavioral response" explanation, is that movement into a special payment category does not, in fact, result in a major change in Medicare revenues, and hence overall facility revenues, for many rural

hospitals. While some "movers" may have benefited substantially, this favorable impact may have been "averaged out" when combined with no impact for many rural hospitals making the change. As noted earlier, a large proportion of hospitals classified as SCHs or MCHs in 1991 found that reimbursement under standard Medicare PPS rules generated the greatest revenues per discharge of the three options available to them. This suggests that these special payment categories provide relatively little payment relief for many small, isolated rural hospitals. A report of the Senate Special Committee on Aging in 1988 reached essentially this conclusion, suggesting that the SCH program be revamped to address the needs of the smaller proportion of rural hospitals that are experiencing financial difficulties.

A third explanation for the lack of estimated impacts on hospitals moving into a special payment category is that the proportion of "movers" during the study period was too small. The net change in the number of SCH hospitals from 1985 to 1991 was 132 hospitals, while there was a net change of 80 hospitals in the RRC category. There may not have been enough data on "movers" to estimate the impact of the move on their financial performance.

In summary, the results of this analysis suggest that "bottom line" measures of overall financial performance were not altered significantly on average for hospitals that chose to move into a special PPS payment classification during the period from 1985-1991, although some individual rural hospitals may have received financial relief. In evaluating the impact of these payment provisions, policymakers should broaden their focus to include documentation of the ways in which hospitals receiving special payments use any additional revenues that might accrue to them.

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