**The Financial Incentives for Rural Hospitals**
**To Expand the Scope of Their Services**

*Working Paper Series*

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## EXECUTIVE SUMMARY

Rural hospital viability depends on rural patients seeking care locally rather than bypassing the local hospital for a larger facility. One way to increase a hospital's volume of patients is to offer a broader scope of services. This paper examines the financial incentives that rural hospitals have to conduct surgery, treat more complex medical conditions such as hip fractures, and provide obstetric services. The objective is to evaluate whether rural hospitals that choose to target more complex medical and surgical patients are more profitable than hospitals with very limited inpatient services.

This paper uses hospital discharge data from six states along with Medicare cost report data to evaluate the financial impact of certain types of admissions on hospital profits. In particular, the data allows us to examine the profitability of basic medical admissions, complex medical admissions, obstetrics, general surgery, and subspecialty surgery. Hospital administrators will gain insights into the relationships between the scope of services at a rural hospital, regional demographics, and the hospital's financial performance. This paper also enables policy makers to gain a better understanding of the financial incentives that rural hospitals have to increase the breadth and sophistication of their services.

The results indicate that rural hospitals that spend the resources necessary to capture a larger share of their market's surgical and obstetric patients are more profitable. In other words, rural hospitals have financial incentives to expand the scope of their services to include obstetrics and possibly general surgery. Because quality-of-care objectives may be at odds with financial objectives, there is a need to monitor the quality of obstetrics and surgical care being provided.

We did not find that a higher market share of subspecialty surgery improves operating margins at rural facilities. Most rural hospitals should not feel financial pressure to entice subspecialists to perform surgery at their facilities. While hospital administrators may still want to offer local subspecialty surgery to limit elderly patients' need to travel, higher volumes of subspecialty surgical admissions were not shown to improve rural hospital profitability.

This paper finds strong evidence that rural hospitals in market areas with fewer than 2000 potential patients have significantly lower operating profits. This suggests that policy makers should consider paying hospitals in markets with under 2000 discharges higher payments for their services. Higher Medicare and Medicaid rates would compensate hospitals for economies of scale problems that are beyond rural hospitals' control.

A low-volume adjustment has been discussed by the Medicare Payment Advisory Commissions, MedPAC (2001). While the commission favored making additional payments to low volume hospitals, commission members were concerned about the relationship between the quality of care and volume of care. To avoid subsidizing unnecessary low-volume providers, MedPAC proposed basing the low-volume adjustment on the combined patient volume of hospitals in a 15 or 20-mile radius. A remaining difficulty with the MedPAC proposal is that is makes additional payment to low-volume hospitals without regard to whether the payments are due to a lack of potential patients (i.e. demographics) or due to high bypass rates.

In this paper, we have shown that a low-volume adjustment could be based on the number of patients in the area as opposed to hospital admissions. The benefit of this type of low-volume adjustment is that rural hospitals that are perceived as providing higher quality and that have lower bypass rates would not be penalized for attracting more patients.

## INTRODUCTION

Rural hospital viability depends on rural patients seeking care locally rather than bypassing the local hospital for a larger facility. One way to increase a hospital's volume of patients is to offer a broader scope of services. This paper examines the financial incentives that rural hospitals have to conduct surgery, treat more complex medical conditions such as hip fractures, and provide obstetric services. The objective is to evaluate whether rural hospitals that choose to target more complex medical and surgical patients are more profitable than rural hospitals with very limited inpatient services.

There is some evidence that rural hospitals can improve their financial performance by increasing their volume of surgical procedures (Amundson and Rosenblatt, 1991; Williamson, Hart, Pirani and Rosenblatt, 1994). Many patients also prefer receiving local surgery over traveling to a regional medical center (Finlayson et al., 1999). A patient's decision to bypass local facilities can be affected by physician relationships, travel considerations, cost, availability of services, and the perceived quality of care at different hospitals. Past bypass studies have found that younger patients and patients with more severe conditions are more likely to bypass their local rural hospital (Adams et al., 1991; Buckzo, 1994; Hogan, 1988), and higher income patients are more likely to bypass rural hospitals for obstetric care (Bronstein and Morrisey, 1990).

Several studies have shown that low-volume hospitals have poorer outcomes for certain highly complex procedures (Dudley et. al, 2000; Luft, Hunt and Maerki, 1987). However, outcomes for more basic procedures appear to be less dependent on volume (Schlenker et al., 1996). Studies of obstetric care in rural areas are mixed. Nesbitt et al. (1997) found that availability of rural obstetric care improved outcomes and hospital charges in Washington state. Larson et al. (1997) found that neonatal deaths are no higher for rural mothers than for urban mothers. However, Heaphy and Bernard (2000)

found that rural hospitals tend to have higher complication rates. In this paper we examine whether rural hospitals have a financial incentive to offer services with varying degree of complexity. If rural hospitals have a financial incentive to offer more subspecialty surgical procedures, there is a greater need to monitor the relationships between volumes and outcomes at small rural facilities. If rural hospitals only have a financial incentive to retain basic medical admissions, we should be less concerned about a potential conflict between financial incentives to expand services and quality of care.

This paper uses hospital discharge data from six states along with Medicare cost report data to evaluate the financial impact of certain types of admissions on rural hospital profits. In particular, the data allows us to examine the profitability of basic medical admissions, complex medical admissions, obstetrics, general surgery, and subspecialty surgery. Hospital administrators will gain insights into the relationship between the scope of services at a rural hospital and the hospital's financial performance. This paper also enables policy makers to gain a better understanding of the financial incentives that rural hospitals have to increase the breadth and sophistication of their services.

## METHODS

To evaluate the profitability of preventing bypass of certain types of admissions, we need to categorize admissions, define bypass, obtain data on local admissions and on local patients that obtained care elsewhere, and link the discharge data to hospital profitability.

**Categorizing Admissions**

Patient admissions are divided into five categories: basic medical admissions, complex medical admissions, births, general surgery, and subspecialty surgery. Basic medical admissions are 139 DRGs that a panel of rural primary care providers concluded would be appropriate for treatment by primary care physicians in the smallest rural hospitals (Moscovice et al. 1993). The remaining 130 medical DRGs were deemed complex medical admissions. The births and newborn category consists of 21 DRGs including vaginal and cesarean deliveries. General surgical DRGs represent 85 types of surgeries that are commonly performed by general surgeons. The remaining 120 surgical DRGs were deemed subspecialty DRGs.

The division of DRGs into general surgery and subspecialty surgery requires subjective judgment since there is no clear definition of general surgery (Richardson, 1999). Other observers could have slightly different categorizations because there is substantial variation in the types of procedures that general surgeons perform and there may be regional variations in the degree to which subspecialists infringe on the general surgeon's "turf" (American Society of General Surgeons, 1996). In rural areas, a general surgeon's scope of services may be larger than in urban areas (Landercasper et al., 1997; Waddle, 2000). In this paper, patients in a particular DRG are considered general surgery patients if our panel of three rural primary care providers concluded that a majority of rural patients in the surgical DRG would be referred to a general surgeon. Rural hospitals that have large volumes of subspecialist surgeries either have active subspecialists on staff or general surgeons with a wider than average repertoire of surgeries. In either case, a high volume of subspecialist surgeries indicates that the hospital has chosen to provide a scope of surgical services that includes relatively complex procedures.

**Creating the Sample**

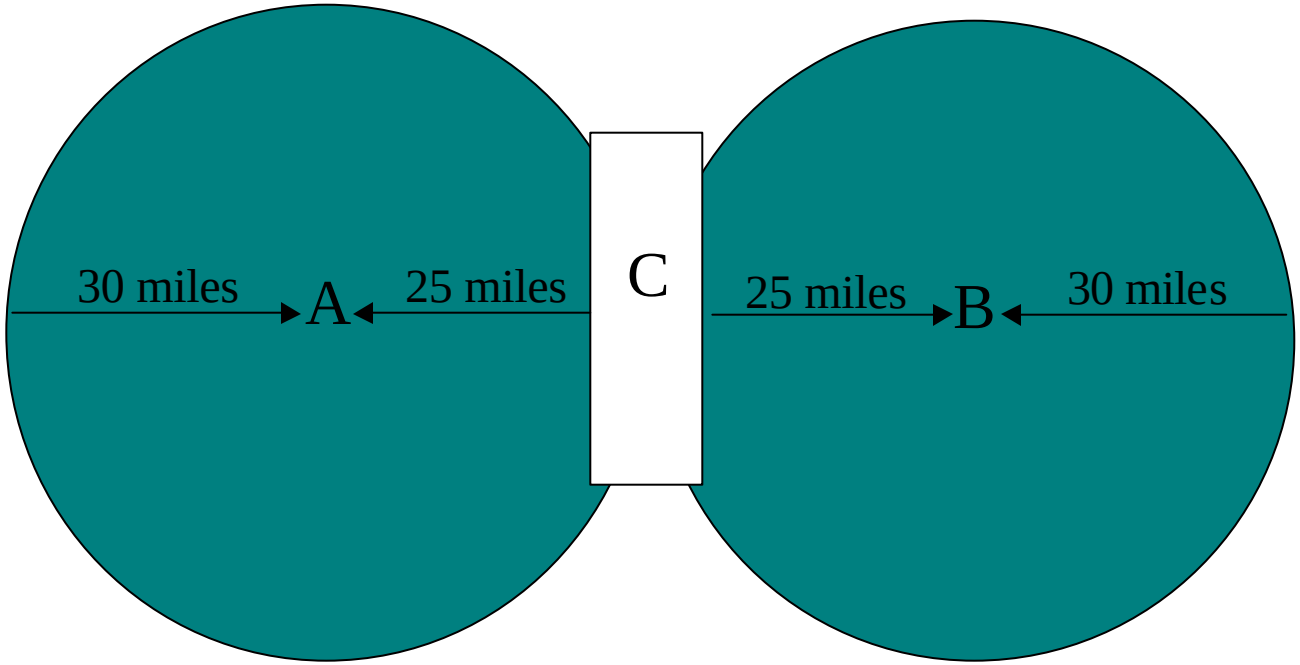
Discharge information for 1991 and 1996 was obtained from the relevant state agency in six states: Washington, Oregon, California, Maine, New York, and South Carolina. These six states were chosen because they could provide DRG and patient zip code information for all hospital discharges and had a substantial number of rural hospitals. The combined discharge files have information on 1,324,937 patients that lived in rural areas and were discharged from rural or urban hospitals in their state. The discharge data was combined with data from the AHA Annual Survey of Hospitals (1991 and 1996), Medicare Cost Reports (1991 and 1996), and demographic information from the Area Resource File (1999). The combined database has financial information on each general hospital in the six states and information on the percentage of patients that bypassed their local rural hospital for each category of admission.

**Calculating Bypass Rates**

Rural hospital's expansion into more complex services is measured by its ability to capture the local market share of patients in specific DRG categories. Bypass rates are calculated for basic medical, complex medical, deliveries, general surgery, and subspecialty surgery. A patient is deemed to have bypassed their closest rural hospital if the following two criteria are met: 1) the closest hospital to the patient is within 30 miles of the patient's home address, and 2) the patient was admitted to a hospital in the state that was at least ten miles further from the patient's home than the closest hospital. Using these criteria, patients bypass a hospital if they travel to a hospital that is significantly further from their home than the closest local hospital. As shown in Figure 1, we deleted any patients from the data set if the distance from their home to the second closest hospital was less than ten miles further than the distance to the closest

**Figure 1**

**Defining Patient Bypass of the "Local" Hospital**




* Hospital A is considered a local hospital for patients in the 30-mile radius around A
* Hospital B is considered a local hospital for patients in the 30-mile radius around B
* For patients in area C, the distance to hospital A is within ten miles of the distance to hospital B. These patients are not included in calculating bypass rates because they have more than one "local" hospital.

hospital. For patients that are close to two hospitals, we cannot clearly state which hospital is their "local" hospital.

Distance from the patient's home to the hospital is estimated using the distance from the center of the patient's zip code to the center of each hospital's zip code. After calculating bypass rates for 1991 and 1996, we found that the bypass rates had changed little over the five years. The mean bypass rate was 40.1 percent in 1991 and 39.4 percent in 1996. The correlation coefficient between individual hospitals' bypass rates in 1991 and 1996 was .93. Because bypass changed little over the six-year period, we combined 1991 and 1996 data into one average bypass rate and used it as a proxy for the hospital's rate of bypass during 1991 through 1996.

When the bypass and admission data from six states is combined with financial and demographic data, 167 small rural hospitals are available for analysis.[1] One limitation of this study is the lack of data on patients who cross state borders to be admitted into a hospital. When we calculate the percentage of patients that are bypassing a rural hospital, patients crossing state borders are omitted from the numerator and the denominator. Our estimates of the percentage of people bypassing rural hospitals may be less than the true level of bypass. The alternative to using state discharge data would be to use Medicare discharge data. However, we would then lack data on younger patients and certain types of admissions such as obstetric admissions.

**Measuring Financial Performance**

The average operating margin of rural hospitals during 1991 through 1996 is used to measure hospital profitability. Operating margins are defined as operating profit divided by net patient

[1] The six states have a total of 204 hospitals located outside of metropolitan statistical areas (MSAs). We eliminated 36 hospitals due to a lack of complete and consistent cost report information.

revenues as reported in Medicare cost reports. Average operating margins over the six-year period are used rather than a panel data set because there was very little change in bypass behavior from 1991 to 1996 and the amount of noise in the financial data can be reduced by averaging profits over a six-year period.

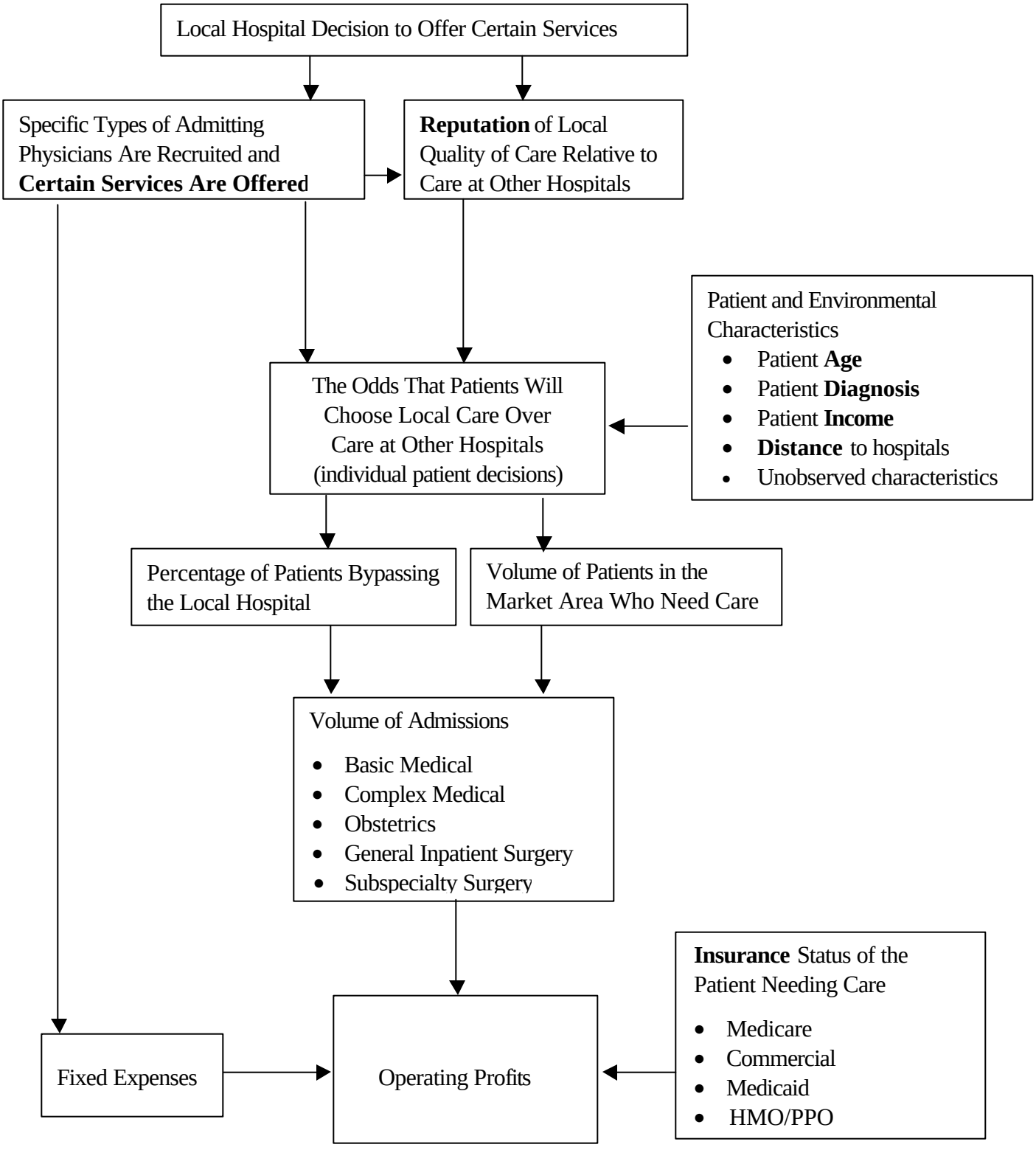
**Estimating the Effect of Bypass on Financial Performance**

We test whether hospitals that capture a relatively large market share of specific types of patients have greater profitability than hospitals with lower market shares. The answer depends on the specific costs and specific benefits of each type of service. Do the financial benefits of offering obstetrics tend to outweigh the costs of providing the service and recruiting and retaining physicians that are willing to do deliveries? Are the financial benefits of offering surgeries greater than the costs of staffing surgical suites and recruiting surgeons? Since we do not have cost accounting data on each of these services and because there are spillover benefits to surgical services such as increased outpatient services that may accompany expansion of services, we examine the overall effect of expanding market share on hospital profits. This is an indirect way of measuring whether rural hospitals receive a positive financial return from expanding services.

The flow chart shown in Figure 2 illustrates how a rural hospital's decision to expand its scope of services can affect financial performance by reducing bypass and expanding admissions. We model the relationship between bypass rates and net income by assuming that bypass rate has a linear effect on operating profits. A second order approximation was also tested, but the second order terms on the bypass rates did not add significant explanatory power to the model as measured by a Ramsey omitted variables test (STATA, 1997).

**Figure 2**

**Hospital Decisions, Patient Decisions, and Hospital Profitability**



In addition to bypass behavior, profitability depends on the potential number of patients in the hospital's market area. The size of the market area is estimated by summing the number of hospital admissions of people that have zip codes within 30 miles of the hospital and are closer to the subject hospital than any other hospital. Patients more than 30 miles away from the hospital are assumed to be outside of the hospital's market area.

Since the marginal impact of increasing market size is expected to decline as the market grows, we use a spline function approach (Greene, 1993) to account for market size. Our model assumes that the marginal impact of market size on operating profits is linear from 0 to 2000 admissions, linear over the range 2000 to 4000 admissions, and linear once the market reaches 4000 admissions. The marginal impact of market size over the range 0 to 2000 admissions is allowed to differ from the marginal impact of market size once a market has over 2000 admissions. The purpose of the spline approach is to allow for the situation where the marginal impact of additional demand for inpatient services changes as the market grows larger. We also tested a cubic function to approximate the effect of market size on operating profit margins. We present both the spline and cubic function results.

In addition to market size, we also want to control for whether the market is growing or shrinking. If a hospital operates in a shrinking market, it may suffer from the costs of excess capacity. The change in area admissions from 1991 to 1996 was included as a proxy for changes in size of the hospital's market for medical care.

Another influential environmental factor is insurance status of patients in the market area. To control for this confounding factor, we included three variables representing the percentage of Medicare, commercial (including HMO) insurance, Medicaid and other payers. The reference category

is self-pay and other patients. Insurance status information is obtained from the hospital discharge data sets.

The model does not include any variables reflecting specific operational characteristics of the hospital such as staffing level, age of equipment, or employment of physicians. These variables were excluded because they depend on the services that a hospital chooses to offer. Since efforts to alter the bypass rates by promoting a wider array of services will affect the hospital's human and physical capital, these characteristics were not included as independent variables in our model. The following model was tested:

Average Operating Profit Margin (1991-1996) = f ($Bypass_j$, Mkt1, Mkt2, Mkt3, Chgmkt, $Ins_i$, e)

Where:

$Bypass_j$ = percentage of potential patients that were closest to the local hospital by at least 10 miles, but were admitted into another hospital in the state. Type j refers to the type of admission.

Mkt = Number of patients whose home is closest to hospital j and were admitted to some hospital in the state. This is a proxy for the number of potential patients in the hospital's market. In the case of the spline function, Mkt1 refers to the patients in the market area up to 2000 patients. Mkt2 and Mkt3 refer to the second and third sections of the spline function. In the case of the cubic function, Mkt1 refers to the size of the market, Mkt2 refers to market size squared, and Mkt3 refers to the market size cubed.

Chgmkt = Percent increase in the number of area patients admitted to a hospital in the state from 1991 to 1996.

$Ins_i$ = percentage of admissions with type i insurance

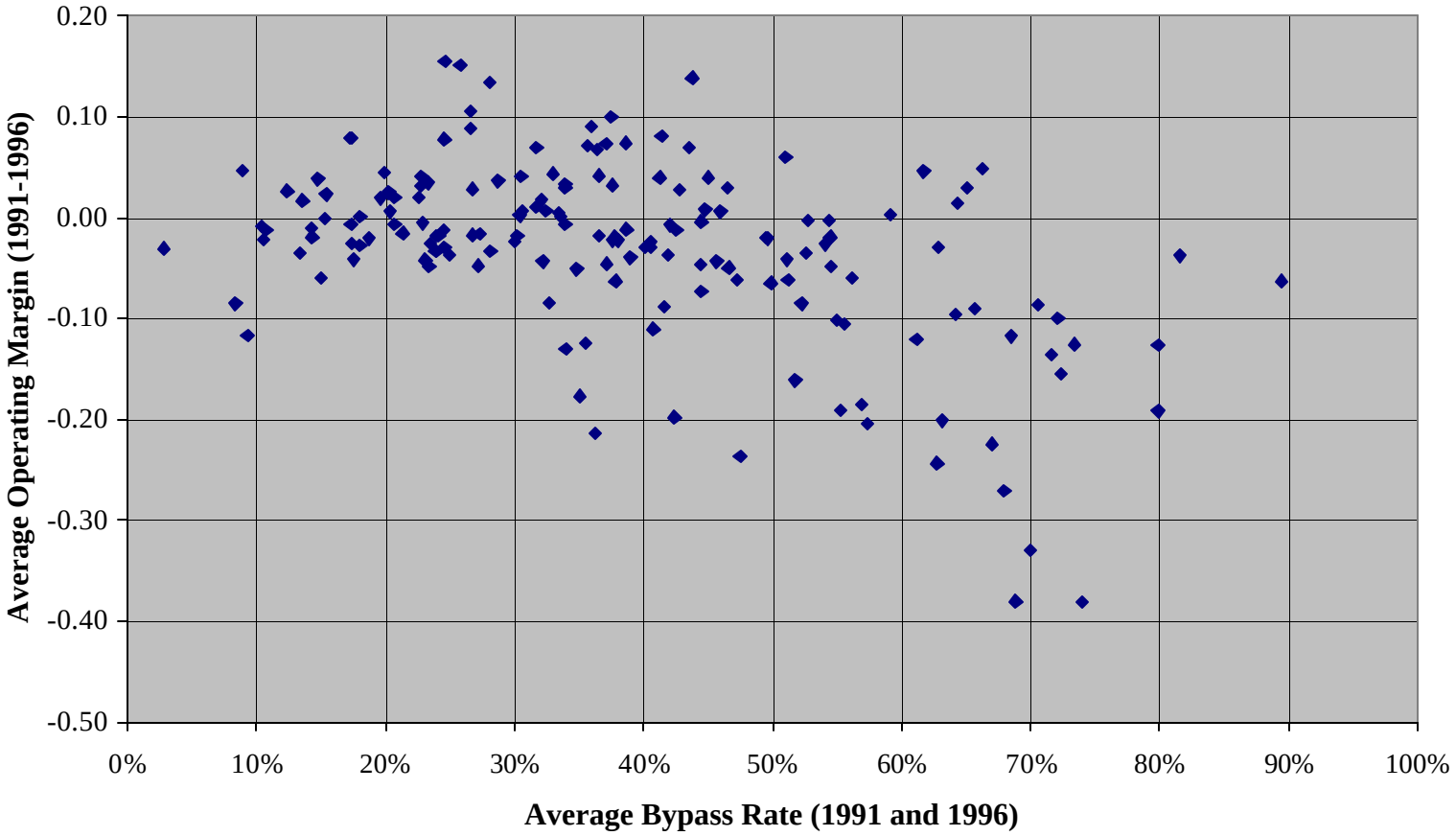
e = error term

**DESCRIPTIVE STATISTICS**

Two scatterplots are used to illustrate the relationships between bypass rates, market size and operating profits. Figure 3 illustrates that rural hospitals with operating profit margins below –10% tend

**Figure 3**

**Bypass Rates and Operating Margins for Rural Hospitals**



to be hospitals with high bypass rates. Figure 4 illustrates that rural hospitals with operating margins below -10% also tend to be located in market areas with fewer than 2000 potential patients. A patient is considered to be in a hospital's market area if the patient is closer to that hospital than all other hospitals, admitted to some hospital in the state, and lives within 30 miles of the hospital.

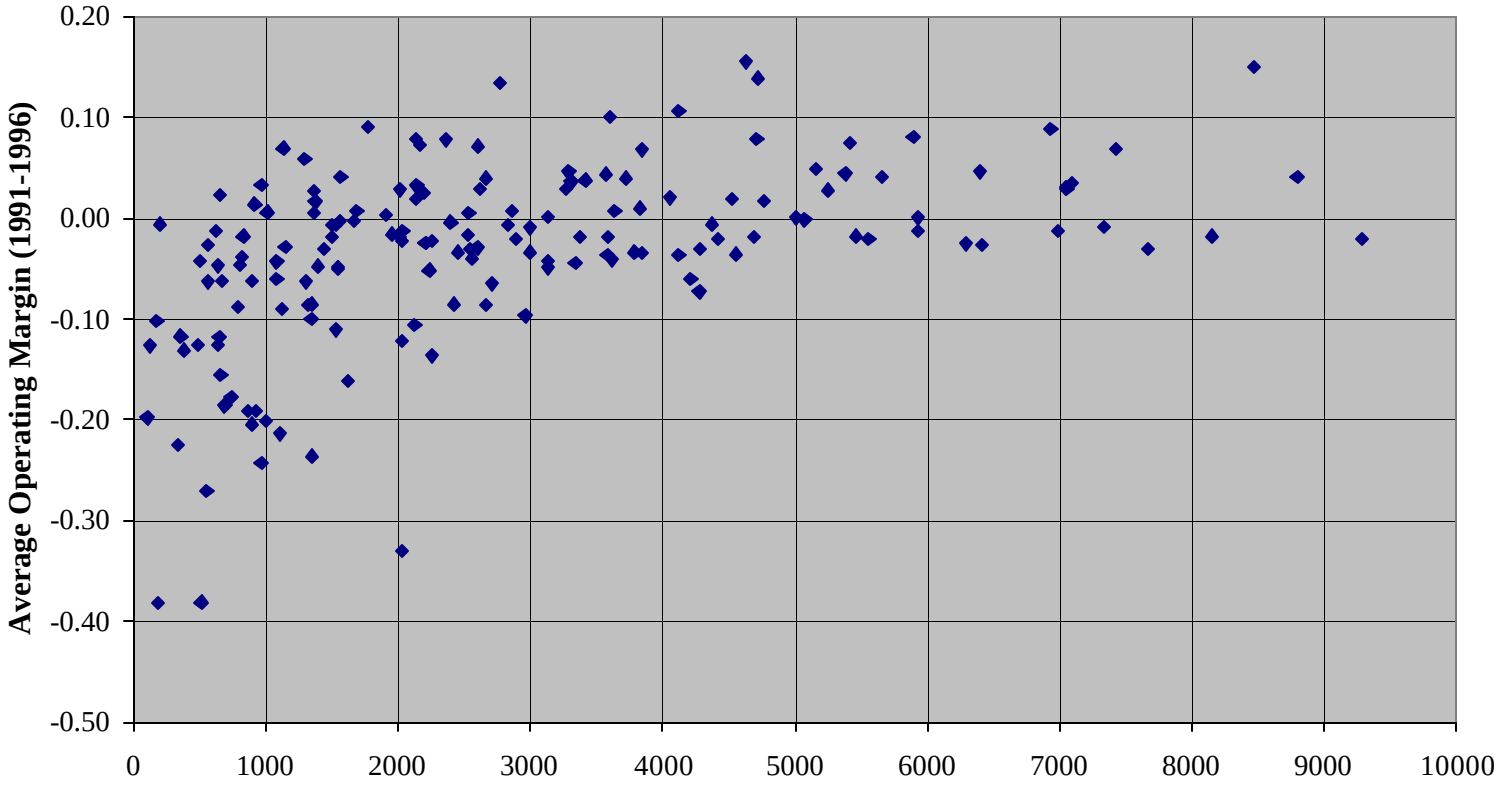
Figure 4 also indicates that there is a wide variance in the operating profit margins of rural hospitals in markets with few patients. Of the 64 hospitals in markets with less than 2000 discharges, 34 hospitals had an average operating margin below –5% during the 1991-1996 time frame while 13 hospitals operated profitably. Of the 13 profitable hospitals, 7 managed to generate operating profits despite having fewer than 1000 discharges per year. It is not clear why there is such a wide dispersion of operating profits among rural hospitals in very small markets. A lack of scale appears to make it more difficult to achieve profitability, but not impossible.

Table 1 compares the characteristics of rural hospitals with positive operating margins to rural hospitals with operating margins below –5%. Unprofitable rural hospitals are located in areas with a lower demand for admissions and higher bypass rates. The combination of lower demand for care and higher bypass rates results in a substantially lower average level of admissions at the unprofitable hospitals. One striking statistic is that hospitals with operating margins below –5% had an average of 188 delivery-related discharges compared to an average of 764 delivery-related discharges at hospitals with positive operating margins.

Unprofitable hospitals also have a slightly higher percentage of Medicaid patients and a slightly lower percentage of patients with commercial insurance. Multivariate analysis is needed to evaluate how much of low-margin hospitals' financial troubles can be attributed to patients' insurance status as opposed to the size of market areas or bypass rates.

**Figure 4**

**Size of the Market Area and Operating Margins for Rural Hospitals**



## Table 1

## Characteristics of Profitable and Unprofitable Rural Hospitals

| Characteristic | Hospitals with positive operating margins (n=60) | Unprofitable hospitals with operating margins below –5% (n=45) | All hospitals (n=167) | Standard deviation, all hospitals |
|---|---|---|---|---|
| Average Operating Margin, 1991-1996 | .05 | -.15 | -.03 | .09 |
| #Area Admissions | 3688** | 1273** | 2841 | 2064 |
| Growth in Area Admissions, 1991-1996 | 1% | 1% | 2% | 27% |
| # Hospital Discharges | 3115** | 855** | 2422 | 2352 |
| Bypass Rate | .33** | .54** | .38 | .18 |
| # Basic Medical Discharges | 1186 ** | 412** | 945 | 826 |
| Bypass Rate, Basic Medical | .23** | .36** | .26 | .13 |
| # Complex Medical Discharges | 649** | 202** | 501 | 487 |
| Bypass Rate, Complex Medical | .33** | .49** | .37 | .16 |
| # Delivery-Related Discharges | 764** | 118** | 570 | 685 |
| Bypass Rate, Deliveries | .31** | .67** | .41 | .32 |
| # General Surgical Discharges | 237** | 61** | 188 | 192 |
| Bypass Rate, General Surgery | .36** | .67** | .45 | .24 |
| # Specialty Surgical Discharges | 278** | 60** | 220 | 295 |
| Bypass Rate, Specialty Surgery | .61** | .88** | .68 | .24 |
| % Commercial Insurance | .24 | .21 | .23 | .14 |
| % Medicare | .54 | .55 | .54 | .11 |
| % Medicaid | .15 | .17 | .15 | .10 |
| Net Patient Revenue | $21,537,230** | $8,400,594** | $17,695,747 | $16,645,595 |
| Staffed Beds | 87** | 47** | 78 | 78 |

** T-tests reveal several statistically significant difference between the characteristics of profitable rural hospitals and rural hospitals with margins below –5%. All levels of admissions, all bypass rates, revenues and staffed beds were significantly different at the p=.01 level. The remaining variables (growth in admissions and insurance status) were never significant at the p=.05 level.

## MULTIVARIATE RESULTS

Due to heteroscedasticity, weighted least squares regression results are reported (STATA, 1997). As expected, the regression results in Table 2 indicate increased demand for inpatient services can lead to increased profits. Over the range of zero to 2000 admissions, a larger number of area patients needing hospital care leads to higher profit margins. This suggests that economies of scale exist over the range of zero to 2000 area admissions. While the coefficient on admissions past 2000 are positive, they are no longer statistically significant. This suggests that economies of scale may decline as the number of admissions increases.

While Table 2 shows that it helps to be in a market where there is more demand by patients, it also informs us something about whether hospitals are spending too little in their effort to attract certain types of patients. Table 2 indicates that hospitals with lower bypass rates for obstetric care (and possibly general surgery) have higher profit margins. In other words, the marginal revenue from these patients is greater than the average cost of attracting and treating additional patients. The analysis does not find that market shares of basic-medical, complex-medical, or specialty-surgery admissions affect profits. These types of admissions may generate marginal profits, but the costs of luring physicians and patients away from other hospitals appears to balance the marginal profits from treating these patients. For example, expanding a hospital's market share of specialty surgery patients may significantly improve hospital revenue, but the cost of attracting more specialty surgeons, purchasing needed equipment, and caring for patients may fully offset the additional revenue from the surgeries. Insurance status was not found to have a significant effect on operating profit margins.

**Table 2**

**Factors Influencing Rural Hospital Operating Margins, 1991-1996 (n=167)**

| Spline Function Variables | Spline Model Coefficients | t-statistic | Cubic Model Coefficients | t-statistic |
|---|---|---|---|---|
| Area Admissions (0 to 2000 ) | 5.8 e-5 | 4.138** | | |
| Area Admissions (2001 to 4000) | 4.9 e-6 | .62 | | |
| Area Admissions over 4000 | 2.2 e-6 | .74 | | |
| Change in Area Admissions, 1991-1996 | .04 | 1.75 | .04 | 1.81 |
| Area Admissions | | | 6.7 e-5 | 2.83** |
| Area Admissions Squared | | | -1.2 e-8 | -1.87 |
| Area Admissions Cubed | | | 6.4 e-13 | 1.36 |
| Percent Bypass of Basic Medical Admissions | .08 | .74 | .10 | .94 |
| Percent Bypass of Complex Medical Admissions | -.00 | .09 | -.01 | -.15 |
| Percent Bypass of Deliveries | -.07 | 2.52* | -.07 | 2.56* |
| Percent Bypass of General Surgical Admissions | -.12 | 1.97 | -.12 | 2.01* |
| Percent Bypass of Specialty Surgical Admissions | .06 | 1.17 | .05 | .99 |
| Commercial Discharges/ Total Discharges | .08 | .70 | .07 | .66 |
| Medicare Discharges/ Total Discharges | .05 | .48 | .06 | .51 |
| Medicaid Discharges/ Total Discharges | .14 | 1.22 | .13 | 1.08 |
| F Statistic | 8.99 | | 7.97 | |

*p < .05
**p < .01

The results from the spline formulation and the cubic formulation of hospital's operating margins yielded almost identical results. To test for regional differences and the influence of outliers, a split sample test was conducted where the results for the three West Coast states and the three East Coast states were estimated separately. Once again, similar results were obtained.

In summary, the three key findings in this study are that on an average, rural hospitals offering obstetric services have higher profit levels, rural hospitals in markets with fewer patients have lower profits, and rural hospitals in the smallest markets have a high degree of variance in their profitability.

## DISCUSSION

Hospital administrators want their facilities to provide their communities with local access to high quality care. However, when evaluating whether a hospital should provide obstetrics, general surgery, or recruit visiting specialists to perform subspecialty surgery, administrators also need to take into account hospital profitability. The findings in this paper suggest that rural hospitals have financial incentives to expand the scope of their services to include obstetrics and possibly general surgery. In addition to financial incentives, hospital administrators may have professional incentives to expand their scope of services due to the prestige of running a larger hospital with more sophisticated services (Newhouse 1970). The net result is that hospital administrators may have an incentive to expand services beyond what is justified purely by quality and cost-effectiveness concerns. Because quality-of-care objectives may be at odds with financial objectives, there is a need to monitor the quality of obstetrics and surgical care being provided.

Although rural hospitals with obstetrics and surgical services tend to have greater profitability, our results do not imply that every rural hospital will improve its profitability by adding these services. In

some communities, recruiting surgical nurses or physicians willing to do obstetrics would cost more than the operating profits from these services. However, on average, offering obstetric services is correlated with higher profitability.

We did not find that subspecialty surgery improves operating margins at rural facilities. Most rural hospitals should not feel financial pressure to entice subspecialists to perform surgery at their facilities. While hospital administrators may still want to offer local subspecialty surgery to limit elderly patients' need to travel, higher volumes of subspecialty surgical admissions were not shown to improve rural hospital profitability. Due to a lack of outpatient data, we were not able to specifically evaluate the profitability of having subspecialty surgeons visit the community for pre-op and post-op visits while conducting the surgery at a larger facility. There may be ways to profitably integrate subspecialty surgeons into the rural hospital's medical staff without conducting subspecialty surgery locally.

Rural hospitals in market areas with fewer than 2000 potential patients had significantly lower operating profits. This suggests that policy makers should consider paying hospitals in markets with under 2000 discharges higher payments for their services. Higher Medicare and Medicaid rates would compensate for economies of scale problems that are beyond rural hospitals' control.

A low-volume adjustment has been discussed by the Medicare Payment Advisory Commissions, MedPAC (2001). While the commission favored making additional payments to low volume hospitals, commission members were concerned about the relationship between the quality of care and volume of care. The MedPAC report states …"extremely low volumes may pose a quality-of-care risk, and Medicare would not want to encourage hospitals operating at such levels unless necessary to maintain access to care" (MedPAC, p.68). To avoid subsidizing unnecessary low-volume providers, MedPAC proposed basing the low-volume adjustment on the combined patient volume of

hospitals in a 15 or 20-mile radius. A remaining difficulty with the MedPAC proposal is that is makes additional payment to low-volume hospitals without regard to whether the payments are due to a lack of potential patients (i.e. demographics) or due to high bypass rates.

In this paper, we have shown that a low-volume adjustment could be based on the number of patients in the area as opposed to hospital admissions. The benefit of this type of low-volume adjustment is that rural hospitals that are perceived as providing higher quality and that have lower bypass rates would not be penalized for attracting more patients. A payment based on regional needs for care only would increase hospital payments for regional conditions that are beyond the hospital's control.

Finally, the results found a wide disparity of operating margins for rural hospitals that operate in a market with a limited number of patients. Most hospitals operating in markets with under 2000 admissions operated at a significant loss, but a limited number of small rural hospitals were able to operate profitably. Additional research is needed to evaluate the causes of the wide disparity in financial performance of rural hospitals that offer limited services and operate in markets with few patients.

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