

Medicaid payment rates for nursing homes, 1979-86

by Stephan F. Gohmann and Robert L. Ohsfeldt

The issue of the cost containment effects of payment systems on per diem payments by Medicaid to nursing homes is addressed. Estimates of real payment rates as a function of broadly defined payment system classifications and economic and demographic variables using State-level data are presented. Little support for the notion that prospective payment systems substantially restrain

payment rates for intermediate care facilities is found, but some model specifications indicate possible cost savings associated with prospective payment systems for skilled nursing facilities. Significant methodological concerns that need to be addressed in future research on the cost containment effects of payment systems are also discussed.

Introduction

Medicaid nursing home expenditures constitute the largest portion of total Medicaid expenditures. In 1986, total Medicaid expenditures on both skilled nursing facilities (SNF) and intermediate care facilities (ICF) were \$17.52 billion and constituted 42.7 percent of total Medicaid expenditures (Health Care Financing Administration, 1986; Muse and Sawyer, 1982). A large portion of Medicaid long-term care expenditures, \$5.08 billion, is paid to intermediate care facilities for the mentally retarded (ICF-MR), but expenditures on nursing homes that primarily care for the elderly constitute 30.3 percent of total Medicaid expenditures. These expenditures have grown in real terms at a relatively slow pace in the 1980s. Medicaid nursing home expenditures, excluding ICF-MR, were \$7.13 billion in 1979. By 1986, real expenditures (in 1979 dollars) were \$8.19 billion (an average annual percent growth rate of 2.04 percent). Thus, it appears that States have been relatively successful in containing nursing home expenditures in the 1980s.

Although much of this containment of the growth in expenditures may be attributable to changes in Medicaid eligibility requirements, some may be attributable to changes in the payment systems States use. In December 1980, Congress passed the Omnibus Reconciliation Act (ORA) which included the Boren amendment. The Boren amendment allowed States more discretion in setting eligibility requirements and payment rates for Medicaid. As a result, many States changed the type of payment scheme they use to reimburse nursing homes. The payment system options available to the States may be classified into two broad categories—retrospective and prospective payment schemes. Under a pure retrospective system, nursing homes are reimbursed for actual covered costs. Pure prospective payment systems are designed so that the amount of payment a nursing home will receive for a particular type of patient is predetermined.

Prospective schemes can be further categorized as prospective facility-specific and prospective class. Under a facility-specific scheme, rates are set specifically for each home based on its costs, caseload, and other attributes. Class systems are based on a weighted average

of costs for groups of homes classified by their caseload, size, and other attributes. Some States may use a combination of prospective and retrospective systems in which some costs are paid fully up to a prospectively determined maximum amount.

This article addresses the issue of the impact of payment systems on per diem payments by Medicaid to nursing homes. Our analysis builds on the analysis presented in Swan, Harrington, and Grant (1988) by using the same type of broad payment system classification they use, but with a more complete model specification. We also highlight significant methodological concerns that need to be addressed in future research on the cost containment effects of payment systems.

Background

The nursing home literature contains considerable debate regarding the effects of payment systems on nursing home care costs and quality. An argument against pure retrospective systems is that such systems offer little incentive for the nursing home to contain costs. Because covered costs are fully reimbursed, the nursing home may more intensely use covered treatments in the care of its patients. Although this may lead to an increase in costs, it also allows the home to provide higher quality of care. Prospective systems may be more conducive to cost containment because these systems give homes an incentive to keep costs at or below the payment rate. One of the major arguments against prospective systems, however, is that this tends to reduce nursing homes' incentive to admit patients with more severe medical needs since giving care to these patients generally is less profitable.

Nyman (1985; 1988) argues that if a State has excess demand for its Medicaid nursing home beds, then an increase in its Medicaid prospective payment rate will lead to reductions in the quality of care. When excess Medicaid demand is present, a firm's primary incentive to increase quality is to attract private patients. If the Medicaid rate is increased, the relative returns to attracting private patients by producing higher quality service falls, and the home is less likely to increase quality. However, when excess demand is not present, increases in Medicaid rates can lead to increases in quality, because the higher rates will make attracting Medicaid patients more profitable. To attract these patients, firms will compete on the basis of quality.

Reprint requests: Stephan F. Gohmann, Ph.D., Department of Economics, University of Louisville, Louisville, Kentucky 40292.

It is generally thought that retrospective reimbursement reduces the efficiency incentives of firms. Cotterill (1983) has analyzed the incentives resulting from differences in Medicaid payment systems for nursing homes. He shows that, in theory, this efficiency problem occurs only when the public rate is based solely on the costs of public patients. He argues that under a cost-based payment system, nursing homes have the incentive to over report costs, and that this incentive grows stronger as the number of public patients increases. This incentive is reduced when payments are less directly linked to costs, as in a prospective system.

Under a retrospective system, the public payment rate is immediately influenced by any change in the facility's costs. For example, if the facility is on the downward sloping portion of its average cost curve and chooses to increase output, then the rate it receives will fall with the increased output. Under the prospective systems, however, changes in costs will not affect payment until a new rate is set. Thus, Cotterill argues that the only effective difference in payment systems may be that prospective systems have a short-run dynamic effect as the payment rate iterates toward minimum average cost. His argument is that, over time, the ratesetters ultimately will tend to set the rate at the minimum of the average cost curve. Cotterill concludes that, "... cost containment and efficiency incentives will not differ solely as a function of the prospective/retrospective difference."

Empirical analyses

The effectiveness of the different payment schemes in containing costs has been the topic of several empirical studies. Meiners (1982) concludes that prospective payment lowers nursing home costs, but Lee, Birnbaum, and Bishop (1983) find no evidence of cost savings. More recently, Harrington and Swan (1984) and Swan, Harrington, and Grant (1988) find that States that use prospective payment schemes have significantly lower per diem nursing home payment rates than States that use a retrospective system. Swan, Harrington, and Grant regress nominal State payment rates on dichotomous variables indicating the type of payment system the State uses for each year during the period 1979 through 1986. They also use cross-section time-series analysis to estimate the effect of payment scheme type on payment rates over time.

Although the study suggests that prospective systems are more likely to be associated with lower nominal payment rates, their results may be misinterpreted. First, Swan et al. fail to analyze how real payment rates are affected by payment systems. The influence of general price inflation is ignored, as is the effect of interstate differences in price levels. Since States differ in terms of overall costs of living, a high cost State with a high nominal rate may actually be offering a lower real payment rate than a low cost State with a lower nominal rate. They also do not include variables accounting for interstate differences in factors, other than payment systems, affecting payment rates. Thus, their analysis fails to determine how effective the different systems have been in containing real per diem payments, holding all other factors constant.

An issue ignored in their study is the possibility that the State's choice of payment system may be endogenously determined, from both an economic and a political perspective. High rate States may be more likely to seek cost containment measures than low rate States. If so, estimates of the cost savings of cost containment measures (e.g., prospective payment) not accounting for this simultaneity will be biased downward. Moreover, if liberal States are more likely to offer incentives for higher quality of care, then associated with higher quality may be higher real payment rates. If ideology also affects payment system choice, then the estimated cost savings of prospective payment systems will either be biased downward (if liberal States are more likely to adopt prospective payment) or upward (if liberal States are less likely to adopt prospective payment). Failure to incorporate endogeneity of payment system choice thus may create a bias of unknown direction in the estimated effects of payment systems on Medicaid payment rates.¹

Another difficulty as Swan et al. note, is that the payment systems used by the States are quite complex—virtually every State's system differs in some dimension from at least one other State's payment system. Classification of systems into broadly defined groups thus necessarily masks substantial within-category variation across States in the specifics of payment system design. Differences in specific aspects of payment system design may relate to significant differences in the overall incentives for efficiency, as well as incentives reflecting objectives other than cost containment, such as quality of care. The economic incentives for cost containment within payment systems thus may not be accurately summarized by the labels of "prospective" or "retrospective" systems. This classification problem is likely to exist to some degree, however, in any quantitative analysis of the cost containment effects of payment systems using cross-sectional State-level data.

Estimates of per diem payments

We estimate a reduced-form model of the determinants of real Medicaid per diem payment rates to SNFs and ICFs. Two methods are used to adjust for State differences in prices. First, a State price index is used to transform nominal payment rates into real payment rates.² The use of the State price index allows us to account for differences in State rates brought about by differences in State prices. Although a national price index would allow us to investigate real payment rates, it would not capture the differences in costs and prices among States. The real State payment rate is the dependent variable in our first set of estimates of the effects of the payment scheme on these rates. We compare our results with those reported in Swan et al. to show that adjusting for price differences

¹This point is discussed in some detail in Ohsfeldt et al. (1988). Although the issue of endogeneity of payment system choice is also ignored in the analysis presented in this article, the implications of the preliminary results in Ohsfeldt et al. for assessing the effects of payment schemes on costs are discussed throughout the article.

²This index was constructed by Craig and Inman (1982) and covers the years from 1960 to 1985. Details concerning the calculation of this index are provided in Gohmann (1988).

among States leads to lower estimates of the effect of payment systems on rates.

Second, we use the percent change in the real payment rates to determine the influence of the various payment schemes on the growth of payment rates. The use of the percent change in the real payment rate eliminates State differences resulting from cross-sectional price differentials, as well as partially controlling for other factors differing across States not accounted for in the model affecting payment levels.³ It is clear that if one payment scheme is more successful in containing costs than another, the percent change in a State's rate should demonstrate these differences. The percent change in the real payment rate allows us to directly determine if the payment scheme categories have a significant impact on the growth in payment rates.⁴

Data

Swan et al. collected data on State payment rates and payment scheme type for both SNFs and ICFs. We use this data along with State demographic data and other data to estimate the effect of nursing home payment schemes on the real Medicaid payment rate and the percent change in the Medicaid payment rate.⁵ We include the same three dichotomous variables that they use to account for State differences in reimbursement schemes: prospective facility-specific scheme (PFS); prospective class scheme (PCL); and a combination of prospective and retrospective schemes (COM). The omitted category is retrospective payment systems.

We also attempt to assess how Swan et al. estimates of payment system effects on payment rates are affected by using a more complete model specification. Thus, unlike them, we include variables in the model to control for differences across States in demographic and economic factors affecting nursing home care markets. The first series of explanatory variables is intended to capture differences in demand for services across States. The percent of the population over 65 years of age, POP65, is intended to proxy the potential overall demand for long-term care. The average 1979-80 life expectancy at age 65, LIFEX, is a proxy for health of the elderly, and hence the demand for institutionalized care. The unemployment rate, UNEMP, reflects overall economic vitality and the potential overall level of Medicaid eligibility (Cromwell et al., 1986). Other explanatory variables capture the effects of differences in supply on payment rates. Supply factors include the number of doctors per 100,000 population, DRS, and the average daily real cost of hospital services, HOSP.⁶ The latter is a proxy for the production cost level within the State.

³That is, to the extent these factors within States do not change over time.

⁴It may be the case that payment schemes may allow for periodic reductions in payment rates, but overall they may have little effect on the growth of the payment rate. This may be evidenced by decreases immediately following the passage of ORA, but then a return to a growth in payment rates.

⁵We attempted to replicate Swan et al. initial results and were successful for all equations except for ICFs in 1982 and 1986.

⁶An additional supply factor, the presence or absence of CON, was included in the model, but ultimately was dropped because of its likely endogeneity (Wendling and Werner, 1980) and its lack of statistical significance.

Real per capita income (in thousands), INCOME, may reflect both supply and demand factors. The level of income affects private demand for institutional care, as well as reflecting the level of poverty within a State, and the ability to pay for transfers to the poor (such as Medicaid). Given Nyman's (1985; 1988) results, the nursing home occupancy rate may reflect important differences in market conditions across States. Unfortunately, consistent occupancy rate data are not readily available at the State level for the entire sample period (1979-86).⁷ Even if complete occupancy rate data were available, however, the State occupancy rate is likely to be endogenously determined by the private market for nursing home care and the overall Medicaid system design. It is beyond the scope of our analysis to incorporate endogenously determined occupancy rates into the model.

The resulting reduced-form model also does not attempt to address the simultaneous determination of payment systems for two reasons. First, a complete structural model would contain at least four simultaneous equations for both SNFs and ICFs: a per diem payment equation, a patient-days per Medicaid recipient equation, a reciprocity eligibility equation, and a payment system choice equation. The sample size provided by the Swan, et al. data is not sufficient to replicate their analysis taking endogeneity into account. Second, even with additional data, the task of imposing appropriate identifying restrictions and estimating all of the parameters for all of the structural equations in the complete model may be nearly impossible.⁸ In our empirical model, we also ignore, as did Swan et al., the within-category variation in payment system schemes, primarily because of unavoidable data limitations.⁹

Instead, the analysis presented here is intended to illustrate the type of biases resulting from ignoring intertemporal and interstate differences in cost of living and other economic or demographic factors, and to demonstrate the complexity of the task of assessing the payment system effects on payment rates, holding all other factors constant.

Real payment rates

Regression coefficients for real payment rate estimates for the years 1979-86 for ICFs and SNFs are presented in Tables 1 and 2. Table 1 contains two sets of regression results for ICFs. The first set of results includes as explanatory variables only the payment scheme indicator variables. The second set of results includes the State

⁷The occupancy rate for 1979, 1985, and 1986, when included in the model, was not statistically significant.

⁸For more discussion on this point refer to Ohsfeldt et al. (1988). Their approach to the problem is to assume an essential recursive simultaneous system, and to estimate only two of the four equations simultaneously.

⁹Nonetheless, the reduced-form model we use is much more complete than the model used in Swan et al.

Table 1
Regression analysis of determinants of real ICF per diem rates, by year: 1979-86

Independent variables	1979	1980	1981	1982	1983	1984	1985	1986
Payment systems								
CONSTANT	*9.62 (15.6)	*9.39 (15.6)	*9.33 (17.5)	*10.26 (14.7)	*9.43 (11.1)	*10.24 (11.7)	*10.70 (12.0)	*11.18 (10.6)
PFS	0.65 (0.9)	0.63 (0.9)	0.67 (1.0)	-0.31 (0.4)	0.87 (1.0)	0.42 (0.4)	0.25 (0.3)	0.08 (0.1)
PCL	-0.65 (0.6)	-0.87 (0.8)	0.15 (0.2)	-1.69 (1.6)	-0.67 (0.6)	-1.49 (1.3)	-2.06 (1.9)	-2.28 (1.8)
COM	0.32 (0.3)	0.39 (0.4)	0.41 (0.5)	-0.17 (0.2)	1.06 (1.1)	0.60 (0.6)	0.80 (0.8)	0.75 (0.6)
R ²	0.05	0.06	0.04	0.07	0.11	0.13	0.25	0.21
SAMPLE	43	44	47	47	47	47	46	46
Payment systems and State variables								
CONSTANT	**26.70 (2.4)	*42.46 (3.7)	*44.90 (4.3)	*45.82 (4.2)	*31.19 (2.8)	*22.63 (2.0)	15.03 (1.6)	11.21 (1.1)
PFS	0.41 (0.6)	0.52 (0.8)	0.63 (1.0)	-0.43 (0.6)	1.52 (1.6)	0.91 (0.9)	1.38 (1.4)	1.34 (1.2)
PCL	-0.09 (0.1)	-0.99 (1.0)	-0.53 (0.6)	-1.42 (1.5)	0.19 (0.2)	-0.72 (0.6)	-0.79 (0.7)	-0.67 (0.5)
COM	0.53 (0.6)	0.84 (1.0)	0.74 (1.0)	-0.14 (0.2)	1.58 (1.6)	1.02 (1.0)	1.68 (1.6)	1.75 (1.4)
POP65	*-0.54 (3.7)	-0.19 (1.5)	**0.28 (2.0)	**0.30 (2.3)	0.05 (0.4)	0.17 (1.4)	0.09 (0.7)	0.02 (0.2)
DRS	**0.02 (2.2)	**0.02 (2.3)	**0.02 (2.5)	*0.02 (2.7)	*0.02 (3.0)	0.01 (1.6)	0.01 (1.8)	**0.02 (2.1)
HOSP	**0.05 (2.2)	-0.02 (1.0)	-0.02 (0.9)	-0.06 (1.3)	-0.00 (0.1)	0.01 (0.40)	0.01 (0.6)	0.00 (0.2)
LIFEX	-0.54 (0.9)	*-1.77 (2.9)	*-1.56 (2.7)	*-1.77 (3.0)	**1.25 (2.2)	-0.96 (1.5)	-0.41 (0.8)	-0.21 (0.4)
UNEMP	**0.50 (2.1)	-0.22 (1.1)	-0.29 (1.7)	-0.13 (0.9)	-0.16 (1.2)	-0.17 (1.1)	-0.24 (1.5)	-0.17 (1.0)
INCOME	-0.92 (0.8)	-0.65 (0.7)	**1.66 (2.1)	-0.34 (0.4)	-1.30 (1.3)	-0.18 (0.3)	-0.43 (0.6)	-0.16 (0.2)
R ²	0.51	0.41	0.45	0.49	0.39	0.32	0.45	0.45
SAMPLE	43	44	47	47	47	47	46	46

*Significant at 0.01 level.

**Significant at 0.05 level.

NOTES: Absolute value of t-statistic in parentheses. ICF is intermediate care facility.

SOURCE: (Swan, Harrington, and Grant, 1988); *Statistical Abstract of the United States*, 1980-1988 annual issues; American Medical Association, *Physician Characteristics and Distribution in the U.S.*, 1961-1988 annual issues; American Hospital Association, *Hospital Statistics*, 1980-1987 annual issues.

demographic and economic variables. We include all observations for which payment rate and price index variables are available.¹⁰

Swan et al. find that PFS and PCL States are more likely to have lower nominal payment rates relative to retrospective States. They estimate negative and significant coefficients for ICF homes for the PFS variable for the years 1982-84. Their PCL coefficient is negative and significant for the years 1982-85. Our estimates, using the same specification as theirs but with the real ICF rates rather than the nominal rates as the dependent variable (Table 1), show that the payment scheme has no statistically significant effect on the real payment rate for ICF homes in any of the 8 years

($p < 0.05$).¹¹ It is apparent that the significant differences in nominal payment rates across schemes found by Swan et al. fail to materialize after accounting for general price differences over time and across States.

Our second set of results in Table 1 shows that including State demographic variables has little effect on the coefficients of the payment scheme variables for ICFs. The only significant coefficients are for DRS, POP65, and LIFEX. The greater the number of physicians per 100,000 population, the higher the payment rates in 6 out of the 8 years. The percent of the population over 65 years of age has a negative effect on the rate of payment. Higher life expectancy at age 65 results in a lower real Medicaid ICF payment rate.

Our estimates for the real SNF per diem payment rate are shown in Table 2. We find that after 1982, the

¹⁰Price index numbers were not available for Alaska and Hawaii, so we excluded these two States. We also estimated our equations for the real payment rate including only the States used in Swan et al. Our estimated results for this smaller sample are not significantly different from the results presented in our Tables.

¹¹The PCL coefficients, however, are negative and statistically significant at the 0.1 level for 1985 and 1986.

Table 2
Regression analysis of determinants of real SNF per diem rates, by year: 1979-86

Independent variables	1979	1980	1981	1982	1983	1984	1985	1986
Payment systems								
CONSTANT	*12.72 (12.5)	*11.77 (13.7)	*12.71 (15.8)	*14.21 (14.4)	*16.14 (13.7)	*16.49 (14.6)	*16.67 (12.1)	*16.15 (11.2)
PFS	0.02 (0.0)	0.77 (0.7)	-0.11 (0.1)	-1.45 (1.2)	** -3.14 (2.3)	** -3.09 (2.4)	-2.69 (1.7)	-1.65 (1.0)
PCL	-2.09 (1.0)	-1.47 (0.9)	-1.76 (1.1)	** -3.92 (2.4)	* -5.54 (3.2)	* -6.02 (3.6)	* -6.01 (3.1)	* -5.27 (2.7)
COM	-0.56 (0.3)	0.21 (0.1)	-0.98 (0.7)	-1.25 (0.9)	** -3.04 (2.0)	** -3.15 (2.1)	-2.74 (1.6)	-2.20 (1.3)
R ²	0.03	0.05	0.04	0.12	0.20	0.24	0.19	0.17
SAMPLE	43	44	47	47	44	47	46	46
Payment systems and State variables								
CONSTANT	26.69 (1.1)	*55.73 (2.8)	38.62 (1.8)	37.48 (1.7)	32.84 (1.4)	15.01 (0.7)	3.79 (0.2)	-0.85 (0.0)
PFS	0.18 (0.1)	1.03 (0.9)	0.12 (0.1)	-1.11 (0.9)	** -3.02 (2.0)	** -3.11 (2.3)	-2.43 (1.5)	-0.86 (0.5)
PCL	-0.67 (0.3)	-1.01 (0.6)	-1.6 (0.9)	-3.01 (1.7)	* -5.02 (2.7)	* -5.17 (2.9)	** -5.10 (2.2)	** -4.46 (2.0)
COM	0.06 (0.0)	1.18 (0.8)	-0.23 (0.2)	-0.80 (0.5)	-2.97 (1.8)	** -2.97 (1.9)	-2.35 (1.3)	-1.49 (0.8)
POP65	-0.59 (1.8)	-0.03 (0.1)	-0.16 (0.5)	-0.14 (0.5)	-0.03 (0.1)	0.08 (0.3)	0.00 (0.0)	0.08 (0.3)
DRS	**0.03 (1.9)	**0.03 (2.5)	0.03 (1.8)	**0.03 (2.4)	0.02 (1.3)	0.01 (1.0)	0.03 (1.5)	0.02 (1.2)
HOSP	-0.05 (0.9)	-0.03 (0.8)	-0.02 (0.6)	-0.05 (1.0)	-0.02 (0.5)	-0.03 (0.8)	-0.03 (0.7)	0.01 (0.2)
LIFEX	0.03 (0.0)	-2.29 (2.0)	-0.99 (0.8)	-0.98 (0.8)	-0.65 (0.5)	0.00 (0.0)	0.78 (0.6)	0.71 (0.6)
UNEMP	0.86 (1.6)	-0.25 (0.7)	-0.28 (0.8)	-0.22 (0.7)	-0.26 (0.9)	-0.09 (0.3)	0.03 (0.1)	-0.00 (0.0)
INCOME	** -4.84 (1.9)	-2.06 (1.3)	-2.46 (1.5)	-1.48 (0.9)	-1.42 (0.7)	0.55 (0.6)	-0.66 (0.4)	-0.23 (0.1)
R ²	0.33	0.29	0.18	0.29	0.26	0.31	0.26	0.24
SAMPLE	43	44	44	47	47	47	46	46

*Significant at 0.01 level.
 **Significant at 0.05 level.

NOTE: Absolute value of *t*-statistic in parentheses. SNF is skilled nursing facility.

SOURCE: (Swan, Harrington, and Grant, 1988); *Statistical Abstract of the United States*, 1980-1988 annual issues; American Medical Association, *Physician Characteristics and Distribution in the U.S.*, 1981-1988 annual issues; American Hospital Association, *Hospital Statistics*, 1980-1987 annual issues.

prospective and combination systems were more likely to be associated with lower real rates than a retrospective system. Although our results for SNFs are qualitatively consistent with those of Swan et al., the magnitude of the effect of the payment system is much smaller.

For example, in their SNF payment rate equation for 1984, the coefficients for PFS, PCL, and COM are -13.39, -24.12, and -11.86. Our estimates are -3.09, -6.02, and -3.15. This represents about a 75-percent reduction in the effect estimated by them, because intertemporal and interstate price differences are taken into account. Including State demographic variables in the model tends to further reduce the magnitudes of the estimated values for the payment scheme dummy variables in the SNF equations. As for other variables in the model, the number of doctors tends to increase payment rates for 1979-81. None of the other variables have a significant effect on the real payment rates for SNF homes in any year.

Percent change in rates

Whether or not one scheme is better at containing increases in the rate of growth in payment rates is not discernable from the evidence presented so far. It may be the case that the States switching to prospective payment schemes may have experienced drastic rate reductions, particularly after the effects of program changes permitted by ORA. If this is the case, one might expect to find a significant decline in real payment rates in 1982. If on the other hand, the prospective schemes lead to lower rates of growth in per diem payments, one would expect to find significant coefficients in others years as well. To determine if the payment schemes actually lead to containing the growth in payment rates, we estimate the percent change in real payment rates as a function of the payment scheme and State demographic variables.

Our estimates of the model for percent change in ICF per diem payments are presented in Table 3. The only

Table 3
Regression analysis of percent change in ICF payment rates, by year: 1980-86

Independent variables	1980	1981	1982	1983	1984	1985	1986
Payment systems							
CONSTANT	0.07 (0.0)	-0.08 (0.1)	*6.43 (2.6)	-5.22 (0.7)	8.75 (1.6)	1.72 (0.4)	4.40 (0.9)
PFS	-2.64 (1.0)	-0.08 (0.1)	-4.52 (1.6)	10.54 (1.3)	-4.55 (0.8)	2.50 (0.5)	-1.40 (0.3)
PCL	-4.94 (1.2)	4.17 (1.9)	*-11.94 (3.3)	7.54 (0.7)	-9.08 (1.3)	-2.45 (0.4)	-1.48 (0.2)
COM	3.15 (0.9)	0.80 (0.4)	-5.08 (1.6)	7.49 (0.8)	-5.44 (0.8)	5.19 (1.0)	-0.61 (0.1)
R ²	0.11	0.11	0.21	0.04	0.04	0.08	0.00
SAMPLE	42	44	47	47	47	46	46
Payment systems and State variables							
CONSTANT	88.46 (1.8)	19.26 (0.6)	-13.18 (0.3)	*-264.60 (2.6)	-58.75 (0.8)	*-137.87 (2.6)	-7.66 (0.1)
PFS	-1.31 (0.4)	-0.48 (0.3)	-4.49 (1.4)	** -18.03 (2.0)	-4.53 (0.7)	1.95 (0.4)	0.19 (0.0)
PCL	-5.66 (1.3)	3.72 (1.3)	** -10.39 (2.5)	12.38 (1.2)	-9.49 (1.2)	-6.42 (1.0)	0.83 (0.1)
COM	4.61 (1.2)	0.64 (0.3)	-4.79 (1.4)	14.50 (1.6)	-5.23 (0.7)	3.88 (0.7)	0.32 (0.0)
POP65	**1.23 (2.3)	0.10 (0.2)	0.33 (0.6)	1.80 (1.7)	1.58 (1.5)	-1.23 (1.7)	-0.22 (0.2)
DRS	0.00 (0.1)	-0.02 (0.7)	-0.00 (0.2)	0.02 (0.3)	-0.07 (1.5)	0.01 (0.3)	0.03 (0.6)
HOSP	0.05 (0.6)	0.00 (0.1)	-0.00 (0.0)	0.24 (1.3)	0.12 (1.0)	0.02 (0.2)	-0.00 (0.0)
LIFEX	** -5.87 (2.2)	-0.63 (0.4)	-0.44 (0.2)	** -11.30 (2.1)	2.66 (0.6)	*7.30 (2.6)	0.57 (0.2)
UNEMP	-1.57 (1.8)	-0.38 (0.8)	0.51 (0.8)	1.76 (0.6)	-0.66 (0.7)	1.69 (1.9)	-0.39 (0.4)
INCOME	-0.13 (0.0)	-1.23 (0.5)	5.81 (1.7)	2.80 (0.3)	2.60 (0.7)	5.25 (1.2)	0.42 (0.1)
R ²	0.32	0.17	0.30	0.29	0.18	0.27	0.06
SAMPLE	42	44	47	47	47	46	46

*Significant at 0.01 level.
 **Significant at 0.05 level.

NOTES: Absolute value of t-statistic in parentheses. ICF is intermediate care facility.

SOURCE: (Swan, Harrington, and Grant, 1988); *Statistical Abstract of the United States*, 1980-1988 annual issues; American Medical Association, *Physician Characteristics and Distribution in the U.S.*, 1981-1988 annual issues; American Hospital Association, *Hospital Statistics*, 1980-1987 annual issues.

significant ($p < 0.05$) payment coefficient was for the prospective class system in 1982. Relative to States using the retrospective system, States using a prospective class system in 1982 had a 12 percentage point lower payment growth rate. The demographic variables add little to the model, except that the facility-specific prospective system coefficient in 1983 becomes positive and significant. These results and the results in Table 1 suggest that for ICFs, prospective payment schemes are not effective in containing the growth in ICF rates or reducing ICF rates. This result should be interpreted cautiously, because it may be affected by ignoring endogenous payment system choice. In Ohsfeldt et al. (1988), preliminary results using a simple two equation simultaneous model (with only per diem payment and payment system choice equations) suggest the estimated effect of prospective

systems on per diem payments is biased upward (e.g., toward zero) by ignoring simultaneity.¹²

Our estimates for the percent change in SNF rates are contained in Table 4. The payment scheme coefficients are significant and negative only in 1982. This result most likely reflects the effect of ORA on the resetting of rates and schemes, as well as other changes in Medicaid programs not explicitly accounted for in the model. The lack of significance of the payment scheme coefficients in the remaining years suggests that these schemes may be no better at containing costs than retrospective schemes.¹³

¹²However, this conclusion is preliminary and is qualified by the fact that Ohsfeldt et al. use different data and an incomplete structural model in their analysis.

¹³Again, this conclusion is qualified because of the possible bias in the estimate of the payment rate reduction resulting from prospective payment given endogenous payment scheme choice.

Table 4
Regression analysis of percent change in SNF payment rates, by year: 1980-86

Independent variables	1980	1981	1982	1983	1984	1985	1986
Payment systems							
CONSTANT	0.91 (0.4)	**3.43 (2.3)	*13.16 (5.4)	*7.76 (2.8)	3.20 (1.1)	3.79 (1.9)	5.53 (1.8)
PFS	-3.42 (1.3)	-2.89 (1.6)	*-10.76 (3.7)	-5.45 (1.7)	0.31 (0.1)	-1.58 (0.7)	-3.79 (1.1)
PCL	-3.04 (0.7)	-1.56 (0.6)	*-16.09 (4.1)	-4.73 (1.1)	-4.40 (1.0)	-1.80 (0.7)	-3.45 (0.8)
COM	3.81 (1.0)	-4.55 (1.9)	*-10.40 (2.9)	-5.52 (1.5)	-0.61 (0.2)	0.58 (0.2)	-4.51 (1.2)
R ²	0.12	0.09	0.32	0.07	0.04	0.04	0.04
SAMPLE	42	44	47	47	49	48	48
Payment systems and State variables							
CONSTANT	66.07 (1.2)	*-91.19 (2.7)	4.20 (0.1)	-1.02 (1.3)	-78.80 (1.4)	-52.19 (1.6)	-20.25 (0.5)
PFS	-2.25 (0.7)	** -4.10 (2.2)	*-9.80 (3.7)	-5.97 (1.7)	1.97 (0.5)	-1.62 (0.7)	-1.73 (0.5)
PCL	-3.75 (0.8)	-1.21 (0.4)	*-19.00 (5.0)	-4.66 (1.1)	-4.07 (0.8)	-2.79 (0.9)	-5.49 (1.3)
COM	5.71 (1.3)	*-6.81 (2.8)	*-8.36 (2.8)	-5.83 (1.5)	0.69 (0.2)	0.45 (0.2)	-3.44 (1.0)
POP65	0.72 (1.1)	-0.50 (1.1)	*1.79 (3.2)	-0.59 (0.9)	0.23 (0.3)	-0.36 (0.8)	0.35 (0.6)
DRS	-0.00 (0.1)	-0.03 (1.2)	*-0.09 (3.4)	-0.01 (0.2)	0.02 (0.5)	0.01 (0.3)	-0.04 (1.2)
HOSP	0.04 (0.3)	-0.07 (1.1)	*0.26 (2.9)	-0.07 (0.7)	0.06 (0.6)	0.01 (0.1)	*0.18 (2.9)
LIFEX	-3.83 (1.2)	*5.10 (2.7)	-1.21 (0.5)	4.40 (1.6)	3.92 (1.2)	3.45 (1.9)	-0.73 (0.3)
UNEMP	-1.47 (1.5)	0.93 (1.7)	** -1.29 (2.1)	0.29 (0.4)	0.61 (0.5)	0.18 (0.3)	0.44 (0.7)
INCOME	-1.21 (0.3)	*6.58 (2.6)	3.40 (1.0)	5.51 (1.1)	-0.23 (0.1)	0.08 (0.0)	4.36 (1.3)
R ²	0.20	0.37	0.61	0.17	0.12	0.15	0.38
SAMPLE	42	44	47	47	49	48	48

*Significant at 0.01 level.

**Significant at 0.05 level.

NOTES: Absolute value of *t*-statistic in parentheses. SNF is skilled nursing facility.

SOURCE: (Swan, Harrington, and Grant, 1988); *Statistical Abstract of the United States*, 1980-1988 annual issues; American Medical Association, *Physician Characteristics and Distribution in the U.S.*, 1981-1988 annual issues; American Hospital Association, *Hospital Statistics*, 1980-1987 annual issues.

Pooled time-series cross-sectional analysis

The evidence presented so far tends to suggest that prospective schemes may not effectively lower real per diem payment rates, and may not be effective in containing the growth in payment rates. We now extend our analysis further to take advantage of the cross-section time-series nature of the data. We use an error components model to estimate the model for data pooled across States during the period 1979-86, as did Swan et al.¹⁴ In Tables 5 and 6, we present results for several cross-section time-series specifications for real payment rates. We estimate our two initial models and then extend the model to follow theirs. Our extended model includes 2-year indicator variables reflecting all years after 1981

(YEAR81) and a second year variable reflecting all years after 1983 (YEAR83). The YEAR81 variable allows us to partially account for the effects of changes in State policies after the Boren Amendment in ORA, and the YEAR83 variable allows for the possible effects of the implementation of the Medicare DRG prospective payment system for hospitals on the demand for nursing home care (particularly SNFs), and the corresponding effects on the payment rates of the "... nursing homes as providers of post-hospital care." (Swan, Harrington, and Grant, 1988). We also include interaction terms for the YEAR81 and YEAR83 variables and the payment scheme variables.

The results for the ICF homes are presented in Table 5. When we estimate a simple model that includes only the payment scheme dummy variables, we find that relative to retrospective systems, the prospective facility specific system and the combination system lead to higher ICF rates than the retrospective system. These results also hold when we include the demographic variables. Our

¹⁴Although (as noted previously) we were able to replicate Swan et al. year by year results, we were unable to replicate their results for this model.

Table 5
Pooled cross-section time-series analysis of real ICF payment rates: 1979-86

Independent variables	Alternative specifications			
CONSTANT	*8.93 (23.2)	*20.79 (2.5)	*8.51 (23.1)	**21.11 (2.4)
PFS	*1.77 (5.8)	*1.68 (5.7)	*1.77 (5.5)	*1.61 (5.1)
PCL	0.97 (1.8)	0.59 (1.3)	*1.80 (3.2)	*1.45 (2.6)
COM	*1.21 (3.1)	*1.01 (2.6)	*1.14 (2.6)	**0.99 (2.3)
POP65	—	-0.08 (1.1)	—	-0.14 (2.1)
DRS	—	*0.01 (2.0)	—	0.01 (1.2)
LIFEX	—	-0.91 (1.9)	—	-0.83 (1.6)
HOSP	—	*0.02 (2.6)	—	0.01 (1.5)
UNEMP	—	** -0.08 (2.0)	—	-0.05 (1.0)
INCOME	—	**0.45 (2.0)	—	0.34 (1.5)
YEAR81(ORA)	—	—	0.64 (1.6)	0.73 (1.7)
YEAR83(PPS)	—	—	**1.12 (2.4)	0.58 (1.1)
Y81 * PFS	—	—	-0.59 (1.4)	-0.52 (1.3)
Y81 * PCL	—	—	** -1.12 (2.1)	** -1.17 (2.2)
Y81 * COM	—	—	-0.59 (1.2)	-0.66 (1.4)
Y83 * PFS	—	—	-0.28 (0.6)	-0.16 (0.3)
Y83 * PCL	—	—	-1.04 (1.9)	-0.89 (1.6)
Y83 * COM	—	—	-0.13 (0.2)	0.03 (0.1)
MSE	0.86	0.86	0.81	0.80
SAMPLE	328	328	328	328

*Significant at 0.01 level.

**Significant at 0.05 level.

NOTES: Absolute value of asymptotic *t*-statistic in parentheses. ICF is intermediate care facility. ORA is Omnibus Reconciliation Act. PPS is prospective payment system.

SOURCE: (Swan, Harrington, and Grant, 1988); *Statistical Abstract of the United States*, 1980-1988 annual issues; American Medical Association, *Physician Characteristics and Distribution in the U.S.*, 1981-1988 annual issues; American Hospital Association, *Hospital Statistics*, 1980-1987 annual issues.

replication of their model using the real ICF payment rate (instead of the nominal rate) is also presented in Table 5. All of the payment scheme coefficients are positive and significant. The only significant interaction term is for the prospective class-ORA interaction term. Thus, our estimates suggest that, relative to retrospective systems, class system payment rates were \$1.80 higher prior to ORA, and were lowered by \$1.12 (to a rate \$.68 higher) after ORA. The inclusion of State demographic variables results in an increase in the magnitude of the coefficient of the PCL-ORA interaction term to -1.17, thus lowering the estimated difference in payment rates to \$.18 after ORA. These results tend to suggest that over time, retrospective systems have had relatively lower payment

rates than prospective and combination systems, but that the differences associated with payment scheme categories are generally small.

The cross-section time-series model estimates for real SNF per diem rates are in Table 6. The simple model indicates that prospective facility-specific States are likely to have higher SNF rates than retrospective States. This result also holds when the State demographic variables are included. Our replication of their model using real SNF rates shows similar but much less pronounced effects. These results are not substantially changed by including economic and demographic variables in the model. Before ORA, our estimates suggest that prospective facility-specific schemes increased per diem

Table 6
Pooled cross-section time-series analysis of real SNF payment rates: 1979-86

Independent variables	Alternative specifications			
CONSTANT	*12.19 (20.1)	17.42 (1.2)	*10.86 (19.6)	21.54 (1.3)
PFS	*1.45 (3.8)	*1.44 (3.6)	*2.17 (5.5)	*2.02 (5.0)
PCL	-0.17 (0.2)	-0.30 (0.4)	**1.51 (2.0)	1.27 (1.7)
COM	0.45 (0.8)	0.31 (0.5)	**1.15 (2.1)	**1.13 (2.0)
POP65	—	-0.09 (0.9)	—	-0.14 (1.5)
DRS	—	0.01 (1.5)	—	0.00 (0.1)
LIFEX	—	-0.65 (0.6)	—	-0.71 (0.7)
HOSP	—	*0.03 (2.6)	—	**0.02 (2.0)
UNEMP	—	-0.02 (0.4)	—	-0.02 (0.3)
INCOME	—	0.61 (1.9)	—	0.00 (0.9)
YEAR81(ORA)	—	—	*2.21 (5.7)	*2.25 (5.6)
YEAR83(PPS)	—	—	*1.95 (4.6)	*1.44 (3.0)
Y81 * PFS	—	—	*-1.97 (4.6)	*-1.88 (4.4)
Y81 * PCL	—	—	*-2.29 (4.0)	*-2.42 (4.2)
Y81 * COM	—	—	*-1.95 (3.7)	*-1.99 (3.7)
Y83 * PFS	—	—	**-1.07 (2.3)	**0.98 (2.1)
Y83 * PCL	—	—	*-1.72 (3.0)	*-1.70 (2.9)
Y83 * COM	—	—	**1.37 (2.5)	**1.24 (2.3)
MSE	1.53	1.54	1.22	1.22
SAMPLE	328	328	328	328

*Significant at 0.01 level.
 **Significant at 0.05 level.

NOTES: Absolute value of asymptotic *t*-statistic in parentheses. SNF is skilled nursing facility. ORA is Omnibus Reconciliation Act. PPS is prospective payment system.

SOURCE: (Swan, Harrington, and Grant, 1988); *Statistical Abstract of the United States*, 1980-1988 annual issues; American Medical Association, *Physician Characteristics and Distribution in the U.S.*, 1981-1988 annual issues; American Hospital Association, *Hospital Statistics*, 1980-1987 annual issues.

payments by about \$2.00, prospective class schemes increased payments by about \$1.50 ($p < 0.1$), and combination systems increased payments by about \$1.15, relative to retrospective reimbursement. However, after ORA, rates for prospective class systems, facility-specific systems, and combination systems were lowered by \$2.42, \$1.88, and \$1.99, respectively, relative to retrospective systems. Real SNF rates were lowered further following the imposition of Medicare's prospective payment system for hospital care. Thus after 1983, relative to retrospective payment, prospective class system SNF rates were \$.94 lower, facility-specific rates were \$2.85 lower, and combination system rates were \$2.10 lower. This effect probably captures the initial

reduction in rates reflecting States' responses to the added discretion in setting rates after ORA. However, we still have not found any evidence that prospective methods lead to reductions in the growth in real payment rates.

Change in per diem rates

Our cross-section time-series results for the percent change in real payment rate for ICF and SNF homes are in Tables 7 and 8. There is no significant difference between the retrospective and prospective payment schemes in containing the growth of real payment rates for ICF homes (Table 7). This lack of statistical significance is indicated in all model specifications. Only

Table 7
Pooled cross-section time-series analysis of percent change in ICF rates: 1980-86

Independent variables	Alternative specifications			
CONSTANT	2.31 (1.4)	*-72.72 (2.9)	-0.01 (0.0)	** -65.78 (2.5)
PFS	0.22 (0.1)	1.54 (0.8)	-1.35 (0.5)	-0.05 (0.0)
PCL	-2.49 (1.1)	-2.06 (0.8)	0.11 (0.0)	0.32 (0.1)
COM	0.62 (0.3)	0.87 (0.7)	1.83 (0.5)	1.40 (0.4)
POP65	—	0.59 (1.9)	—	0.52 (1.6)
DRS	—	-0.00 (0.1)	—	-0.00 (0.3)
LIFEX	—	**3.08 (2.2)	—	**2.84 (2.0)
HOSP	—	0.07 (1.9)	—	0.07 (1.7)
UNEMP	—	0.16 (0.5)	—	-0.02 (0.0)
INCOME	—	2.18 (1.3)	—	1.83 (1.1)
YEAR81(ORA)	—	—	4.54 (1.1)	3.86 (1.0)
YEAR83(PPS)	—	—	**0.19 (0.0)	-2.08 (0.4)
Y81 * PFS	—	—	0.71 (0.2)	0.99 (0.2)
Y81 * PCL	—	—	-6.24 (1.1)	-5.59 (1.0)
Y81 * COM	—	—	-5.23 (1.0)	-4.08 (0.8)
Y83 * PFS	—	—	-0.10 (0.0)	0.39 (0.1)
Y83 * PCL	—	—	2.03 (0.3)	2.39 (0.4)
Y83 * COM	—	—	3.30 (0.6)	3.85 (0.7)
MSE	95.80	90.08	94.05	90.63
SAMPLE	287	287	287	287

*Significant at 0.01 level.

**Significant at 0.05 level.

NOTES: Absolute value of asymptotic *t*-statistic in parentheses. ICF is intermediate care facility. ORA is Omnibus Reconciliation Act. PPS is prospective payment system.

SOURCE: (Swan, Harrington, and Grant, 1988); *Statistical Abstract of the United States*, 1980-1988 annual issues; American Medical Association, *Physician Characteristics and Distribution in the U.S.*, 1981-1988 annual issues; American Hospital Association, *Hospital Statistics*, 1980-1987 annual issues.

one of the payment scheme-time interaction terms is statistically significant. Indeed, the only variable that is consistently significant in the ICF payment growth rate model is life expectancy.

The results for the SNF payment growth rate regressions are presented in Table 8. The results suggest that over time, relative to retrospective systems, combination and prospective facility specific systems reduced the growth rate of per diem payments by about 4 percentage points, and prospective class systems reduced growth rates about 2 percentage points. Most of this reduction occurred after the effects of ORA. After 1983, however, the reduction in growth rates attributable to ORA largely disappears. This may be partially a result

from the implementation of Medicare's PPS and the corresponding increase in Medicare demand for SNF services.

These results should be interpreted cautiously. Most of the apparent cost containment effects of prospective payment schemes occur on the heels of ORA (between 1981 and 1983). Six States changed payment system categories from 1981-83 (another four States changed systems after 1983). States with prospective payment systems might have been more likely than other States to adopt other types of cost containment measures in Medicaid programs after ORA.¹⁵ The possible effects of

¹⁵The impact of payment systems on the rate of change in per diem payments is not addressed in Ohsfeldt et al. (1988).

Table 8

Pooled cross-section time-series analysis of percent change real SNF payment rates: 1980-86

Independent variables	Alternative specifications			
CONSTANT	*5.73 (5.5)	*-48.49 (2.6)	2.17 (1.5)	** -44.86 (2.5)
PFS	*-4.11 (3.7)	*-3.88 (3.6)	-3.08 (1.7)	-2.77 (1.5)
PCL	*-5.36 (3.6)	*-6.20 (3.8)	-2.08 (0.8)	-3.04 (1.4)
COM	*-3.62 (2.6)	*-3.89 (2.7)	-0.58 (0.2)	-1.36 (0.5)
POP65	—	0.11 (0.6)	—	0.10 (0.4)
DRS	—	-0.02 (1.6)	—	-0.02 (1.8)
LIFEX	—	*2.61 (2.6)	—	**2.34 (2.3)
HOSP	—	0.05 (1.8)	—	**0.06 (2.0)
UNEMP	—	0.04 (0.2)	—	-0.10 (0.4)
INCOME	—	2.05 (1.7)	—	1.64 (1.4)
YEAR81(ORA)	—	—	*9.85 (4.3)	*10.20 (4.4)
YEAR83(PPS)	—	—	*-7.49 (3.1)	*-9.26 (3.6)
Y81 * PFS	—	—	** -6.57 (2.4)	** -6.72 (2.5)
Y81 * PCL	—	—	*-9.89 (2.6)	*-9.89 (2.6)
Y81 * COM	—	—	** -8.79 (2.5)	** -8.18 (2.4)
Y83 * PFS	—	—	**7.80 (2.8)	*8.11 (2.9)
Y83 * PCL	—	—	**8.39 (2.4)	*8.64 (2.5)
Y83 * COM	—	—	**7.05 (2.1)	**7.42 (2.3)
MSE	49.39	47.18	47.65	48.38
SAMPLE	287	287	287	287

*Significant at 0.01 level.

**Significant at 0.05 level.

NOTES: Absolute value of asymptotic t-statistic in parentheses. SNF is skilled nursing facility. ORA is Omnibus Reconciliation Act. PPS is prospective payment system.

SOURCE: (Swan, Harrington, and Grant, 1988); *Statistical Abstract of the United States*, 1990-1988 annual issues; American Medical Association, *Physician Characteristics and Distribution in the U.S.*, 1981-1988 annual issues; American Hospital Association, *Hospital Statistics*, 1980-1987 annual issues.

other programmatic changes may be reflected in the payment scheme-time interaction coefficients, if other programmatic changes and payment system choice are correlated. Thus, it is unclear to what extent the estimated reduction in growth rates following is attributable to payment system incentives, or to changes in eligibility requirements, Medicaid bed supply, benefit limits, and so on.

In summary, these estimates, together with the estimates presented in Table 6, suggest that States with prospective payment systems tended to have higher SNF payment levels, but lower SNF payment growth rates, than States with retrospective systems. SNF payment growth rates tended to converge across payment system categories after 1983. The results do not, in our view,

provide convincing evidence for the cost containment effects of prospective payment systems per se, because the apparent cost savings may be the result of confounding changes in other aspects of Medicaid programs following ORA. Available data do not permit us to explore this hypothesis further.

Conclusion

When nominal payment rates for ICF and SNF homes are analyzed, as in Swan, Harrington, and Grant (1988), the findings suggest that prospective payment schemes tend to reduce payment rates for long-term care, particularly for SNFs. However, our regression analysis,

using real payment rates and demographic control variables, tends to indicate that differences in payment scheme categories among States have little effect on the real payment rate for either ICFs or SNFs, or the growth in real payment rates for ICFs. Our findings regarding SNF payment growth rates are mixed. Although the type of payment scheme may affect other components of the Medicaid nursing home system, such as quality of care, the results presented here show no strong support for one general category of payment system over another on the basis of cost containment.

However, this conclusion is based on results that may simply reflect the inherent limitations of our model. The payment system categories used may not be accurate indicators of the cost containment incentives within State payment systems. State's payment systems choices may be correlated with other programmatic changes with cost containment implications not accounted for in our model. Furthermore, it may be the case that both the payment rate and the payment system are determined endogenously, along with reciprocity and utilization rates. Analyzing this effect is beyond the scope of this article. In another study, Ohsfeldt et al. (1988) find that accounting for simultaneity bias increases the estimated effect of prospective payment schemes on reducing payment rates. Their results, however, are obtained from an incomplete structural model, and are sensitive to the choice of identifying restrictions employed. Nevertheless, their results, along with the analysis presented here, suggest the difficulty of measuring the cost savings associated with payment system incentives. Additional research is needed before we conclude strongly that States adopting prospective payment systems for long-term care will be successful in containing their payment rates.

Acknowledgment

The authors would like to thank Steve Craig for making the State price index available to them.

References

- Cotterill, P.G.: Provider Incentives Under Alternative Reimbursement Systems. In Vogel, R.J., and Palmer, H.C., Eds. *Long-Term Care: Perspectives from Research and Demonstrations*. Health Care Financing Administration. Washington. U.S. Government Printing Office, 1983.
- Cromwell, J., Hurdle, S., and Wedig, G.: Impacts of Economics and Programmatic Changes in Medicaid Enrollments. *Review of Economics and Statistics* 66:(2)232-40, May 1986.
- Harrington, C., and Swan, J.H.: Medicaid nursing home reimbursement policies, rates, and expenditures. *Health Care Financing Review*. 6(1):39-49. HCFA Pub. No. 03176. Office of Research and Demonstrations, Health Care Financing Administration. Washington. U.S. Government Printing Office, Fall 1984.
- Craig, S.G., and Inman, R.P.: Federal Aid and Public Education: An Empirical Look at the New Fiscal Federalism. *Review of Economics and Statistics* 64:(4)541-552, Nov. 1982.
- Gohmann, S.: State Nursing Home Policies and Expenditures, presented at the Southern Economic Association meetings, Nov. 1988.
- Health Care Financing Administration, Bureau of Data Management and Strategy: Federal 2082 Reporting Requirements, Baltimore, Md. 1986.
- Lee, A.J., Birnbaum, H., and Bishop, C.: How Nursing Homes Behave: A Multi-Equation Model of Nursing Home Behavior. *Social Science and Medicine* 17:(2)1897-1906, Feb. 1983.
- Meiners, M.R.: An Econometric Analysis of the Major Determinants of Nursing Home Costs in the United States. *Social Science and Medicine*, 16:(8)887-898, Aug. 1982.
- Muse, D.N., and Sawyer, D.: *Medicare and Medicaid Data Book, 1981*. Health Care Financing Program Statistics. HCFA Pub. No. 03128. Office of Research and Demonstrations, Health Care Financing Administration, U.S. Government Printing Office, Apr. 1982.
- Nyman, J.: Prospective and Cost-Plus Medicaid Reimbursement, Excess Medicaid Demand, and the Quality of Nursing Home Care. *Journal of Health Economics* 4:(3)237-259, Sept. 1985.
- Nyman, J.: The Effect of Competition on Nursing Home Expenditures under Prospective Payment. *Health Services Research* 23:(4)555-574, Oct. 1988.
- Ohsfeldt, R.L., Buchanan, R., and Antel, J.: The Effects of Prospective Payment Methods on Medicaid Payment Rates for Long-Term Care, presented at the Southern Economic Association meetings, Nov. 1988.
- Swan, J.H., Harrington, C., and Grant, L.: State Medicaid reimbursement for nursing homes, 1978-86. *Health Care Financing Review*, 9:(3)33-50. HCFA Pub. No. 03263. Office of Research and Demonstrations, Health Care Financing Administration. Washington. U.S. Government Printing Office, Spring 1988.
- Wendling, W., and Werner, J.: Nonprofit Firms and the Economic Theory of Regulation. *Quarterly Review of Economics and Business* 20(1):6-18, Autumn 1980.