

IX. EMPLOYMENT RELATIONS FOR HEALTH CARE WORKERS

Serving the Medicaid and Medicare Populations: Nursing Labor Market Dynamics

Matthew Bodah, John Burkett, and Leonard Lardaro
University of Rhode Island

Abstract

In this paper we examine the effects of changes in Medicaid and Medicare coverage on the employment of registered nurses, licensed practical nurses, and certified nursing assistants. With estimates using time series data, we find that Medicaid coverage has a significant positive effect on the employment of registered nurses in the short run. A 10 percent increase in Medicaid coverage is associated with a 2.74 percent increase in registered nurse employment. Results also show that a model of monopsony power, previously applied to hospitals, is relevant to nursing homes.

Introduction

The effective demand for nurses may depend on not only the number of people who could benefit from nursing care, but also their insurance coverage. From 1987 to 2001, the number of people covered by Medicare rose steadily, from 30.5 million to 38.0 million, while the number covered by Medicaid fluctuated between 20.2 million (1987) and 31.9 million (1995). In this paper, we examine the effects of changes in Medicaid and Medicare coverage on employment of registered nurses (RNs), licensed practical nurses (LPNs), and nursing aides, orderlies, and attendants (NAOAs). Employment has trended upward for RNs and NAOAs, while it has risen and then fallen

Authors' address: University of Rhode Island, Schmidt Labor Research Center, 36 Upper College Road, Kingston, RI 02881

for LPNs. The fall in LPN employment in the 1990s is probably due in large part to a move by hospital administrators to replace LPNs with NAOAs in less complex tasks and with RNs in more complex ones. If the wages of the three types of nurses were determined independently, we would expect to see the wages of LPNs dropping relative to those of RNs and NAOAs. In fact, the earnings of the three groups moved in near parallel, calling to mind the wage structures discussed by Dunlop (1957). The rigidity of wage structures among nurses has been noted by Krall (1995), who observes that hospital administrators have feared that changes in the customary wage differentials among RNs, LPNs, and NAOAs could create dissension and undermine cooperation.

Monopsonistic Equilibrium

Considering the seeming rigidity of the wage structure for nurses, we doubt that markets for nurses can be accurately modeled as if in continuous equilibrium. Nonetheless, equilibrium employment and wages may be of interest as attractors influencing disequilibrium dynamics. A simple model of monopsonistic equilibrium in the nursing labor market was introduced by Yett (1970). In this model, a local monopsonist derives its marginal expenditure function from a given labor supply function, chooses a quantity of labor to equate its marginal expenditure with its marginal revenue product, and pays just enough to attract this quantity of labor, given the labor supply curve. The gap between its chosen employment level and that which would equate its marginal revenue product with its chosen wage may be one source of frequent reports of nurse "shortages."

New Evidence of Monopsony Power

Because previous studies of monopsony power in nursing labor markets have focused on hospitals as employers of RNs and LPNs, we need new evidence to justify applying the monopsony model more widely. Fortunately, we have recently gained access to a cross-sectional data set pertaining to nursing homes in Rhode Island. Because nursing homes far outnumber hospitals, one might suspect they would operate in a more competitive labor market.

Of the three occupational groups considered in this paper, NAOAs have the least specialized training. The wage differentials separating nurses from non-health service workers are less for NAOAs than for RNs or even LPNs. Thus, one might suspect that nursing homes compete for NAOAs not only with each other and with hospitals, but also with many non-health service sector employers. If the local monopsony model of nursing labor markets has a weak spot, it is most likely in application to nursing homes as employers of NAOAs. Our data set on Rhode Island nursing homes provides information on employment and wages for an important subset of NAOAs, certified nurse assistants

(CNAs). To assess the relevance of the local monopsony model to nursing homes as employers of CNAs, we estimate the wage elasticity of CNA labor supply to individual nursing homes. In monopsonistic markets, this elasticity is a finite positive number. The smaller the elasticity, the greater the monopsony power. Data for the year 2001 are used, which consist of a total of 52 nursing homes located throughout Rhode Island. We specify the supply of labor to a nursing home i as follows:

$$(1) \quad L_i = \alpha_1 W_i + \alpha_2 CA_i + \alpha_3 HW_i + \alpha_4 RLU_i + \alpha_5 L_i^0 + \varepsilon_i$$

where L is average weekly hours, W is average weekly wages paid to CNAs, CA is a vector of variables measuring amenities and nonwage compensation, HW is expenditure on "Help Wanted" advertising, RLU is the relative local unemployment rate, L^0 is the employment level for the previous year, and ε is a random disturbance. All variables are in logarithmic form.

Because wages are endogenous, equation (1) is estimated using an instrumental variable technique, where W is regressed on a series of nursing home-specific variables related to labor demand, and the predicted values of W are used in place of the original variable when estimating the labor supply equation. Inclusion of the lagged dependent variable reflects a partial adjustment framework, where actual hours supplied require a period of adjustment before arriving at their long-run equilibrium. The coefficient of L^0 allows this equation to provide an estimate of the long-run elasticity of supply, which is obtained by dividing the short-run elasticity α_1 by $(1 - \alpha_5)$. The estimated equation fits the data well, yielding an adjusted R^2 of .977 and an F statistic of 307.5. The estimates of primary interest (with t statistics in parentheses) are $\hat{\alpha}_1 = .420$ (3.767) and $\hat{\alpha}_5 = .537$ (4.309). The estimated short-run wage elasticity of CNA labor supply, 0.420, is statistically significant at the 1 percent level and above. The estimate of long-run wage elasticity is 0.908, which is also statistically significant. A 1 percent rise in average weekly wages raises the supply of weekly CNA hours to nursing homes, on average, by 0.420 percent in the short run and by 0.908 percent in the long run, given fixed values of the other regressors. Thus, the supply of CNAs to individual nursing homes appears to be inelastic in both the short and the long run, confirming the relevance of the local monopsony model.

The Role of Insurance in a Model of Monopsonistic Equilibrium for Use with Time-Series Data

We assume that labor supply and hence the marginal expenditure function depends on, inter alia, the labor force and wages in alternative occupations, whereas the marginal revenue product function depends on the popu-

lation and the extent to which it is covered by insurance. Thus, reduced-form equations for equilibrium levels of employment and wages should have labor force, wages in alternative occupations, population, and insurance coverage among their right-hand-side variables.

Medicaid coverage increases when (a) eligibility criteria are relaxed or (b) people lose jobs and fall below poverty lines defining eligibility. In the former case, increases in Medicaid coverage should raise marginal revenue product curves, boosting nurses' equilibrium employment and earnings. In the latter case, the reverse might occur, particularly if the people being added to Medicaid roles had previously been covered by more generous private insurance. Medicare coverage increases when people turn 65 or become disabled more rapidly than people already covered die. No doubt the old and disabled make greater demands on nursing facilities than do younger and healthier people; however, the bulk of people joining Medicare have previously had employment-based health insurance. Since the early 1980s Medicare has used a prospective payment system that probably put more cost-saving pressure on health care providers than does traditional private insurance. The effects of growth of the Medicaid and Medicare populations on employment of nurses are thus empirical questions.

Specification of Disequilibrium Dynamics

Allowing employment to depend on its equilibrium level and its lagged level, we specify the following employment equation:

$$L_t = \beta_0 + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} + \beta_6 L_{t-1} + \varepsilon_t,$$

where L denotes full-time employment, X_1 the number of people covered by Medicaid, X_2 the number covered by Medicare, X_3 the population (all three expressed in millions), X_4 average real earnings in all occupations, and X_5 labor force. All variables are expressed as natural logarithms. The time subscript takes values ranging from 1988 to 2001. An equation of this form pertains to all three types of nurses. The only difference among the explanatory variables for the three types of nurses is that we construct the labor force variable as a weighted average of male and female labor forces with weights reflecting the sexual composition of the three occupations in 1988. The lagged dependent variable may pick up two effects. On the one hand, adjustment of employment takes some time. On the other hand, adjustment of capital may take longer. In the transition from one equilibrium to another, labor inputs may overshoot their terminal values to compensate for the slower adjustment of capital inputs. Thus, the sign on the coefficient of the lagged employment term is uncertain.

Time-Series Data and Econometric Results

Our data consist of annual observations for 1988–2001 obtained from the Bureau of Labor Statistics's *Employment & Earnings* and the Census Bureau's *Statistical Abstract of the United States 2001*, table 12, and *Historical Health Insurance Tables*, table HI-1. With seven parameters to estimate from only fourteen observations, collinearity problems must be expected. Using diagnostics suggested by Belsley (1991), we find that the RN data have a near collinearity involving the constant, Medicaid coverage, population, and earnings; LPN data have one involving the constant, Medicaid coverage, population, earnings, and the labor force; and NAOA data have one involving all variables except the labor force. Considering the pattern of collinearity in our data sets, we may anticipate difficulty in getting precise and robust estimates of five coefficients of particular interest (i.e., those indicating the effects of Medicare coverage on RN employment, Medicaid coverage on LPN employment, Medicaid and Medicare coverages on NAOA employment, and lagged NAOA employment on current NAOA employment). These difficulties could in principle be finessed by introducing extraneous information on the coefficients of other variables involved in near collinearities. Although we may do so in future research, for now we simply approach the ordinary least squares (OLS) estimates with due caution and limited expectations.

OLS estimates of the reduced-form employment equation for the three nursing categories are shown in the table. The italicized numbers under coefficient estimates are *t* statistics. Because the variables are all expressed in logarithmic form, the estimated coefficients can be interpreted as elasticities. The summary statistics indicate that in each nursing category the regression accounts for a large share of the variance in employment and that a hypothesis of 0 autocorrelation cannot be rejected at conventional significance levels. Bearing in mind that the critical values of a *t* statistic with 7 degrees of freedom are 1.895 at the .05 level and 2.998 at the .01 level, we can see that Medicaid and Medicare coverages have estimated effects on RN employment that are statistically significant at the .01 level and Medicare coverage has an estimated effect on NAOA employment that is significant at the .05 level. We suspect, however, that collinearity makes the estimates of the effect of Medicare coverage on RN employment and the effects of Medicaid and Medicare coverages on NAOA employment vulnerable to errors in variables. Thus, our one robust finding with regard to short-run effects is that Medicaid coverage tends to increase RN employment. In principle, long-run effects could be calculated by equating current and lagged values of employment. The coefficients on lagged employment, however, are estimated with so little precision that this exercise would be of little substantive interest.

TABLE 1
OLS Estimates of Reduced-Form Employment Equations

	RNs	LPNs	NAOAs
Constant	-0.544 -0.079	-30.001 -1.749	-71.017 -2.126
Medicaid coverage	0.274 5.848	-0.008 -0.759	-0.292 -1.416
Medicare coverage	-1.771 -3.135	0.001 0.080	-4.792 -1.996
Population	-0.349 -0.309	4.729 2.169	9.846 1.918
Earnings in other occupations	0.358 0.983	-1.251 -1.453	-1.841 -1.303
Labor force	3.982 9.453	-4.028 -2.448	2.572 2.145
Lagged dependent variable	-0.112 -1.027	0.273 1.092	-1.084 -1.769
Summary statistics:			
<i>R</i> ²	0.996	0.811	0.974
Durbin's <i>F</i>	3.096	0.153	1.232
Tail area for <i>F</i>	0.129	0.709	0.310

Conclusions

Our analysis of a cross section of Rhode Island nursing homes indicates that the supply of certified nursing assistant hours to individual nursing homes is inelastic in both the short and the long run. This result indicates that a model of monopsony power, previously applied to hospitals as employers of RNs and LPNs, is also relevant to nursing homes as employers of certified nurse assistants. The remarkable persistence of the earnings structure for RNs, LPNs, and NAOAs in the face of efforts by hospital administrators to replace LPNs with RNs and NAOAs is suggestive of relative wage rigidity.

We have used a model involving monopsony power and relative wage rigidity as a basis for specifying reduced-form employment equations for RNs, LPNs, and NAOAs. Estimating these equations from U.S. time-series data, we have found evidence that Medicaid coverage has a significant positive effect on employment of RNs: a 10 percent increase in Medicaid coverage is estimated to induce a 2.74% short-run increase in RN employment. Because of the low precision of the estimate for the coefficient of lagged RN employment, we are unable to say with confidence whether the long-run effect is greater or less than that. The effects of Medicaid on employment of LPNs and

NAOAs and the effects of Medicare on all three occupations remain in doubt pending analysis using richer data sets or more extraneous information.

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