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**BUREAU OF ECONOMICS
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WASHINGTON, DC 20580**

**The Effect of Hospital Mergers on Inpatient Prices:
A Case Study of the New Hanover-Cape Fear Transaction**

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Washington, DC

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Abstract

The Federal Trade Commission initiated a Hospital Merger Retrospective Project in 2002 to analyze the effects of consummated mergers. One of the mergers studied was the 1998 acquisition by New Hanover Regional Medical Center (“New Hanover”) of Columbia Cape Fear Memorial Hospital (“Cape Fear”) in Wilmington, North Carolina. In this paper, we employ patient-level claims data from four different insurers to estimate the effects of this merger on inpatient prices. Our results provide mixed evidence. Two of the insurers experienced substantial post-merger price increases relative to the control group of hospitals. The post-merger price changes for another insurer, however, were comparable to those for the control group, while the fourth insurer actually experienced a significant price decrease following the merger. Thus, it is difficult to draw conclusions about the impact of this merger on inpatient pricing.

¹ The views expressed in the paper are those of the author and not necessarily those of the Commission or any individual Commissioner. I am thankful to Michelle Kambara, Peter Newberry, and Jorge Roberts for outstanding research assistance and to Steve Tenn, Mike Vita, and an anonymous referee for helpful comments. All errors are my own.

Introduction

The hospital industry went through substantial consolidation during the 1990s. During this time, the Federal Trade Commission, Department of Justice, and the California Attorney General challenged seven hospital mergers and lost all seven cases.² As a result, the Federal Trade Commission initiated a Hospital Merger Retrospective Project in 2002 to analyze the effects of consummated mergers. One of the mergers studied was the 1998 acquisition by New Hanover Regional Medical Center (“New Hanover”) of Columbia Cape Fear Memorial Hospital (“Cape Fear”) in Wilmington, North Carolina. In this paper, we evaluate the effects of this merger on inpatient prices.

New Hanover is a large public non-profit hospital that offers a wide range of services, including tertiary care such as cardiac surgery. At the time of the acquisition, it had 546 staffed beds. Cape Fear was a small community hospital with 109 staffed beds that offered general acute care services. The two hospitals are located six miles apart from one another while the next closest hospital is over 20 miles away. Thus, those consumers located near New Hanover and Cape Fear may have viewed the two hospitals as very close substitutes for providing general acute care services. Thus, it is plausible that the acquisition enabled one or both of the merged parties to increase prices.

On the other hand, it is possible that competition from nearby hospitals constrained potential price increases. Table 1 lists the six hospitals that are located within 60 miles of New Hanover. The two closest hospitals, located within approximately 30 miles of New Hanover, are

² The seven cases were: California v. Sutter Health System (2000), FTC v Tenet Healthcare Corp. (1998), United States v. Long Island Jewish Medical Center, (1997), FTC v. Butterworth Health Corp. (1996), United States v. Mercy Health Services (1995), FTC v. Freeman Hospital,

very small – approximately one-half of the size of Cape Fear or smaller at the time of the acquisition.³ The closest hospitals to New Hanover that are of comparable size to Cape Fear are 45 miles away. While this appears to be a long distance to travel for hospital services, the courts have accepted such large geographic markets. In *FTC v. Freeman*, for example, the court considered the merging parties to compete with hospitals located 50 miles away.⁴

Another issue is whether New Hanover's status as a public non-profit hospital would reduce its incentive to exercise market power. It has been argued that the objective of non-profit hospitals is to serve the community rather than to maximize profits.⁵ Indeed, this argument has been accepted by the courts as a rationale for ruling that mergers among non-profit hospitals are not likely to be anticompetitive.⁶ Recent hospital merger retrospective studies, however, have provided evidence of significant post-merger price increases from mergers involving non-profit hospitals.⁷

Another consideration is whether the merger led to efficiencies that may have offset any potential anticompetitive effects. Following the merger, for example, New Hanover opened an

(1995), *In re Adventist Health System* (2004).

³ Pender Memorial, located 32 miles from New Hanover, is somewhat larger, but it has been operated by New Hanover since 1999. Thus it is not an independent competitor.

⁴ *FTC v. Freeman Hospital*, 911 F Supp. 1213 (W.D. MO. 1995), *aff'd* 69 F.3d 260 (8th Cir. 1995). See also Capps, Dranove, Greenstein, and Satterthwaite (2002) for a discussion of geographic market definition in recent hospital cases.

⁵ See, for example, Lynk (1995).

⁶ See, for example, *United States v. Long Island Jewish Med. Ctr.*, 983 F. Supp. 121, 149, 146 (E.D.N.Y 1997) and *FTC v. Butterworth Health Corp.*, 1997-2 Trade Cas. (CCH) (6th Cir. 1997). This argument was recently rejected, however, in the decision of *Evanston Northwestern Healthcare Corp.*, FTC Docket No. 9315, Initial Decision (October 20, 2005).

⁷ See Vita and Sacher (2001), Haas-Wilson and Garmon (2009), and Tenn (2008).

orthopedic specialty center at Cape Fear and consolidated orthopedic surgery at this location.⁸ As another example, obstetric services were consolidated to the New Hanover location.⁹ To the extent that these consolidations led to cost savings that were passed on to consumers, prices may have fallen, other things equal. Consolidations such as these may have also increased the quality of care in these areas. An analysis of possible merger-related quality improvements, however, is beyond the scope of this paper.

We estimate the effect of the New Hanover-Cape Fear merger on inpatient prices. Our analysis is based on patient-level claims data from New Hanover and four large managed care insurers. These data contain detailed information about the diagnosis, procedures, and payments relating to the claim as well as demographic information about the patient. We perform econometric analysis to control for factors, such as the types of illnesses treated, that are unrelated to the merger that may affect hospital prices. In addition, there may be unobservable factors that are also experienced by other hospitals, such as changes in technology. To control for such factors, we estimate the price changes at New Hanover *relative* to those at a control group of similar hospitals. In other words, we estimate the difference between the price changes for New Hanover and the price changes for the control group hospitals. This “difference-in-differences” approach is used in other merger retrospective studies.¹⁰

⁸ www.nhrmc.org, accessed on 11/20/2008.

⁹ www.nhrmc.org, accessed on 11/20/2008.

¹⁰ See, for example, Vita and Sacher (2001), Taylor and Hosken (2007), Tenn (2008), and Haas-Wilson and Garmon (2009).

Econometric Model

A typical difference-in-differences approach to analyzing a hospital merger would involve estimating an equation similar to the following:

$$\ln p_i = X_i\beta + \gamma_{hi} + \alpha Post-Merger_i + \theta(Post-Merger_i * M_i) + \omega_i$$

The dependent variable, p_i , is the price for a given inpatient hospital admission for individual i , X_i is a set of patient and diagnosis characteristics, and γ_{hi} represents the hospital fixed effect for hospital h . The variable $Post-Merger_i$ is a dummy variable that is equal to one if patient i is admitted to hospital h_i during the post-merger period, and M_i is a dummy variable equal to one if hospital h_i is one of the merging parties. The coefficient θ is the difference-in-differences estimator and reflects the difference between the price change for the merging parties and the price change for the control group, after controlling for observable characteristics X .

As discussed by Bertrand, Duflo, Mullainathan (2004) and Donald and Lang (2007), OLS estimation of difference-in-differences equations such as the one above is likely to lead to standard errors that are substantially biased downward. This is because the error terms are likely to be correlated within groups. In our case, the error terms are likely to be correlated among patients treated at the same hospital under the same insurance contract. Thus, there is less new information from additional patients at the same hospital than would be implied by the number of observations. In addition, due to random variation among hospitals, the price changes at the merging and control hospitals would not generally be the same even in the absence of the merger. Failure to take account of the group-error structure generates underestimates of the standard errors.

Unbiased standard errors can be obtained by using a simple two-stage approach.¹¹

Thus, we follow Tenn (2008) and estimate the price change for New Hanover and Cape Fear relative to the control group in two stages. In the first stage, we estimate the price changes for each hospital using the following model for each insurer separately:

$$\ln p_i = X_i\beta + \gamma_h + \delta_h \text{Post-Merger}_i + \varepsilon_i \quad (1)$$

The hospital-specific coefficient of the Post-Merger dummy variable, δ_h , measures the post-merger price change of hospital h after controlling for characteristics X .

In the second stage, we estimate the difference between the price changes for the merging hospitals and the control group hospitals:

$$\hat{\delta}_h = \alpha + \theta M_h + v_h \quad (2)$$

The dependent variable is estimated from equation (1), and M_h is a dummy variable equal to one if hospital h is one of the merging parties. As above, the coefficient θ is the difference-in-differences estimator. The fact that the dependent variable is estimated rather than observed raises the possibility that the error term may be heteroskedastic. The error term will be approximately homoskedastic, however, if the number of observations for each control group hospital is large, as is the case in this study.¹² In contrast to the one-step procedure that is commonly employed, OLS estimation of (2) will yield unbiased standard error estimates, assuming that the error term, v_h , is i.i.d. normal.¹³

¹¹ See Moulton (1990), Bertrand et al., (2004), Donald and Lang (2007), and Tenn (2008).

¹² See Donald and Lang (2007),

¹³ See, for example, Moulton (1990), Bertrand et al., (2004), Donald and Lang (2007), and Tenn (2008) for a discussion of these two econometric approaches to difference-in-

We estimated our benchmark models using both the one-step and the two-step methods. Consistent with the discussion above, the estimated coefficients for the two methods are similar, but the standard errors estimated by the two-step approach are substantially larger. The results reported below are based on the two-step procedure.

Data

We received patient-level claims data from New Hanover as well as from four large managed care insurers. These data contain detailed information about the diagnosis, procedures, and payments relating to the claim as well as demographic information about the patient. The New Hanover data include claims for New Hanover and Cape Fear only, while the data that we received from the insurance companies include claims data for all of the hospitals in the state of North Carolina. In order to use the same data source for the merging hospitals and the control group hospitals, our difference-in-differences analysis is based on the data provided by the insurers. However, we also estimate equation (1) using the data provided by New Hanover to provide a benchmark and to test the robustness of the results based on the insurer data.

The variables used in the econometric analysis are defined in Table 2. Our measure of price is the total amount paid for each inpatient stay. This includes the payments made by the insurance company as well as the patient's copayment and deductible. For some claims, the total payments reported in the data are too low to be credible, presumably due to incomplete claims,

difference estimation.

coding errors, or missing data.¹⁴ We restrict the dataset to claims for which the average payment per day is greater than \$250.

The claims for New Hanover and Cape Fear are not identified separately post-merger in the insurer datasets. Thus, we estimate the combined price changes for New Hanover and Cape Fear (“New Hanover/Cape Fear”) in our difference-in-differences analysis. Using the data provided by New Hanover, however, we are able to estimate the price changes for the two hospitals separately. Based on these data, the estimated price changes for New Hanover alone are similar to those for New Hanover and Cape Fear combined. This reflects, in part, the small size of Cape Fear relative to New Hanover.

The merger was consummated in November 1998, but prices were largely determined by the existing pre-merger contracts until new contracts were negotiated. New Hanover negotiated its post-merger contracts with individual insurers at different times, with the effective dates of these contracts ranging from February 1999 to January 2001. In our benchmark specification, the pre-merger period is defined to be 1997-1998, and the post-merger period is defined to be 2001-2002.¹⁵ The two years, 1999 and 2000, are considered to be the transition years and are omitted from the estimation.

¹⁴ The data that we received from the insurers include multiple lines for each claim, representing the various procedures or services performed. The data are aggregated for each claim based on the claim number and/or other identifying information.

¹⁵ Some of the datasets do not include data prior to 1997. In order for the pre-merger period to include two full years of data, the full year of 1998 is considered to be part of the pre-merger period even though the merger was consummated in November of that year. To the extent that New Hanover adjusted its pricing immediately, our results will underestimate the full impact of the merger. Sensitivity analysis, however, indicates that our results are robust to a number of different event windows.

Our benchmark control group includes urban hospitals in North Carolina that are similar in size to New Hanover.¹⁶ In particular, this group is defined to include all urban hospitals in the state that have over 400 beds. One of the hospitals meeting these criteria was omitted from the benchmark control group because it also was involved in a merger of two hospitals located in close proximity to one another during the sample period.¹⁷ The resulting control group consists of eleven hospitals.¹⁸ One of the insurers had contracts with only nine of these hospitals during the sample period so the control group for this insurer consists of nine hospitals.

To control for changes in the mix of services provided and/or the severity of illnesses, we assign each claim to one of fifteen categories based on the patient's Diagnosis Related Group (DRG) that is identified in the claims data. Each DRG is defined to include a group of diagnoses that require similar resources to treat. A dummy variable for each category is included in the estimation equation. These categories are similar to those upon which many hospital contracts are based. A contract between a hospital and an insurer, for example, may include general per diem or per case rates for surgery and medical admissions and then specify special rates for categories such as cardiac surgery and obstetrics.¹⁹ For one insurer, DRG codes are not

¹⁶ We choose hospitals that are similar to New Hanover rather than Cape Fear because the observed price changes are driven largely by New Hanover due, in part, to the relative sizes of the two hospitals.

¹⁷ Sensitivity analysis indicates that including this hospital in the control group does not affect the results substantially.

¹⁸ These hospitals are: Carolinas Medical Center, Duke University Hospital, Forsyth Medical Center, Moses Cone Health System, Pitt County Memorial Hospital, Presbyterian Healthcare, North Carolina Baptist Hospital, Northeast Medical Center, Rex Healthcare, University of North Carolina Hospitals, and WakeMed.

¹⁹ See Table 2 for a list of categories included in the analysis.

reported in the data so we use dummy variables based on the patient's primary ICD9 diagnosis code.²⁰

We also control for changes in the severity of illness by including the patient's length of stay as an independent variable. For payers with more than one insurance plan, we employ dummy variables for each type of plan (e.g., HMO, PPO, etc.) to control for different pricing structures among these plans. In addition, when available in the particular dataset, we include the patient's age and sex. To protect the identity of the insurers as well as to avoid inadvertently reporting information that may be competitively sensitive, we do not provide summary statistics of the data.

Results

Table 3 summarizes the post-merger changes in the price per admission based on the data provided by New Hanover for each of the four insurers. The unadjusted average price per admission charged by New Hanover/Cape Fear increased post-merger for three of the insurers. The price increases ranged from 24% for Insurer 3 to 106% for insurer 1. In contrast, price per admission decreased by 18% for Insurer 4. As mentioned above, the price changes for New Hanover alone are similar to those for New Hanover and Cape Fear combined. Cape Fear only

²⁰ ICD9 codes are very detailed diagnosis codes. We assign a dummy variable for each of the nineteen major groups of codes. For example, the group "Diseases of the Circulatory System" includes individual diagnoses such as aortic aneurysm (icd9 code 441), chronic rheumatic heart diseases (icd9 codes 393-398.9), and diseases of veins and lymphatics (icd9 codes 351-359.9). Note that while the diagnoses within these groups may be similar in terms of the parts of the body affected, they may not be similar in terms of severity or the resources required for treatment.

had contracts with two of the insurers during the pre-merger period. The Cape Fear price change was similar to the New Hanover price change for one of these insurers and insignificant for the other. In order to protect the identity of the insurers, we do not report these results in the table.

The econometric results of equation (1) are reported in the next section of the table. The results in this table are based only on the data submitted by New Hanover and therefore do not reflect differences from the control group hospitals. The coefficient of the Post-Merger dummy variable indicates the change in admission prices after controlling for the patient characteristics, diagnosis, and type of insurance plan. This coefficient is statistically significant at the 1% level for all of the insurers. When changes are relatively small, this coefficient is a good approximation of the estimated percent price change. For larger changes, the implied price

change can be derived as $\exp\left[\delta - \frac{se_{\delta}^2}{2}\right] - 1$, where δ is the coefficient of the Post-Merger

dummy variable, and se_{δ} is its standard error.²¹ The estimates indicate that prices increased by over 26% for Insurers 1, 2, and 3, and decreased by 23% for Insurer 4. In order to protect the identity of the individual insurers, we do not report the weighted average price change for the four insurers.

The estimated coefficients for the length of stay variable are statistically significant at the 1% level for all four insurer equations. They indicate that a 10% increase in the length of stay leads to an increase in price per admission ranging from 5.7% to 7.5%.

Table 4 reports the post-merger price changes for New Hanover/Cape Fear relative to the control group hospitals based on the admissions data provided by the insurers. Although the

²¹ See, for example, <http://shazam.econ.ubc.ca/intro/dumlog.htm>.

unadjusted numbers do not match exactly those from New Hanover's admissions data, the implications are similar: Insurers 1, 2, and 3 experienced large price increases following the merger while Insurer 4 experienced a price decrease. The second row reports the price changes for the control group hospitals calculated over the same time period. If one views the changes in the control group prices as reflecting changes in costs and technology that are common to large hospitals in North Carolina, then a rough estimate of the impact of the merger on New Hanover/Cape Fear prices would be the difference between changes in New Hanover/Cape Fear prices and changes in the control group prices. This exercise suggests that the merger led to large relative price increases for Insurers 1 and 2 (131% and 49.5%, respectively), relatively little change for Insurer 3 (2.7%) and a large price decrease for Insurer 4 (-29%).

The econometric difference-in-differences estimates from equation (2) of the two-stage procedure are reported in the next panel of Table 4.²² The intercept reflects the average change in the control group price, after controlling for length of stay, diagnosis category, type of insurance plan and, when available, the age and sex of the patient. The pattern of coefficients among the insurers is similar to the pattern of calculated price changes based on the raw data.

The coefficient of the New Hanover/Cape Fear dummy variable reflects the change in New Hanover/Cape Fear's price relative to the control group after controlling for diagnosis and patient characteristics. The coefficient for Insurer 3 is not statistically different from zero at any conventional level of significance. This is consistent with the fact that the control group price changes were similar to those at New Hanover/Cape Fear for this insurer. The coefficient for Insurer 1 is statistically significant at the 10% level, and the coefficients for Insurers 2 and 4 are

²² We do not report the results of equation (1) in order to protect the identity of the

statistically significant at the 1% level. The estimated coefficients imply that Insurers 1 and 2 both experienced substantial post-merger price increases of 56.5% and 65.3%, respectively, and that prices actually fell for Insurer 4 by 30%. Thus, the econometric estimates imply price changes that are broadly similar to those based on the unadjusted difference-in-differences calculations for Insurers 2 and 4. The estimated price change for Insurer 1 is smaller than the unadjusted difference and has a wide 95% confidence interval, but the point estimate still indicates a substantial price increase.

Sensitivity Analysis

We estimated a number of alternative specifications in order to test the robustness of our results. For example, one alternative uses case mix weights rather than DRG category dummy variables to control for changes in the mix of patients in equation (1). A case mix weight is calculated by the Center for Medicare and Medicaid Services (CMS) for each DRG and is defined as the average cost of treating a patient for that DRG relative to the average cost for all DRGs. The dummy variable approach used in our benchmark analysis is more flexible because it allows the data to determine the relative weights for patients treated at New Hanover. If some illnesses are treated relatively infrequently, however, there may be too few observations to estimate the weights with any precision. We re-estimated equation (1) using the CMS case mix weights for the three insurer datasets that included DRG codes. The coefficient is positive as expected and statistically significant for all three insurers. More importantly, the results with

insurers.

respect to the post-merger price changes are very similar to those reported above. Our results are also robust to whether the estimation equation includes the variables for the patient's length of stay, age and sex.

We also tested the sensitivity of our results to the definition of the pre- and post-merger periods. For one specification, we defined the pre-merger period to be the one year prior to the consummation of the merger (i.e., 11/1997 – 10/1998) and the post-merger period to be one year following the effective date of the first post-merger contract between New Hanover/Cape Fear and the particular insurer. The results are broadly similar to those reported in Table 4 and do not affect our conclusions that Insurers 1 and 2 experienced large price increases following the merger while Insurer 4 experienced a large price decrease.

Our results are also robust to whether individual control group hospitals are included or omitted from the control group. In other words, our results are not driven by one or two of the control group hospitals. Another possible control group would consist of the six hospitals located in the counties surrounding New Hanover County. These hospitals are all relatively small and, thus, were not included in our initial control group. They presumably, however, face similar local costs such as wages. We repeated our analysis for Insurer 1 using this alternative group of control hospitals. Prices for the control group fell by 10% between the pre- and post-merger periods, and the estimated price change for New Hanover/Cape Fear relative to this group was similar to our benchmark results for this insurer. In addition to providing a robustness check for our benchmark results, the substantial increase in New Hanover/Cape Fear's price relative to nearby hospitals indicates that these hospitals were not able to constrain a price increase, at least for this insurer. While we did not repeat this sensitivity analysis for the other

insurers, the decrease in prices for this control group suggests that it is unlikely that local cost increases could explain the large price increases experienced by Insurer 2.

Conclusion

Our results provide mixed evidence regarding the effect of the New Hanover-Cape Fear transaction on inpatient prices. Two of the insurers experienced substantial post-merger price increases relative to the control group of hospitals. The post-merger price changes for another insurer, however, were comparable to those for the control group, while the fourth insurer actually experienced a significant price decrease following the merger.

An interesting question that arises from these results is whether differences among insurers may lead to different post-merger outcomes. Haas-Wilson and Garmon (2009) also find that estimated post-merger price changes varied across insurers in their study of two hospital mergers in Chicago. Possible explanations for such variations include the insurers' bargaining abilities, the types of plans that they offer, and the services that they provide.²³ It may be, however, that some of the estimated price changes reflect factors that are unrelated to the merger. Thus, it is difficult to draw conclusions about the impact of the New Hanover-Cape Fear merger on inpatient pricing.

²³ We cannot address this issue here because we are required to protect the identity of the insurers.

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Table 1: Hospitals Located within 60 Miles of New Hanover

Hospital Name	Location	# of Staffed Beds in 1998	Distance from New Hanover
Merging Parties			
New Hanover	Wilmington, NC	546	
Columbia Cape Fear	Wilmington, NC	109	6 miles
Closest Hospitals			
Brunswick Community	Supply, NC	56	30 miles
J. A. Doshier Memorial	Southport, NC	40	31 miles
Pender Memorial*	Burgaw, NC	68	32 miles
Columbus County	Whiteville, NC	117	48 miles
Bladen County	Elizabethtown, NC	58	53 miles
Onslow Memorial	Jackonsville, NC	133	56 miles
Duplin	Kenansville, NC	80	60 miles

* Pender Memorial has been operated by New Hanover since 1999.

Sources: The number of staffed beds was obtained from the 1998 *American Hospital Association Guide*. Distances were calculated using www.mapquest.com.

Table 2: Variable Definitions

Variable	Definition
Dependent Variable: Price per Admission	The total payments made by the insurer and patient for each inpatient admission.
Post- Merger Dummy Variable	A dummy variable is equal to zero for admissions during the pre-merger period, 1997-1998, and equal to one during the post-merger period, 2001-2002.
Diagnosis	We control for each diagnosis by including a dummy variables based on the patient's DRG code for each of the following categories: angioplasty, c-section (high), c-section (normal), cardiac stent, cardiac surgery, other cardiology, joint replacement, neurosurgery, nicu, normal newborn, vascular, obstetrics (other than c-section), high-risk obstetrics (other than c-section), medical (not otherwise specified), and surgical (not otherwise specified). For one insurer, DRG codes are not reported in the data so we use dummy variables based on the patient's primary ICD9 diagnosis code.
Sex	A dummy variable equal to one if the patient is female.
Age	The patient's age, measured in years
Length of Stay	The number of days that the patient was in the hospital for the particular admission.
Plan Type	A dummy variable equal to one if the patient's insurance plan is an HMO.

**Table 3: Post-Merger Price Changes for New Hanover-Cape Fear
Based on the New Hanover's Admissions Records**

	Insurer 1	Insurer 2	Insurer 3	Insurer 4
Unadjusted Price Change	106%	62%	24%	-18%
Econometric Results				
Post-Merger	0.509** (0.014)	0.722** (0.024)	0.235** (0.024)	-0.260** (0.012)
Length of Stay	0.571** (0.013)	0.746** (0.020)	0.638** (0.021)	0.677** (0.012)
Age	0.006** (0.001)	0.008** (0.001)	0.008** (0.001)	0.003** (0.001)
Sex (female=1)	0.079** (0.016)	0.038 (0.024)	0.089** (0.028)	0.048** (0.014)
R-squared	0.749	0.751	0.778	0.767
Implied Post-Merger Price Change	66%	106%	26%	-23%

Notes: The post-merger period is defined to be 2001-2002 and the pre-merger period is defined to be 1997-1998. The estimation equations also include dummy variables for diagnosis categories and dummy variables for the type of insurance plan. Standard errors are in parentheses.

** The estimate is statistically significant at the 1% level.

**Table 4: Price Changes for New Hanover-Cape Fear relative to the Control Group
Based on the Health Insurers' Admission Records**

	Insurer 1	Insurer 2	Insurer 3	Insurer 4
Unadjusted Price Change				
New Hanover/Cape Fear	135%	46.7%	30.3%	-16%
Control Group	4%	-2.8%	27.6%	13%
<i>Difference</i>	131%	49.5%	2.7%	-29%
Econometric Results				
Intercept	0.065 (0.077)	-0.124** (0.047)	0.243** (0.025)	0.090** (0.033)
New Hanover-Cape Fear	0.483* (0.266)	0.516** (0.164)	0.073 (0.079)	-0.350** (0.115)
Adjusted R-squared	0.174	0.449	-0.018	0.4301
Implied Price Change				
95% Confidence Interval	-10% , 193%	16% , 141%	-11% , 29%	-45% , -9%

Notes: The dependent variable is the estimated log price change of inpatient admissions of each hospital between the pre-merger and post-merger periods, after controlling for length of stay, diagnosis and the type of insurance plan. When available in the relevant dataset, the age and sex of the patient are also included in the first stage estimation. The pre-merger period is 1997-1998 and the post-merger period is 2001-2002 for three of the insurers. One of the insurers was not able to provide data for 1997 so the pre- and post-merger periods are 1998 and 2001, respectively. Standard errors are in parentheses.

* The estimate is statistically significant at the 10% level.

** The estimate is statistically significant at the 1% level.