Rural Policy Brief

Assessing the Financial Effect of Medicare Payment on Rural Hospitals: Does the Source of Data Change the Results?

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Purpose

In this policy brief, we explore how predictions of changes in hospital financial performance as a result of change in Medicare payment differ when comparing results using data from the Medicare Cost Report (MCR) to results using data from the audited hospital financial statement (FS). The purpose of this exploratory research is to test the assumption that MCR data yield a valid indicator of changes in hospital financial well-being.

Principal Research Results

Whether using MCR or FS data, there is very little difference in results when the same statistical models are used to predict changes in hospital margins. Data from either source show Medicare payment to be a significant predictor of total margin but not a significant predictor of current ratio, ratio of cash flow to total debt, or return on equity. MCR data show Medicare payment to be a significant predictor of days cash on hand; FS data do not.

These results indicate that when policy analysts and policy makers examine the effect of payment policies on hospitals' financial performance (e.g., total margin) using the best available national data (the MCR) rather than FS data, the results are likely to be valid, despite previously reported discrepancies in the financial information between the two data sources (Chen et al., 2004). Using statistical analysis of MCR data as a basis for decisions is, therefore, valid for hospitals as a whole. However, using MCR data to directly track the financial performance of individual hospitals may not be valid. Our analysis does not, therefore, support using only MCR data for particular hospitals when FS data are available. In those situations, our findings would support using both data sources because of the potential disagreements between the financial data in the MCR and the FS. That is, the total margin for any given hospital may appear to be 2.0, using MCR data, when in reality it is closer to -3.0, based on FS data.

Background

In a previous policy brief, we showed that there is a certain degree of disagreement between the financial data in the MCR and the FS. Our analysis, using a sample of 52 non-Critical Access Hospitals (CAHs), found a considerable range in the magnitude of differences—as much as 7.34 percentage points larger (MCR compared to FS) or 6.47 percentage points smaller (Chen et al., 2004).[1] This finding suggests that relying on a single source of financial data, such as the MCR, to assess current financial performance of individual rural hospitals, and perhaps groups of them (e.g., aggregated by bed size or region), may be inappropriate. However, MCR data may be suitable as a resource to assess the impact of Medicare payment policy on hospital financial status, predicting change in aggregate measures rather than measuring current financial condition. The MCR has been the only publicly available source of data for financial analysis, and its format is standardized for all hospitals. Therefore, policy analysts and researchers have relied heavily on the MCR to examine the effects of payment policies on hospital financial performance. This examination of the comparative ability to predict change in financial status using MCR or FS data could give researchers reason to be confident or cautious in using the MCR.

Data And Method

We obtained audited financial statements for fiscal years 1997, 1998, and 1999 (including both balance sheets and income statements) from 52 (requests were made to 237) rural hospitals in the following eight states: North Carolina, South Carolina, Pennsylvania, Illinois, Wisconsin, Texas, Nebraska, and Montana. The criteria for being included in the study were (1) the hospital was located in a rural area, (2) the hospital had no more than 100 acute care beds, and (3) the hospital was not a CAH during the study time frame. The same three years of financial data were extracted from the Centers for Medicare & Medicaid Services' (CMS') Hospital MCR Data Set (see Appendix A for the MCR worksheets and lines used). Five financial ratios were calculated from both MCR data and FS data and used as the dependent variables: total margin, return on equity, current ratio, days cash on hand, and cash flow ratio to total debt. Total margin and return on equity indicate a hospital's profitability; current ratio reflects a hospital's capability of meeting its short-term debt obligation using its short-term assets; days cash on hand measures the number of days a hospital can use its cash and investment to pay its operating expenses; the ratio of cash flow to total debt demonstrates a hospital's capability of meeting its debt obligations using cash generated from operations. The formulas of these five ratios are expressed in Appendix B. Independent variables, extracted and created from the American Hospital Association (AHA) Annual Survey data set and the MCR, include Medicare payment as well as variables that describe hospital characteristics.[2]

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[1]The limits of agreement were estimated at a 95% confidence level. The range became (-3.89, 4.42) after the observations, which showed an extremely large difference between the MCR and FS data, were excluded from the analysis.

[2]The variables include whether a hospital has a nursing home unit, bed size, average length of stay, average daily census, staffing ratio, ownership, number of services offered, occupancy rate, percentage of patient days by Medicare patients, percentage of patient days by Medicaid patients, percentage of surgeries performed in outpatient settings, percentage of outpatient visits as ER visits, wage per employee, geographic location, and network participation.

Separate regression analyses using MCR and FS data were conducted for each of the five financial ratios.[3] We then compared the results of regression coefficients (for the Medicare payment variable) between the MCR and FS models. Since we analyzed panel data (i.e., cross-sectional time-series data) that contained three-year information for 52 hospitals, we used a generalized estimating equations (GEE) approach to account for the correlation in the same hospital for different years (Liang & Zeger, 1986). Only those observations with data in both the MCR and FS were included in the analysis.

Findings

Figures 1-5 show the regression results in terms of the effect of Medicare payment (Part A and Part B) on the five financial performance indicators for hospitals within the study sample, adjusted for ratio specific covariates. To demonstrate the stability of the coefficient estimates, 95% confidence intervals of the coefficients are also shown in the figures.

Figure 1 shows the results related to the hospitals' total margin. Both FS and MCR models indicate that Medicare payment is a significant predictor of a hospital's total margin. Based on the FS model, a 1% increase in Medicare payment would increase a hospital's total margin by 0.0327 percentage points ($P < 0.01$; 95% confidence interval [CI]: 0.0106 to 0.0548 percentage points). Based on the MCR model, a 1% increase in Medicare payment would increase a hospital's total margin by 0.0302 percentage points ($P < 0.01$; 95% CI: 0.0074 to 0.053 percentage points).

Figure 1. Effect of Medicare Payment on Total Margin
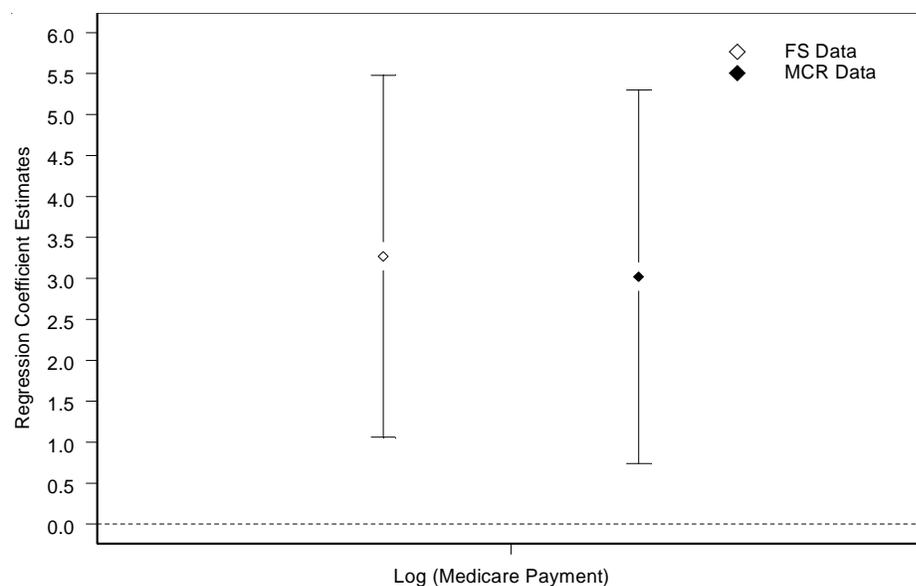
Variable	Data	Estimate	SE	95% CI
Log (Medicare Payment)	FS	3.27	1.13	(1.06, 5.48)
	MCR	3.02	1.16	(0.74, 5.30)

[3]Backward selection modeling was used to finalize the regression model for each financial ratio dependent variable using the FS data. The final models only include those variables significant at the $P < 0.05$ level or those that by their exclusions would cause more than a 10% change in the coefficient for Medicare payments. The MCR models were run with the same covariates from the FS models but using the financial ratios from the MCR data source.

Figure 2 shows the results related to the hospitals' return on equity. Both FS and MCR models indicate that Medicare payment is not a significant predictor of a hospital's return on equity. Although the statistical significance of the Medicare payment variable is the same for both models, the 95% confidence intervals show some degree of disagreement. If the cut-off P value is set at 0.1 rather than 0.05, the results for the FS and MCR models differ. Based on the FS model, a 1% increase in Medicare payment would increase a hospital's return on equity by 0.0256 percentage points (P = 0.0649). However, based on the MCR model, Medicare payment would still not be a significant predictor of a hospital's return on equity (P = 0.1995).
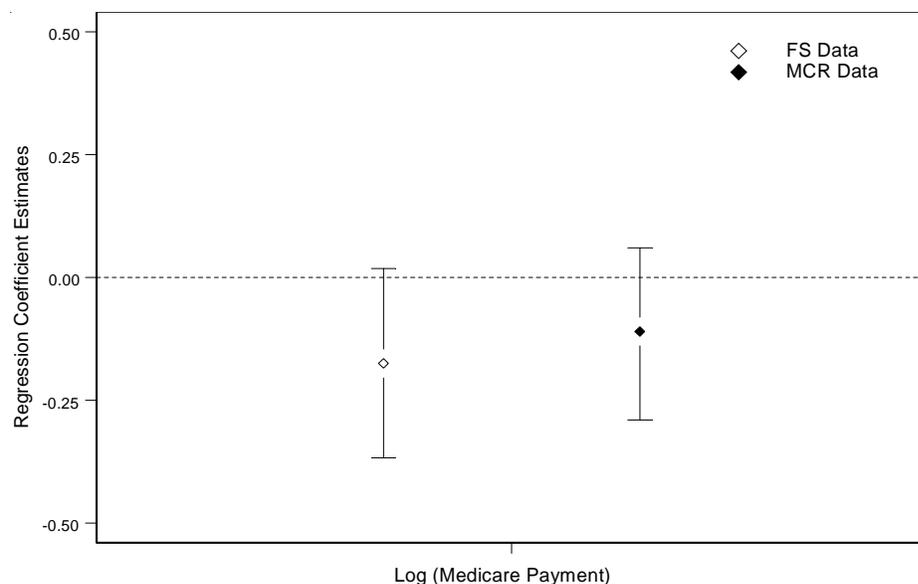
Figure 2. Effect of Medicare Payment on Return on Equity
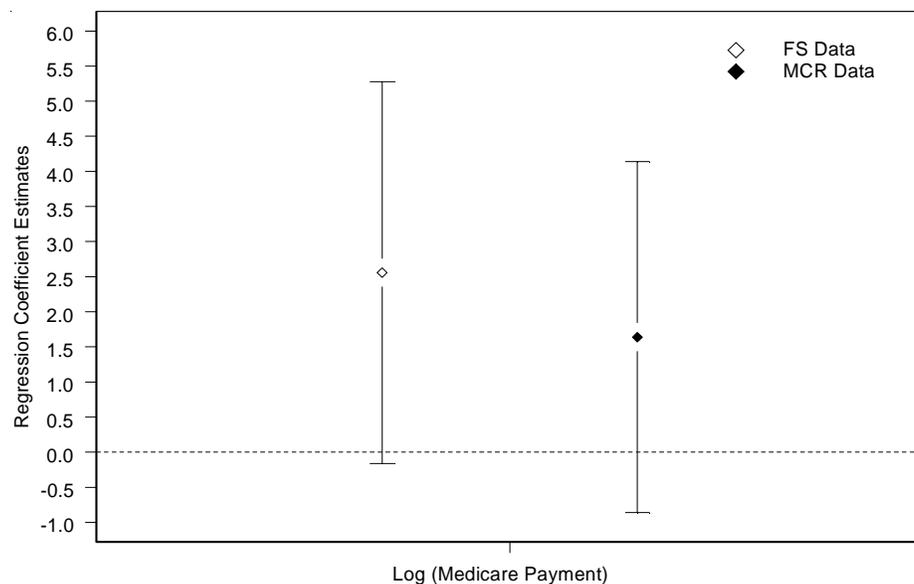
Variable	Data	Estimate	SE	95% CI
Log (Medicare Payment)	FS	2.56	1.39	(-0.16, 5.28)
	MCR	1.64	1.28	(-0.86, 4.14)

Figures 3 and 4 show the results related to the hospitals' current ratio and cash flow to total debt. Based on both the FS and MCR models, Medicare payment is not a significant predictor of either current ratio or cash flow to total debt (P > 0.05 for both models). Again, there is some disagreement between the estimated 95% confidence intervals of the FS and MCR models, although both models show considerable agreement in the regression results.
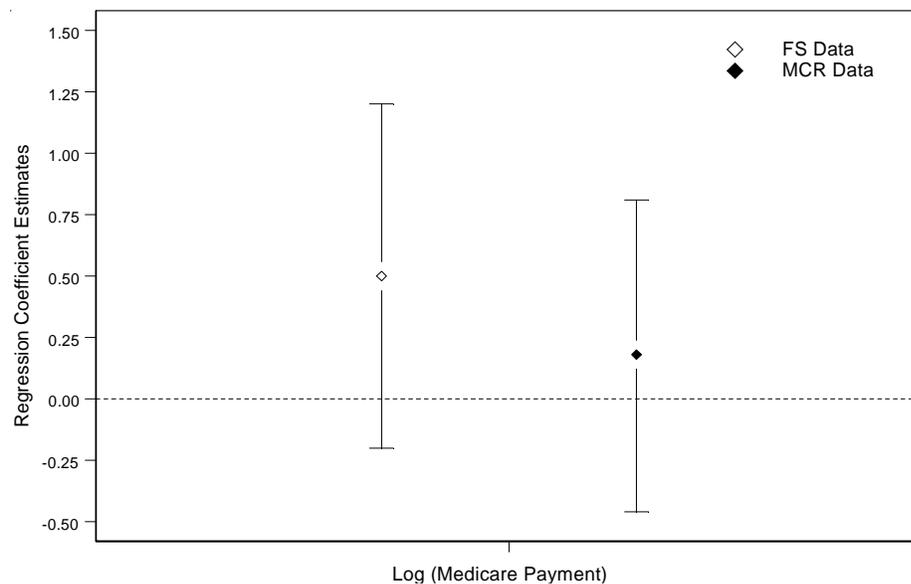
Figure 3. Effect of Medicare Payment on Current Ratio

Variable	Data	Estimate	SE	95% CI
Log (MedicarePayment)	FS	-0.175	0.098	(-0.367, 0.018)
	MCR	-0.11	0.09	(-0.29, 0.06)

Note: Current ratio was transformed to the log scale to meet normality criteria for the model.

**Figure 4. Effect of Medicare Payment on Cash Flow to Debt Ratio**

Variable	Data	Estimate	SE	95% CI
Log (Medicare Payment)	FS	0.50	0.36	(-0.20, 1.20)
	MCR	0.18	0.32	(-0.46, 0.81)

Note: Cash flow to debt ratio was transformed using a cube root transformation to meet normality criteria for the model.

Figure 5 shows the results related to the hospitals' days cash on hand. Compared to the four other financial indicators, the regression results for days cash on hand shows the greatest disagreement between the two models. Based on the FS model, Medicare payment is not a significant predictor of a hospital's days cash on hand (P = 0.7076). However, based on the MCR model, a 1% increase in Medicare payment would increase a hospital's days cash on hand by approximately 0.6% (P < 0.01; 95% CI: 0.2% to 1%).

Figure 5. Effect of Medicare Payment on Days Cash on Hand
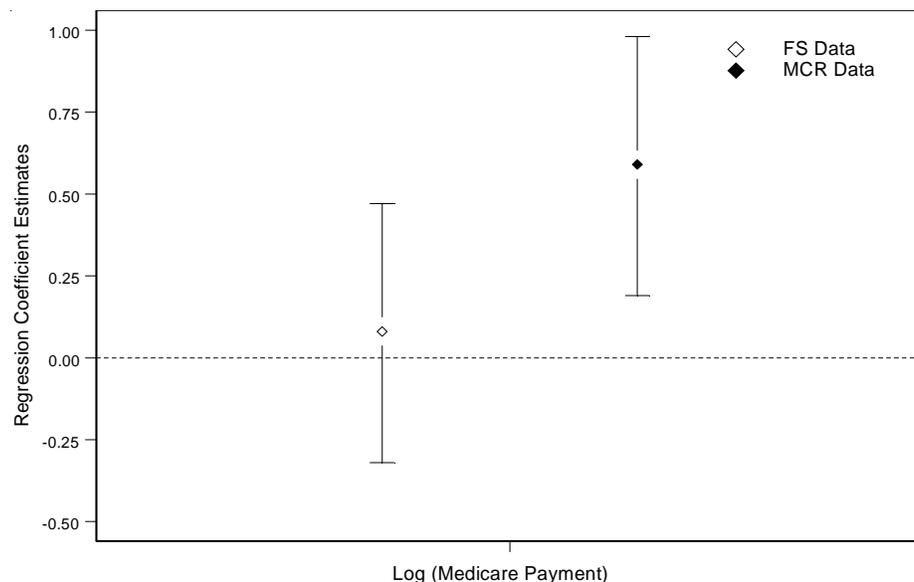
Variable	Data	Estimate	SE	95% CI
Log (Medicare Payment)	FS	0.08	0.20	(-0.32, 0.47)
	MCR	0.59	0.20	(0.19, 0.98)

Note: Days cash on hand was transformed to the log scale to meet normality criteria for the model. There were some zeros for this variable in the MCR data set, so one was added to all values before the transformation.

Conclusion

A comparison of the regression results using FS and MCR data shows considerable agreement when examining the effect of Medicare payment on hospital financial performance indicators. However, for one ratio, days cash on hand, there was noticeable difference between models, with the MCR-based model demonstrating a significant effect for Medicare payment but the FFS-based model not doing so. On the other hand, the financial indicator most frequently used in policy discussions, total margin, was affected by Medicare payment, and both models demonstrated a very similar impact. The disagreements between the financial data in the MCR and the FS (Chen et al., 2004) do not appear to produce different results in a statistical examination of the effect of Medicare payment on hospital margins. Statistical models using MCR data indicate that a 1% increase in Medicare payment would increase a hospital's total margin by 0.0302 percentage points and days cash on hand by approximately 0.6%.

Limitations

This study focused on comparisons between the financial data in the G worksheet of the MCR and the FS. Since the Medicare payments for hospitals are not currently determined based on the financial data in the G worksheet of the MCR, the adequacy of the G worksheet data may be questionable, as hospitals are not really held accountable for reporting that information. On the other hand, the FS is published to demonstrate the hospital's public accountability to its stakeholders, such as creditors and business partners. Therefore, the FS is usually under closer and stricter scrutiny by outside professionals. We recognize that the financial data in the G worksheet of the MCR may have limited implication for the assessment of Medicare payment policies due to its limited relevance to the Medicare reimbursement process. Nevertheless, because it is the only section in the MCR that provides standardized financial accounting data like that found on typical financial statements, many researchers and analysts still use the financial data from the G worksheet of the MCR and make policy recommendations accordingly. Therefore, it is still important to examine the difference between the G worksheet of the MCR and the FS.

In addition, the results are based on information collected from the 52 hospitals that responded to the data request from among the 237 hospitals contacted for information, resulting in a response rate of 22%. We are only able to comment on the level of agreement between the financial measures for hospitals that responded to the data request.

References

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Liang, K., & Zeger, S. L. (1986). Longitudinal data analysis using generalized linear models. *Biometrika, 73*, 13-22.

Appendices

Appendix A: MCR Worksheets and Lines of the Financial Data

Financial Ratio	MCR Worksheet and Lines
Total margin	G-3: 3, 25, 31
Return on equity	G-3: 31; G: 51
Current ratio	G: 11, 36
Days cash on hand	G: 1, 2; G-3: 4; A-7: 5
Cash flow to total debt	G: 36, 42; G-3: 31; A-7: 5

Appendix B: Definitions of Financial Ratios (cited from The Center for Healthcare Industry Performance Studies)

1. Total Margin = [(Excess Revenues over Expenses)/(Total Revenue)]x100
2. Return on Equity = [(Excess Revenues over Expenses)/(Net Assets)]x100
3. Current Ratio = (Current Assets)/(Current Liabilities)
4. Days Cash on Hand =
   (Cash + Short Term Investments)/[(Total Expenses – Depreciation Expenses)/365]
5. Cash Flow to Total Debt =
   [(Excess Revenues over Expenses+ Depreciation Expenses)/(Current Liabilities+ Long Term Debt)]x100