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Hospitals With Chronic Financial Losses: What Came Next?
by Sarah Q. Duffy and Bernard Friedman

Abstract: Hospitals with chronic losses might respond by closing, by drastically changing their services and patient mix, or by increasing efficiency. These possible responses are examined by studying a cohort of hospitals that were losing money between 1980 and 1984 as measured by their five-year average total revenue margins. These “negative-cohort” hospitals were followed through 1988 to see if they survived, and if they did, what changes they made. Only about 10 percent of hospitals in the negative cohort closed. The remainder did not alter their service mix or select in favor of easier, better-paying patients. However, there was a reduced rate of investment in new technologies.

There is growing concern about hospitals with chronic financial losses. Even if hospitals experiencing losses do not close, they may make changes to survive that might compromise access to and quality of care. Congress has attempted to respond to chronic losses in rural hospitals through efforts such as the Essential Access Community Hospital program (1989) and the Rural Transition Grant program (1987). More recently, as the average revenue margin on Medicare patients across all hospitals has fallen below zero, indicating that hospitals are losing money on Medicare patients, federal officials have expressed more intense interest in the effects of losses on the supply and quality of services. In this DataWatch we investigate some consequences of chronic financial losses, as measured by five-year average total revenue margins, in a nationwide sample of nearly 500 hospitals. This information, which has not been available elsewhere in the literature, should help policymakers to determine appropriate actions.

We start with the basic economic principle that no ordinary enterprise can continue to operate indefinitely with losses. Hospitals with losses for several years should either close, merge, or make changes to become more profitable. We investigate these possible responses directly by comparing rates of closure, merger, and change in selected variables between hospitals that generated profits and those that experienced losses.

When hospitals with chronic losses do not close, merge, or make changes to survive, it is conceivable that they are surviving in equilibrium with

Sarah Duffy is a service fellow and Bernard Friedman a senior fellow in the Division of Provider Studies, Center for Intramural Research, Agency for Health Care Policy and Research, in Rockville, Maryland.
reported losses because of “sponsorship” that is not revealed in customary accounting data. For example, equilibrium costs might be overestimated for hospitals with sponsors because they do not need to save depreciation allowances to make future investments. These investments are financed by a parent organization such as a local government, university, or multi-hospital system. Revenues might be underestimated because of the absence of some nonoperating transfers, income from grants, loan forgiveness, or other omissions from typical accounting reports. Such unusual financing arrangements can be examined indirectly by measuring changes in the amount of debt that hospitals are able to issue. If hospitals with poor financial performance are able to maintain or increase debt financing, sponsors must be willing to hold or guarantee the debt. In addition, some types of hospitals, such as those that are owned by a local government, have a teaching mission, and are the only local provider of services, may be more likely to be supported by outside sponsors. We can use these characteristics as proxies to account for the likelihood that sponsors would enable a hospital to survive with chronic losses.

Previous analyses concerning financially distressed hospitals either compare financially weak and financially sound hospitals at a single point in time or calculate the impact of financial margins on the probability of closure. These studies find that financially distressed hospitals tend to be smaller and costlier, have lower occupancy rates, and treat more underserved patients than do financially sound hospitals. These analyses also find that although hospitals rarely close, those with recent losses are more likely than financially sound ones to close. However, these analyses do not examine what becomes of money-losing hospitals if they do not close.

We depart from the literature by examining over time the behavior of the majority of hospitals with persistent financial losses that do not close. We examine whether the changes they make to survive improve efficiency or diminish access or quality.

**Data and methods.** To investigate the consequences of chronic losses, we used the Hospital Cost and Utilization Project (HCUP) database maintained by the Agency for Health Care Policy and Research (AHCPR). This database, which covers the period 1980-1987, contains all discharge records from a sample of more than 500 hospitals nationwide as well as financial and other data on those hospitals from the American Hospital Association’s (AHA’s) Annual Survey. Financial data have been checked against the Health Care Financing Administration’s (HCFA’s) Medicare Cost Reports. We deleted the very few cases with a meaningful discrepancy between the two sources.

We separated hospitals into two groups depending on whether they are making profits or losses. We defined a persistent “negative-margin” cohort
to consist of hospitals with total revenue margins that were on average negative between 1980 and 1984. The margin, $M_i$, equals total net revenue less total expenses, divided by total net revenue. Total net revenue is equal to total gross charges less discounts and allowances plus other operating and nonoperating revenues. The margin in any particular year may have been positive, but the average for five years was negative. In our sample, 77 percent of the hospitals had negative margins for three or more years, while only 3 percent had a negative margin for only one year. We revisited these hospitals three years later and compared their actions and experiences with those of hospitals in the “positive-margin” cohort—hospitals that had five-year average revenue margins of zero or greater. We compared changes across cohorts to control for exogenous changes, such as changes in Medicare payment policies and patient mix that, while common to all hospitals, may have affected hospitals in one cohort more than another. For example, hospitals in the negative cohort may have intended to admit more privately insured patients but were hindered by the greater use of outpatient services by the privately insured and by more indigent inpatients resulting from drug abuse and acquired immunodeficiency syndrome (AIDS).

We pose three broad hypotheses about how hospitals might change in response to losses. Hospitals might (1) become more selective in admitting patients by accepting fewer uninsured patients or patients who are particularly costly to treat within any diagnostic group; (2) eliminate losses by reducing use of resources per case, by reducing the supply of unprofitable services, and by adopting services expected to be more profitable; or (3) reduce investment required to maintain plant and equipment or to modernize, since a record of losses should reduce access to capital and raise its cost. While strategies implied by these hypotheses may increase operating efficiency, they also may have less welcome effects on access and quality.

We describe the statistical methods briefly here; we report more details and several additional results in a more extensive paper available on request. We defined outcome variables as changes in patient mix, resource use, service offerings, and investment between 1984 and 1987. We then used regression analysis across all hospitals to test whether cohorts differed. We allowed for an effect of the hospital’s initial level of the outcome variable in accord with the econometric literature on partial adjustment to target outcomes. Finally, for a selected set of outcomes, we implemented a more intensive multivariate analysis that allows for several cohort characteristics as well as other theoretically appropriate explanatory variables.

<table>
<thead>
<tr>
<th>Outcome Variables</th>
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</thead>
<tbody>
<tr>
<td><strong>Patient mix.</strong> Decreases in the proportion of severely ill or underinsured...</td>
</tr>
</tbody>
</table>
patients signal that hospitals became more selective, possibly compromising access. To measure changes in severity of illness, we used the Disease Staging classification and rating system. Specifically, we calculated the proportion of patients with Stage level 3 or higher, indicating “multiple site involvement, generalized systemic involvement, poor prognosis,” or death. If hospitals with negative margins are trying to avoid the sickest patients, severity measures should decline relative to levels for the positive cohort.

We used two variables to measure selection on the basis of expected reimbursement: the proportion of patients with neither private insurance nor Medicare as the expected source of payment, and the ratio of the sum of bad debt and charity care to total revenue. If hospitals with negative margins are trying to turn themselves around by avoiding poorly paying patients, values of both of these variables should decline relative to those of positive-cohort hospitals.

**Resource use and service offerings.** We employed several variables to signal changes in operations and service mix that hospitals might make to become more profitable. While many of these changes should have no direct effect on or may enhance quality of care, some changes may signal a decline in quality. We considered four variables to evaluate operational changes that may affect quality. The first is case-mix-adjusted length-of-stay. Hospitals with negative margins should reduce length-of-stay by more than those with positive margins, holding other things constant, such as the proportion of patients covered by insurance that reimburses a fixed amount per case. Another measure is the proportion of physicians with admitting privileges who have board certification in their specialty. If hospitals in financial difficulty are reducing quality, or if management is otherwise unable to maintain good relations with physicians as it makes cutbacks, we would expect board-certified physicians who likely have more alternatives, to leave. We also assessed changes in the ratio of registered nurses (RNs) to total nursing staff, expecting hospitals in poor financial health to substitute less costly licensed practical nurses (LPNs) for RNs. Negative-cohort hospitals may also attempt to substitute part-time for full-time employees to increase staffing flexibility and to reduce benefit costs. We expect the ratio of full-time employees to part-time employees to decline for the negative cohort relative to the positive cohort. In addition, negative-cohort hospitals may pursue efficiency by reducing overall staff, so we expect the number of full-time-equivalent (FTE) employees per admission to decline for negative-cohort hospitals relative to positive-cohort hospitals.

Other changes that hospitals with chronic losses might make to enhance performance that would not adversely affect the quality of care include attempts to become more efficient by specializing, in that they see more patients in fewer diagnosis categories. To measure this factor, we used Dean
Farley’s specialization index, which uses the diagnosis-related group (DRG) system to classify discharges and compares individual hospitals with a national proportional distribution. Hospitals with patient distribution similar to the national proportional distribution will have a specialization index that tends toward zero, while more specialized hospitals will have a higher index. If negative-cohort hospitals attempt to become more efficient by becoming more specialized, this measure should increase compared with positive-cohort hospitals over the observation period.

Another way hospitals can improve financial performance without adversely affecting quality is to increase the number of profitable services. National surveys suggest several profitable nontraditional services, including psychiatric acute care, alcohol and chemical dependency treatment, rehabilitation, and home care services. Negative-cohort hospitals may at the same time attempt to drop two essential but traditionally money-losing services: obstetrics and emergency room care. This could present an access problem if there are no alternative sites of care in the hospital’s market area.

Hospitals may also improve their financial situation without harming quality by contracting with health maintenance organizations (HMOs) and preferred provider organizations (PPOs). While negative- and positive-cohort hospitals could benefit from such arrangements, negative-cohort hospitals may be under more pressure to enter these arrangements to increase occupancy. Negative-cohort hospitals could also be under more pressure to enter management contracts. These hospitals should be more willing than positive-cohort hospitals to yield some autonomy in their day-to-day operation for the sake of improved efficiency.

Investment. The third hypothesis is that hospitals with negative margins may reduce investment. We measured both general investment, looking at the change in net plant assets per admission, and specific investments in intensive care unit (ICU) beds, computed tomography (CT) scan facilities, magnetic resonance imaging (MRI) facilities, cardiac catheterization programs, and diagnostic ultrasound services. We tested whether negative-cohort hospitals, if they made new investments at all, invested at a lower rate than did positive-cohort hospitals.

Of course, other factors may determine a hospital’s survival. For example, the quality of management and its ability to relate to the medical staff may be important determinants of success but are difficult to measure directly. The variables we chose to analyze enable us to quantify some access and quality issues and to indicate hospitals’ movement toward efficiency.

### Hospital Characteristics

The seventy hospitals in the negative cohort in 1984 had an average
five-year total revenue margin of -2.8 percent, compared with the 410 positive-cohort hospitals' average total revenue margin of 4.7 percent (Exhibit 1). The negative-cohort hospitals had fewer beds on average and were more commonly located in rural areas and controlled by local governments. Differences in these characteristics may be responsible for some of the differences in the observed changes in outcome variables. These possible influences can be controlled in a multivariate analysis.

Most hospitals with persistent losses in 1984 continued to operate in 1988, as shown in the bottom half of Exhibit 1. Only 10 percent of negative-cohort hospitals closed, compared with 1.2 percent of positive-cohort hospitals. The cohorts did not differ significantly in proportion of hospitals that merged or were acquired or leased by a multihospital system.

**Changes In Financial Position And Costs, 1984-1987**

If hospitals in the negative cohort responded to losses according to any of the three hypotheses we described, one would expect to observe improvements in their financial position relative to the positive cohort. We compared the two cohorts in 1984 and again in 1987, not only with regard to revenue margin but also with regard to credit worthiness and the actual degree of indebtedness. The ratio of cash flow to total debt, which lenders

| Exhibit 1 |
| Comparison Of Hospitals In Negative And Positive Cohorts, 1980-1988 |
|-----------------|-----------------|-----------------|-----------------|
| Negative cohort (N = 70) | Positive cohort (N = 410) |
| Mean five-year (1980-1984) total revenue margin | -2.8% | 4.7% |
| Selected characteristics in 1984 | | |
| Urban location | 37.1% a | 56.3% |
| Control by local government | 39.7% b | 26.9% |
| Only short-stay hospital in county | 39.7% | 30.2% |
| Mean number of beds | 128 | 234 |
| Closure or merger by 1988 | | |
| Percent of hospitals that closed between 1984 and 1988 | 10.0% a | 1.2% |
| Percent of hospitals that merged with another hospital between 1984 and 1988 | 2.9 | 2.7 |
| Percent of hospitals acquired by a multihospital system between 1984 and 1988 | 17.1 | 18.3 |

Source: Division of Provider Studies, Center for General Health Services Intramural Research, Agency for Health Care Policy and Research.

Note: Hospitals in the negative cohort had a negative five-year total revenue margin from 1980 through 1984; those in the positive cohort had a positive five-year total revenue margin.

a Cohort difference significant at p < .01.
b Cohort difference significant at p < .05.
watch closely, is a basic indicator of ability to cover interest and amortization payments. It may improve because cash flow increases (mainly as a result of higher margins or lower capital outlays) or because indebtedness decreases. Two measures of indebtedness are the ratio of current liabilities to total assets and the ratio of long-term debt to total assets. As these ratios increase, hospitals have less remaining collateral to secure their debt. Established texts on hospital accounting provide norms for all of these ratios.\(^{14}\)

Total revenue margins did improve for the negative cohort between 1984 and 1987 (Exhibit 2).\(^ {15}\) The average margin for the positive cohort also improved somewhat. The negative cohort’s operating revenue margin improved slightly, as did that of the positive cohort.

The ratio of cash flow to total debt was much lower for the negative cohort than for the positive cohort in both 1984 and 1987. Although the cash-flow ratio had improved for the negative cohort by 1987, it was still only about one-third the value shown for the positive cohort and was well below standards advocated for the industry. Despite the losses in the negative cohort already evident in 1984 and the continued negative results in 1987, hospitals in that cohort increased their short-term liabilities relative to assets. Positive-cohort hospitals increased their short-term indebtedness to a much lesser degree. Moreover, negative-cohort hospitals were able to maintain their financing of total assets via long-term debt, with a leverage ratio of about 30 percent in both years. The continued long-term and

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### Exhibit 2

Financial Position And Costs For Negative And Positive Hospital Cohorts, 1984 And 1987

<table>
<thead>
<tr>
<th>Margins, cash flow, and indebtedness</th>
<th>Negative cohort (N = 63)</th>
<th>Positive cohort (N = 405)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1984 mean</td>
<td>1987 mean</td>
</tr>
<tr>
<td>Total revenue margin</td>
<td>-3.54%</td>
<td>-0.54%</td>
</tr>
<tr>
<td>Operating revenue margin</td>
<td>-7.12%</td>
<td>-6.87%</td>
</tr>
<tr>
<td>Cash flow/total debt</td>
<td>1.71%</td>
<td>12.40%</td>
</tr>
<tr>
<td>Current liabilities/total assets</td>
<td>21.33%</td>
<td>25.18%</td>
</tr>
<tr>
<td>Long-term debt/total assets</td>
<td>30.34%</td>
<td>32.62%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Costs, prices, and admissions</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Costs per adjusted admission</td>
<td>$2,276</td>
<td>$3,875</td>
<td>$2,169</td>
<td>$3,795</td>
</tr>
<tr>
<td>Price to insured patients (index,</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>adjusted for case-mix and inflation)</td>
<td>0.75</td>
<td>1.22</td>
<td>0.752</td>
<td>1.180</td>
</tr>
<tr>
<td>Number of adjusted admissions</td>
<td>9,560</td>
<td>9,933</td>
<td>16,753%*</td>
<td>16,390%*</td>
</tr>
</tbody>
</table>

Source: Division of Provider Studies, Center for General Health Services Intramural Research, Agency for Health Care Policy and Research.

Notes: This table and subsequent analyses are based on data from the 63 hospitals in the negative cohort and the 405 hospitals in the positive cohort that survived and provided data for all years required by the analysis (1980-1984 and 1987). Means are weighted by the number of adjusted admissions.

\(^a\) Difference between cohorts is significant at p < .01.
increasing short-term levels of indebtedness of the negative cohort indicate a willingness of some sponsors to hold these obligations despite very weak cash flow and negative income. However, the losses in 1984 were probably too large to sustain an equilibrium.

Improvements in operating revenue margins and in cash flow suggest that hospitals in the negative cohort may have acted to control costs or to raise revenue from patients. While cost per adjusted admission was higher for the negative cohort than for the positive cohort in both years, the difference was not statistically significant. Between 1984 and 1987 it grew by 70 percent for the negative cohort and 75 percent for the positive cohort, a difference that was not statistically significant. Differences in changes in price and admissions between the cohorts also were not significant, although hospitals had significantly fewer admissions in both years.

**Results**

**Patient mix.** Contrary to our first hypothesis, the proportion of patients in the high-severity category actually increased for negative-cohort hospitals (Exhibit 3). Severity also increased for positive-cohort hospitals. The difference between cohorts was not statistically significant. This suggests that negative-cohort hospitals were either unwilling or unable to “cream skim” as a strategy for survival. One explanation for the increase in severity in both cohorts is the shift of less severely ill patients to outpatient treatment. Variables signaling acceptance of patients with relatively little ability to pay increased over time for both cohorts. The combined total of bad debt and charity care as a proportion of total revenue increased significantly more for the negative cohort than for the positive cohort. These findings fail to support our hypothesis.

**Eliminating losses.** Changes in resource use did not differ significantly between the cohorts. Indeed, some of the measures (percentage of board-certified physicians, ratio of RNs to total nursing staff, and FTEs per adjusted admission) actually increased for the negative cohort, contrary to the hypothesis. In some hospitals this could be because existing management lacked the ability or desire to improve. That negative-cohort hospitals were significantly more likely to relinquish control of day-to-day operations and become contract managed suggests that the problem was addressed in at least some of the hospitals with weak management.

It is noteworthy that negative-cohort hospitals did not abandon emergency services to a greater degree than did positive-cohort hospitals (3.2 percent versus 2.8 percent). However, the negative cohort abandoned obstetrical services more frequently than did the positive cohort (19.6 percent versus 7.7 percent). Negative-cohort hospitals were significantly
# Exhibit 3
Changes in Patient Mix, Resource Use, Services Offered, and Investment, By Hospital Cohort, 1984-1987

<table>
<thead>
<tr>
<th>Variables</th>
<th>1984 means&lt;sup&gt;a&lt;/sup&gt;</th>
<th>Actual percent change in means, 1984-1987</th>
<th>Significance test for cohort difference in changes&lt;sup&gt;b&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Negative cohort</td>
<td>Positive cohort</td>
<td>Negative cohort</td>
</tr>
<tr>
<td>Patient mix</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent severely ill</td>
<td>18.53%</td>
<td>16.72%</td>
<td>12.09%</td>
</tr>
<tr>
<td>Percent poorly insured</td>
<td>29.00%</td>
<td>21.23%</td>
<td>16.59%</td>
</tr>
<tr>
<td>Bad debts and charity care/total revenue</td>
<td>8.18</td>
<td>4.92</td>
<td>56.85</td>
</tr>
<tr>
<td>Resource use and services</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Case-mix-adjusted length-of-stay (days)</td>
<td>6.79</td>
<td>6.34</td>
<td>-9.72</td>
</tr>
<tr>
<td>Percent of physicians board-certified</td>
<td>62.22%</td>
<td>70.32%</td>
<td>9.56</td>
</tr>
<tr>
<td>RNs as percent of total nursing staff</td>
<td>71.31%</td>
<td>78.09%</td>
<td>7.14</td>
</tr>
<tr>
<td>Full-time employees to FE employees</td>
<td>85.52</td>
<td>84.05</td>
<td>1.84</td>
</tr>
<tr>
<td>Specialization index</td>
<td>0.3610</td>
<td>0.1592</td>
<td>2.16</td>
</tr>
<tr>
<td>Profitable services index</td>
<td>0.8621</td>
<td>1.11</td>
<td>43.73</td>
</tr>
<tr>
<td>FTEs per adjusted admission</td>
<td>7.90</td>
<td>7.51</td>
<td>6.96</td>
</tr>
<tr>
<td>Percent of hospitals with</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emergency room</td>
<td>98.41%</td>
<td>98.75%</td>
<td>3.23d</td>
</tr>
<tr>
<td>Obstetrics</td>
<td>88.89</td>
<td>87.28</td>
<td>m &amp; v</td>
</tr>
<tr>
<td>HMO affiliation</td>
<td>13.11</td>
<td>21.88</td>
<td>21.57g</td>
</tr>
<tr>
<td>PPO affiliation</td>
<td>0.54</td>
<td>0.23</td>
<td>19.23g</td>
</tr>
<tr>
<td>Contract management</td>
<td>9.84</td>
<td>9.41</td>
<td>26.429</td>
</tr>
<tr>
<td>Investment</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Net plant assets per adjusted admission</td>
<td>$14,39.70</td>
<td>$13,40.95</td>
<td>30.78</td>
</tr>
<tr>
<td>Beds in intensive care units to total beds</td>
<td>6.56</td>
<td>7.04</td>
<td>23.32</td>
</tr>
<tr>
<td>Percent of hospitals with</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CT scan</td>
<td>34.92%</td>
<td>56.86%</td>
<td>19.519</td>
</tr>
<tr>
<td>MRI</td>
<td>0.00</td>
<td>3.24</td>
<td>1.59</td>
</tr>
<tr>
<td>Cardiac catheterization</td>
<td>4.76</td>
<td>24.44</td>
<td>0.00</td>
</tr>
<tr>
<td>Diagnostic ultrasound</td>
<td>82.54</td>
<td>91.27</td>
<td>27.27</td>
</tr>
</tbody>
</table>

**Source:** Division of Provider Studies, Center for General Health Services Intramural Research, Agency for Health Care Policy and Research.

<sup>a</sup> Weighted by total adjusted admissions. The 1984 cohort differences for the following variables were significant at p < 0.05: percent severely ill patients, percent poorly insured patients, bad debts and charity care/total revenue, percent of physicians board-certified, RNs to total nursing staff, specialization index, percent of hospitals with PPO affiliation, beds in ICU to total beds, percent of hospitals with CT scan, cardiac catheterization, and diagnostic ultrasound.

<sup>b</sup> The significance test is conducted with the change in a particular variable as the “dependent” and the cohort as well as the initial (1984) value as the “independent” variables. A two-stage method with additional instrumental variables from 1984 is used to avoid bias that might arise from correlation of the initial value with the unexplained errors in the dependent variable.

<sup>c</sup> Not significant.

<sup>d</sup> Proportion of hospitals abandoning the service.

<sup>e</sup> Chi square, not significant

<sup>f</sup> Chi square.

<sup>g</sup> Proportion of hospitals adopting the service.
less likely than positive-cohort hospitals to affiliate with HMOs or PPOs as a strategy for survival. Except for obstetrical services and contract management, these results offer very little support for our second hypothesis, which should be reassuring about likely changes in quality of care.

**Investment.** It appears that both cohorts started with a similar level of plant and equipment assets per admission. However, the negative cohort had fewer sophisticated facilities for diagnostic imaging and cardiac catheterization. The negative cohort made much less new investment than the positive cohort between 1984 and 1987. Net plant assets per adjusted admission rose by almost 76 percent for the positive cohort, but only 31 percent for the negative cohort. The proportion of ICU beds increased much more in the positive cohort than in the negative cohort.¹⁶ Large differences also are shown in the proportion of hospitals in each cohort newly adopting CT scan, MRI, or cardiac catheterization facilities. These results strongly support our third hypothesis.

We conducted multivariate tests on the investment differences reported in Exhibit 3. Specifically, we allowed for hospital characteristics that were shown in Exhibit 1 to be significantly different between the cohorts. In addition, we included other variables recommended in the literature as affecting investment by affecting noncapital input costs, the expected return to investment, and the price of external capital. The results of the multivariate model did not change the qualitative conclusions already reported. Several other independent factors affecting investment were identified (for example, teaching status, investor ownership, price of capital, and RN availability). These and other multivariate results, which we do not present here, concerning our first two hypotheses do not change the findings shown in Exhibit 3.

**Discussion**

Only 10 percent of the hospitals with a five-year record of chronic losses as of 1984 closed over the four years ending in 1988. Aggregate data for subsequent years tend to present the same picture: Many hospitals face financial pressure and occasional or chronic losses, but closure is not a frequent outcome.¹⁷ The important question is how hospitals with chronic losses survive. We studied an array of strategies, including some that suggest declines in access and quality of care.

We found that hospitals surviving with persistent losses did not respond in ways that suggest severe and immediate deterioration of access to or quality of care as measured. They did not, on average, admit patients selectively to reduce the percentage of severely ill or poorly insured patients. Changes in resource use and services offered likewise did not signal
significant decreases in quality of care provided by negative-cohort hospitals as compared with positive-cohort hospitals. Negative-cohort hospitals were slightly more likely than positive-cohort hospitals to drop obstetric services, but they did not cut back more on emergency services, lose their board-certified physicians, drastically cut back average length-of-stay, change to a less expensive mix of nursing staff, or reduce total staff per case. However, they were more likely to become managed by contract, and this may signal a desire to become more efficient.

Although there is little evidence of declining access or quality in the short run, chronic financial losses appear to have long-run effects, as suggested by our third hypothesis. Hospitals with negative revenue margins were less technologically sophisticated at the beginning of the observation period than were those with positive margins, and the differences between the two cohorts became more pronounced over time. The tendency of hospitals with negative margins to invest less in their physical plant and in new technologies may affect access to medical technology for patients who are unable to travel to other hospitals. Other studies suggest that this is likely to affect only a very small segment of the population. Moreover, the potential effect on access to sophisticated services should be weighed against the possibility that the slower rate of investment by these hospitals may help to restrain wasteful increases in total health care spending. Unnecessary investment in technology for competitive purposes is commonly cited as an undesirable factor in health care cost increases. When a physician must send a patient on a two-hour trip to have an MRI scan, both are likely to assess the marginal value of the procedure more carefully.

It is somewhat surprising that hospitals with persistent losses could invest at all. That hospitals with such dismal reported financial performance continue to exist and to attract investment funds suggests that revenue margins do not adequately reflect financial status. Our results support the suspicions of other researchers and anecdotal evidence that although margins are often used in research on the economics of hospitals, they are imperfect measures of financial performance and the ability to survive.

Negative margins, per se, may receive more attention than they deserve in debates on whether payment policies, be they the Medicare prospective payment system (PPS) or various state rate regulation schemes, are inadequate or unfair. Potential problems of access to care should be monitored by surveys of the population at risk. More research on the long-term cost, access, and quality consequences of reductions (or increases) in hospital investment is warranted. Carefully targeted efforts to maintain access to both basic care and advanced technology may be necessary. However, general payment policies designed to keep revenue margins above some arbitrary level (such as zero) could be simply wasteful, rewarding a hospital
even if it is inefficient or largely redundant to meet the needs of the local population.

Many organizations contribute data for the research program of the Agency for Health Care Policy and Research (AHCPR) Division of Provider Studies. The Commission on Professional and Hospital Activities (CPHA), Ann Arbor, Michigan, requested identification as a discharge abstract data supplier in publications including CPHA data, such as this report. Data from any source were supplied only upon authorization of individual hospitals. Data suppliers hold no responsibility for analyses, interpretation, or conclusions from their discharge abstract data. This DataWatch does not represent policy of either the AHCPR or the U.S. Department of Health and Human Services (HHS). The views expressed herein are those of the authors, and no official endorsement by the AHCPR or HHS is intended or should be inferred. The authors thank Rosanna Coffey, Dean Farley, and two anonymous referees for their comments. Any remaining errors are the responsibility of the authors.

NOTES


3. The authors were advised about this matter by two persons with close involvement in hospital finances: Steve Andes of the American Hospital Association and Emily Goodman of the United Hospital Fund of New York. Any inferences or speculations about this matter for broad samples of hospitals must be drawn with caution and should not be blamed on these helpful individuals.


6. We ran analyses two other ways as well. First, we compared hospitals in the lowest quartile of the five-year total revenue margin distribution with those in the highest quartile of that distribution. The results were similar to those we present here but are not as focused, since about 40 percent of the hospitals in the lowest quartile had positive
revenue margins. Second, we ran a three-way comparison. The three groups were the 
negative cohort, the highest quartile, and everyone else, which we called the “middle 
cohort.” The results of this comparison suggest that when there were differences in 
behavior among the three cohorts, the middle cohort and the highest quartile behaved 
very similarly, and they both behaved differently than the negative cohort. These 
results bolster our belief that the most important comparison is between the negative 
cohort and all other hospitals.
7. Regarding patient selectivity, see D.B. Sherlock, “Indigent Care in Rational Markets,” 
*Inquiry* (Fall 1986): 261-267. Regarding reduced investment, see for example M.R. 
and P. Cotton, “Public Hospitals, Taut and Tattered Safety Net,” Medical World News, 
II April 1988.
8. “Hospitals with Persistently Negative Revenue Margins: Closure, Merger, or Strategic 
method also controls for the phenomenon of “regression to the mean” of unexplained 
disturbances. We used the 1984 value of each dependent variable predicted from a 
first-stage regression to avoid bias that might be introduced from using a lagged 
dependent variable. Further, we employed the technique of “seemingly unrelated 
regressions” to test for correlation of unexplained errors across equations. That tech-
ique did not change any reported conclusions.
Severity*, vol. 1, Report no. NCHSR 83-52 (Rockville, Md.: National Center for Health 
Services Research, August 1983).
11. We add bad debt and charity care because of inconsistent reporting across hospitals in 
the AHA Annual Survey. If we could separate them, charity care could be seen as a 
purer measure of patient selection, since part of an increase in bad debt could be due 
to a decrease in willingness or ability of the financial management to collect those debts.
12. D. Farley, “Measuring Casemix Specialization and the Concentration of Diagnoses in 
Hospitals using Information Theory,” *Journal of Health Economics* (June 1989): 185-
207.
1 (1988): 37; and S.M. Shortell et al., “The Effects of Hospital Ownership on 
Nontraditional Services,” *Health Affairs* (Winter 1986): 97-111. These services may 
only be profitable if provided to patients with private insurance or higher incomes.
15. The comparisons in Exhibit 3 are based on weighted averages for each cohort (the 
weights are the number of adjusted admissions) to give more importance to hospitals 
with a larger impact on the nation. It is interesting to note that the unweighted average 
revenue margin for the negative cohort remained at about -3.2 percent in both 1984 
and 1987. The contrast between the weighted and unweighted results implies that 
larger hospitals in the negative cohort made more improvement over time than smaller 
hospitals.
16. The difference is significant at p = .07.
of Market Factors on Hospital Closures.”
19. See, for example, N.M. Kane, “Hospital Profits: A Misleading Measure of Financial 