AN EMPIRICAL STUDY OF THE DETERMINANTS OF SAFETY-NET HOSPITAL FAILURES

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ABSTRACT

Several safety-net hospitals have closed in the United States, but the scholarly literature does not adequately explain why. This study examines the relationship between the operational status (open or closed) of safety-net hospitals and unemployment, median household income, gross profit margin, efficiency ratio, operating margin, excess margin, and salary and benefit expenses per full-time equivalent. Study data were collected and analyzed by means of a logistic regression analysis. A significant relationship between hospital operational status and unemployment, operating margin, and salary and benefit expenses per full-time equivalent was indicated in this study. A safety-net hospital closure model was developed that showed that unemployment, operating margin, and salary and benefit expenses per full-time equivalent had a direct impact on hospital closures. Safety-net hospitals that experience upward trends in the unemployment rate in the areas they serve and have a poor operating margin and high salary and benefit expenses that make them more likely to close. This study provides supporting data to hospital administrators so decisions can be made to avoid future safety-net hospital closures. Information from this research can also provide legislators information and data as to why safety-net hospitals close and used as a tool for health care reform.

JEL: I14, I18, I28, I38

KEYWORDS: Charity Care, County Hospitals, Finance Ratios, Indigent, Indigent Health Care, Medically Indigent, Safety-net Hospital, Uncompensated Care, Underinsured, Undocumented Alien Health Care, Unemployment, and Uninsured

INTRODUCTION

There has been an evolution in health care in the United States. Safety-net hospitals have become the primary provider of care to the uninsured population (Hadley & Cunningham, 2004). For a variety of reasons, many safety-net hospitals have shut down and many have experienced challenges in a variety of ways (Cousineau & Tranquada, 2007). Bazzoli, Lindrooth, Kang, and Hasnain-Wynia (2006) stated that safety-net hospitals had a history of providing charity and discounted care to the uninsured population. DeLia (2006) reported that uninsured patients of all ages depend on uncompensated care from safety-net hospitals. As an indicator of uninsured patients, Weissman (2005) reported that hospitals in the United States spent $25 billion on uncompensated care (care to the uninsured) in 2005. The amount of the uncompensated care represents the commitment safety-net hospitals have for caring for the uninsured and population who lack access to health care. In the process of dealing with socioeconomic changes and a rise in the number of uninsured patients, hospital administrators have made decisions to meet the current demands of their institution. In making these decisions, they were faced with an increased uninsured population and changes in socioeconomic factors.

A review of the scholarly literature reveals there is a gap in the literature and perhaps a lack of understanding among hospital administrators and other decision-makers about the factors that influence the closure of safety-net hospitals. There is a lack of knowledge about which factors are common with safety-net hospital closures. Two gaps exist in the scholarly research of safety-net hospitals. The first gap is the effect of increased uninsured patients on safety-net hospitals. The second gap is the effect of

changing socioeconomic factors on safety-net hospitals. The purpose of this research was to address those gaps and provide some answers as to why safety hospitals close. In this quantitative study, we identified common factors found in California safety-net hospitals that closed from 2002 to 2009.

We examined the current literature related to safety-net hospitals along with data provided by the United States Census Bureau and other government agencies. We also explored the relationships between socioeconomic data, common safety-net hospital management and financial ratios, and hospital closures to determine the patterns that existed. The literature review is a review of the significant research related to the operation of safety-net hospital in the United States, with emphasis on California. The data and methodology section includes information on the design of the study that was performed in order to test the hypotheses. It also includes a description of the variables and how the data were collected. The results section is a summary of the findings and contains a hospital closure model. The concluding comments will include a reiteration of the goal of this article, discussion on the data and methodology used, summary of findings, limitations, and directions for future research.

LITERATURE REVIEW

The areas commonly discussed in the safety-net hospital concept are effectiveness, efficiency, financial stressors, and payer mix. Safety-net hospitals commonly make comparisons among effectiveness, efficiency, financial stressors, and payer mix to other safety-net and non- safety-net hospitals and the national average. These comparisons show safety-net hospitals how they are doing in comparison to others using financial indicators. Along with financial indicators, safety-net hospitals must contend with changing socioeconomic factors. Ehrlich, Flexner, Carruth, and Hawkins (1980) defined the term *effectiveness* as producing an effect, powerful in its effect or making a striking impression. In one point of view, Bennis (2009) reported that leadership would determine if an organization becomes sick or fails.

Bennis showed that leadership was the key that kept information flowing within the organization. When information flowed, effectiveness was achieved. In relation to safety-net hospitals, effectiveness was about setting the right targets such as quality of care, access of care, and medical education programs. Chin (2008) described effectiveness as quality of care. In another point of view, Hadley and Cunningham (2004) and Silverman (2008) reported that effectiveness was about the availability of care for uninsured people and expanding the insurance coverage area. Gourevitch, Malaspina, Weitzman, and Goldfrank (2008) showed that medical education programs played a critical role in the effectiveness of safety-net hospitals. Safety-net hospitals have been more effective when they provided quality care, had accessible care, and provided medical education programs.

The term *efficiency* means acting effectively, producing results with little waste of effort (Ehrlich et al., 1980). Much like effectiveness, Bennis (2009) believed that the leadership of an organization had control over the flow of information. The flow of information was vital to its success. Bennis added that followers who were lied to were never the same again. Bennis also believed that crises were always a result of leadership. When Bennis' leadership theory is followed, efficiency starts with leadership. For safety-net hospitals, efficiency is a way of providing better quality care while saving money. Hadley, Holahan, Coughlin, and Miller (2008) revealed that the current costs, sources of payment, and incremental costs of covering the uninsured are all factors of efficiency for safety-net providers. Hadley et al. concluded that efficiency provides savings for safety-net providers. Hadley et al. reported that one way in which safety-net providers achieves efficiency is through greater use of information technology. Additionally, Bazzoli et al. (2006) showed that efficiency is measured by the amount of labor, amount of supplies used, services provided, number of beds, and management of finances. Similarly, Weissman (2005) showed that safety-net hospitals needed to focus on efficiency as a method to contain costs versus

increasing the cost of services. Our review of the literature revealed that changes in operation, changes in services, and information technology were the three most common measures taken to improve efficiency.

Cousineau and Tranquada (2007) stated that county hospitals are constantly challenged with balancing public health and indigent care. As county hospitals were providing care to the indigent to meet the public health requirements, they were doing so with high costs. Along with normal costs of doing business, safety-net hospitals were also faced with financial stressors. The financial stressors were mainly linked to a high rate of uninsured patients (Coughlin, Bruen, & King, 2004). Several researchers have shown that the common financial stressors faced by safety-net hospitals included government regulations, Disproportionate Share Hospital (DSH) and Upper Payment Limit (UPL) Funding, uncompensated care, primary care programs, and charity care programs (Bazzoli, Kang, Hasnain-Wynia, & Lindrooth, 2005; Bazzoli et al., 2006; Bennett, Moore, & Probst, 2007; Coughlin et al., 2004; Coustasse, Lorden, Nemarugommula, & Singh, 2009; Cunningham, Hadley, Kenney, & Davidoff, 2007; DeLia, 2006; Hadley et al., 2008; Lindrooth, Bazzoli, Needleman, & Hasnain-Wynia, 2006; Weissman, 2005; Wolfskill, 2007). Safety-net hospitals must deal with accomplishing the public health demand while relying on enough reimbursement and revenue from others.

In the State of California, Office of Statewide Health Planning and Development (OSHPD) outlined five major payer groups. The five groups included Medicare, Medicaid, third party (primarily commercial insurance), county indigent, and other (Melnick & Fonkych, 2008). The "other" category includes self-paying patients, uninsured, and charity care patients treated at the hospital (Office of Statewide Health Planning and Development [OSHPD], 2010). OSHPD stated that any patient who received care and payment was received by the hospital from county indigent funds was required to report that patient as indigent. They were not considered self-pay because they did not have money to pay and qualify for under a county indigent program. The self-pay category includes high-income international patients who are seeking a specialist or a high-income patient who wish to pay out-of-pocket (Melnick & Fonkych, 2008). Melnick and Fonkych reported that self-pay patients were a small group of the uninsured population. In determining which classification a patient belongs, there are exceptions worth noting. The "other" category includes patients involved in car accidents covered under an auto insurance policy. Melnick and Fonkych (2008) reported that only 12% of those patients involved in an auto accident received coverage under an auto insurance policy or claim. In some cases, patients were admitted to the hospital and placed in the other category but found coverage after admission. Melnick and Fonkych stated that these patients were usually reclassified within 60 days of their discharge. Once a patient was reclassified, the payments were placed in the correct category for reporting purposes. However, initial measurement errors and inaccurate reporting can easily occur at the beginning of the admission.

When dealing with a payer mix, hospitals look for ways to increase the patient type that brought the most revenue. A payer mix ratio is determined by assigning a percentage to each category, when added together, equals the total patient population for a specific timeframe (OSHPD, 2010). The payer mix includes both outpatient and inpatient services but can be reported separately (Bennett et al, 2007). The best outcome for safety-net hospitals is possessing an equal payer mix that provides revenue with the least amount of uncompensated care in the "other" category (County of Kern, 2010). The payer mix for Kern Medical Center (safety-net hospital serving Kern County) on March 31, 2010 was Medicare 7.78%, Medicaid 52.79%, third party 8.82%, indigent 14.68%, and other 15.94% (County of Kern, 2010).

Financial indicators are used among safety-net hospitals to reviews trends, benchmark, and determine the financial well-being of the organization. Financial indicators can outline the profitability, liquidity, capital structure, revenue, costs, and utilization of a safety-net hospital (Pink, Holmes, D'Alpe, Strunk, McGee, & Slifkin, 2006). Effectiveness and efficiency are other terms that can be measured through financial indicators. Some of the most common financial indicators used by hospitals include gross profit margin, efficiency ratio, operating margin, excess margin, and salary and benefit expense per full-time equivalent

(FTE). Chernew, Gibson, Yu-Isenberg, Sokol, Rosen, and Fendrick (2008) showed that socioeconomic factors had significant effects on hospitals and other health care resources. Two common socioeconomic factors commonly reported by the United States Census Bureau (2010) are unemployment and median household income. Christ and Guell (2009) reported a sharp increase in unemployment over the past few years that had severely impacted health care and pharmaceutical companies. For household income, Chernew et al. reported that lower median household incomes had a negative effect on health care.

During the course of the literature review, we determined that there is a lack of research for three major areas. For example, further research is needed on the impact of the rising indigent population in the United States because the increase of indigent patients appears from the literature to have a direct impact on the operation of county hospitals and other safety-net hospitals. It was also apparent that a gap exists in hospital charity care and uncompensated care programs. We showed that in some cases charity care and uncompensated care programs were successful while others failed. Based on the successes and failures, we concluded that further studies were needed to determine if in fact charity care and uncompensated care programs were the answer to saving costs for safety-net hospitals. Another area where research was lacking was the impact of socioeconomic demographics on safety-net hospitals. Socioeconomic demographics could explain why some safety-net hospitals were profitable while others were not.

DATA AND METHODOLOGY

The purpose of this quantitative study was to address the gap in the understanding of the effects that increased uninsured population and socioeconomic factors have on safety-net hospital closures. We identified common factors found in California safety-net hospitals from 2002-2009. Based on Trochim and Donnelly's (2007) design descriptions, this study was similar to a non-experimental design. The non-experimental research design that was used in this study is a causal-comparative design or ex post facto design, as described by McMillan (2004). This design allowed us to understand a complex issue, enhanced the prior research, and explained the complex links. By using this design, relationships between the independent and dependent variables were determined through a logistic regression analysis (logic model). The statistical analysis and hypothesis testing employed a logistic regression analysis that included descriptive statistics of all variables, variable coefficients, z value, p values, odd ratios, analysis of variance (ANOVA), model prediction analysis, and logic formula using ex post facto archival data from California State Association of Counties (CSAC), OSHPD, United States Census Bureau, and United States Department of Labor. This approach (logistic regression) was chosen because (a) all the data were historical in nature and (b) the response variable (hospital status) was binary in nature.

A logistic regression analysis is an effective research method or tool for developing models when the output is categorical in nature (e.g., open/closed). This methodology also is used to determine if there are any interactions among the independent variables. At the completion of this analysis, a logistic model was developed and verified to be valid. In the process of developing a logistic regression model, Minitab 16 was used to analyze the data. The computed coefficients (β_0 and β_i) were calculated and the quality of the regression model was tested using four assessments. The computed coefficients were constant = β_0, unemployment = β_1, median household income = β_2, gross profit margin = β_3, efficiency ratio = β_4, operating margin = β_5, excess margin = β_6, and salary and benefit expenses per FTE = β_7. The four assessments used to evaluate the regression model were overall model evaluation, tests of individual predictors (the coefficients of the explanatory variables), goodness-of-fit test, and validation of the predicted probabilities. Once a logistic regression model was built using the postulated explanatory variables (x_1 = unemployment rate, x_2 = median household income, x_3 = gross profit margin, x_4 = efficiency ratio, x_5 = operating margin, x_6 = excess margin, and x_7 = salary and benefit expenses per FTE) and response variable (y = hospital operating status; closed = 0 and open = 1), it must be assessed to assure all

variables are a good fit and determine which coefficients were significant. The final result yielded the following logit model or hospital closure model:

$$P(y = 1) = \frac{e^{\beta 0 + \beta 1x1 + \beta 5x5 + \beta 7x7}}{1+e^{\beta 0 + \beta 1x1 + \beta 5x5 + \beta 7x7}} \quad (1)$$

This quantitative study was designed to test the following hypotheses:

H_0: There is no significant relationship between the dependent variable (hospital operational status) and independent variables (unemployment, median household income, gross profit margin, efficiency ratio, operating margin, excess margin, and salary and benefit expenses per FTE). All the coefficients (βi) equal zero.

H_1: There is a significant relationship between the dependent variable (hospital operational status) and at least one independent variable (unemployment, median household income, gross profit margin, efficiency ratio, operating margin, excess margin, and salary and benefit expenses per FTE). At least one coefficient (βi) does equal zero. In the process of developing a logistic regression model, Minitab 16 was used to analyze the data. The computed coefficients (β_0 and β_i) were calculated and the quality of the regression model was tested using four assessments. The computed coefficients were constant = β_0, unemployment = β_1, median household income = β_2, gross profit margin = β_3, efficiency ratio = β_4, operating margin = β_5, excess margin = β_6, and salary and benefit expenses per FTE = β_7. The four assessments used to evaluate the regression model were overall model evaluation, tests of individual predictors (the coefficients of the explanatory variables), goodness-of-fit test, and validation of the predicted probabilities.

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$$P(y = 1) = \frac{e^{\beta 0 + \beta 1x1 + \beta 5x5 + \beta 7x7}}{1+e^{\beta 0 + \beta 1x1 + \beta 5x5 + \beta 7x7}} \quad (2)$$

The criterion used for selecting the sample was based on an available data set and its relevance to the problem statement. The unit of analysis was California safety-net hospitals that operated at least 1 year during the 2002-2009 calendar years (January to December). Safety-net hospitals used in this study met the following criteria:

1. The hospital was classified as a general acute care and comparable hospital by OSHPD.

2. The hospital had a minimum of 3 years of operation prior to 2010.

3. The hospital had at least 1 year of operation from 2002-2009.

4. The number of total visits (outpatient and inpatient combined) by indigent patients, other indigent patients, and other patients, as outlined by OSHPD, equaled 5% or more of total hospital visits.

5. The hospital had an emergency department classified as open by OSHPD during its operational period.

The 1999 to 2009 OSHPD Hospital Annual Financial Data (HAFD) sets were used in determining which hospitals met the criteria. Based on these criteria, the sample size was 274 safety-net hospitals.

The data collection tools that were used in this study were American FactFinder, Local Area Unemployment Statistics (LAUS), and Automated Licensing Information and Report Tracking System (ALIRTS). All of the data were collected using these collection tools. All the collection tools were built by the government agencies responsible for the data collection. Each report generated by these tools included a key or legend, notations (data flags), and limitations (if applicable) on the bottom of each report, chart, and graph. The variables were divided by dependent and independent variables. Each variable is listed below along with a detailed description. The dependent variable was hospital operational status (open or closed). The independent variables were unemployment, median household income, gross profit margin, efficiency ratio, operating margin, excess margin, and salary and benefit expenses per FTE.

Data that were available for hospital operational status can be taken from the 2002 to 2009 OSHPD HAFD data sets. The HAFD data sets were located in ALIRTS on the OSHPD website. This variable was reported as open with a dummy variable of one and closed with an assigned dummy variable of zero. Each safety-net hospital was assigned a dummy variable based on the hospital's operational status at the end of the 2009 calendar year. OSHPD reported operational status as yes for open and no for closed.
Unemployment (3-year rate change) data were taken from LAUS. The formula used to calculate the unemployment 3-year rate change was:

$$Unemployment\ (3-year\ change) = (2009\ Unemployment\ Rate - 2007\ Unemployment\ Rate) \quad (3)$$

If the hospital operating status was reported as closed prior to the end of the 2009 calendar year, the third to the last year and final year of the operational years were used (Example: if the hospital closed in 2002, then the unemployment rates for 2000 and 2002, were used). Unemployment rate was reported as a percent. Median household income (3-year change) data originated from the United States Census Bureau, with support from other federal agencies. The formula used to calculate the median household income 3-year change was:

$$Median\ Household\ Income\ (3-year\ change) = (2009\ Median\ Household\ Income - 2007\ Median\ Household\ Income) \quad (4)$$

If the hospital operating status was reported as closed prior to the end of the 2009 calendar year, the third to the last year and final year of the operational years were used. Median household income was reported as a positive or negative number rounded to the nearest dollar. Median household income was also adjusted for inflation or normalized using the Consumer Price Index (CPI) Inflation Calculator provided by United States Department of Labor (2011). The data for gross profit margin were found on the OSHPD website using the ALIRTS system. The formula for gross profit margin was:

$$Gross\ Profit\ Margin = \frac{(Gross\ Patient\ Revenue - Total\ Operating\ Expense)}{Gross\ Patient\ Revenue} \quad (5)$$

For the purposes of this study, the gross profit margin was reported in terms of a 3-year average. The gross profit margin variable with a 3-year average was calculated by adding the gross profit margin from 2007-2009 and divided by 3 years. The formula used to calculate the gross profit margin 3-year average was:

$$Gross\ Profit\ Margin\ (3-year\ average) = \frac{(2007\ Gross\ Profit\ Margin + 2008\ Gross\ Profit\ Margin + 2009\ Gross\ Profit\ Margin)}{3\ years} \quad (6)$$

If the hospital operating status was reported as closed prior to the end of the 2009 calendar year, the last three operational years were used. Gross profit margin was reported as a positive or negative number rounded to the nearest thousandth.

The data for efficiency ratio were found on the OSHPD website using the ALIRTS system. The formula for efficiency ratio was:

$$Efficiency\ Ratio = \frac{(Total\ Operating\ Expenses - Interest\ Expenses)}{Gross\ Patient\ Revenue} \quad (7)$$

For the purposes of this study, the efficiency ratio was reported in terms of a 3-year average. The efficiency ratio variable with a 3-year average was calculated by adding the efficiency ratio from 2007-2009 and divided by 3 years. The formula used to calculate the efficiency ratio 3-year average was:

$$Efficiency\ Ratio\ (3 - year\ average) = \frac{(2007\ Efficiency\ Ratio + 2008\ Efficiency\ Ratio + 2009\ Efficiency\ Ratio)}{3\ years} \quad (8)$$

If the hospital operating status was reported as closed prior to the end of the 2009 calendar year, the last three operational years were used. Efficiency ratio was reported as a positive or negative number rounded to the nearest thousandth.

The data for operating margin were found on the OSHPD website using the ALIRTS system. The formula for operating margin was:

$$Operating\ Margin = \frac{(Total\ Operating\ Revenue - Total\ Operating\ Expense)}{Total\ Operating\ Revenue} \quad (9)$$

Operating margin is commonly reviewed over a length of time. For the purpose of this study, operating margin was calculated as a 3-year average. The formula for operating margin 3-year average was:

$$Operating\ Margin\ (3 - year\ average) = \frac{(2007\ Operating\ Margin + 2008\ Operating\ Margin + 2009\ Operating\ Margin)}{3\ years} \quad (10)$$

If the hospital operating status was reported as closed prior to the end of the 2009 calendar year, the last three operational years were used. Operating margin was reported as a positive or negative number rounded to the nearest thousandth.

The data for calculating the excess margin can be found on the OSHPD website in the ALIRTS system. The formula for calculating excess margin was:

$$Excess\ Margin = \frac{(Totaling\ Operating\ \ Revenue - Total\ Operating\ Expense + Nonoperating\ Revenue)}{(Total\ Operating\ Revenue - Nonoperating\ Revenue)} \quad (11)$$

The excess margin with a 3-year change was calculated by subtracting the 2007 excess margin from the 2009 excess margin. The formula used to calculate the excess margin 3-year change was:

$$\text{Excess Margin}\ (3 - \text{year change}) = (2009\ Excess\ Margin - 2007\ Excess\ Margin) \quad (12)$$

If the hospital operating status was reported as closed prior to the end of the 2009 calendar year, the third to the last year and final year of the operational years were used. Excess margin was reported as a positive or negative number rounded to the nearest thousandth.

Salary and benefit expense per FTE requires two variables: total expense: salary and benefits and number of FTEs allocated by the hospital. The data for this variable were found on the OSHPD website using the ALIRTS system. The formula for salary and benefit expense per FTE was

$$Salary\ and\ Benefit\ Expense\ per\ FTE = \frac{Total\ Expenses{:}Salary+Benefits}{Total\ Number\ of\ FTEs} \quad (13)$$

For the purpose of this study, salary and benefit expense per FTE was calculated as a 3-year average. The formula for salary and benefit expense per FTE 3-year average was

$$Salary\ and\ Benefit\ Expense\ per\ FTE\ (3-year\ average) = \frac{(2007\ Salary\ and\ Benefit\ Expense\ per\ FTE + 2008\ Salary\ and\ Benefit\ Expense\ per\ FTE + 2009\ Salary\ and\ Benefit\ Expense\ per\ FTE)}{3\ years} \quad (14)$$

If the hospital operating status was reported as closed prior to the end of the 2009 calendar year, the last three operational years were used. Salary and benefit expense per FTE was reported as a positive or negative amount rounded to the nearest dollar. Salary and benefit expense per FTE was also adjusted for inflation or normalized using the CPI Inflation Calculator provided by United States Department of Labor (2011).

RESULTS

The results of the log-likelihood test are shown in Table 1. The log-likelihood test showed that there was a significant probability that at least one coefficient (β_i), was not equal to zero (log likelihood, or G = χ^2 = 110.546, *df* = 7, N = 274, *p* = 0.000). Therefore, the null hypothesis (that all coefficients are equal to zero) was rejected. However, although the overall log likelihood *p* value equals zero, the individual *p* values do not indicate that any of the explanatory variables were significant (*p*>0.05 for all variables). That indicates a need for some model refinement.

Table 1: Logistic Regression Table: *y* versus x_1, x_2, x_3, x_4, x_5, x_6, and x_7

Predictor	Coefficient	*SE* Coefficient	*Z*	*P*	Odds ratio	95% *CI*, Lower	95% *CI*, Upper
Constant	130.69**	1,828.6**	0.07**	0.943**	—	—	—
x_1	1,583.8**	22,416**	0.07**	0.944**	+	0.00**	+
x_2	-0.0212**	0.3271**	-0.06**	0.948**	0.98**	0.52**	1.86**
x_3	6,834.1**	108,832**	0.06**	0.950**	+	0.00**	+
x_4	6,968.2**	110,651**	0.06**	0.950**	+	0.00**	+
x_5	189.52**	2,883.5**	0.07**	0.948**	<0.0001**	0.00**	+
x_6	91.286**	3,102.8**	0.03**	0.977**	<0.0001**	0.00**	+
x_7	0.0000**	0.0293**	0.01**	0.995**	1.00**	0.94**	1.06**

*This table shows the results of the logistic regression for y versus x_1, x_2, x_3, x_4, x_5, x_6, and x_7. The p values indicate that not all variables were significant. This indicates that model refinement is needed to establish a final model. SE = standard error; CI = confidence interval; + = Convergence has not been reached for the parameter estimates criterion; Log likelihood = -0.000; test that all slopes are 0: G = 110.546, DF = 7, P value = 0.000. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.*

In an effort to build a valid logit model, the explanatory variables were analyzed in several different combinations using a stepwise regression approach until the remaining variables had a *p* value of less than 0.05. Using Minitab 16, every possible combination of explanatory variables were evaluated until three remained with *p* values less than 0.05. All other combinations yielded at least one *p* value greater than 0.05. Table 2 lists the results of the analysis conducted (logistic regression analysis of *y* versus x_1, x_5, and x_7). In this logistic regression analysis, there was a significant probability that unemployment (x_1), operating margin (x_5), and salary and benefit expenses per FTE (x_7) affect hospital operational status (χ^2 = 92.700, *df* = 3, N = 274, *p* = 0.000). Interactions were considered and assigned as explanatory variables (x_8 through x_{28}). All combinations of the interactions variable yielded *p* values greater than 0.05. The

interactions analysis included the testing of all variables (response and explanatory) individually and in different combinations. Based on the interactions analysis, no interaction explanatory variables or other response variables will be included in the logit model. Additionally, the p value of each explanatory variable (x_1, x_5, and x_7) left in the model was less than 0.05.

Table 2: Logistic Regression Table: y versus x_1, x_5, and x_7

Predictor	Coefficient	*SE* Coefficient	*Z*	*P*	Odds ratio	95% *CI*, Lower	95% *CI*, Upper
Constant	9.5466**	3.649**	2.62**	0.009**	—	—	—
x_1	109.08**	36.989**	2.95**	0.003**	<0.0001**	<0.0001**	<0.0001**
x_5	14.381**	7.107**	2.02**	0.043**	1,759,984**	1.580**	1.570**
x_7	0.0002**	0.0001**	2.14**	0.032**	1.000**	1.000**	1.000**

*This table reflects the results of a logistics regression analysis completed on y versus x_1, x_5, and x_7. Based on the results of the p values, all variables were significant. SE = standard error, CI = confidence interval; Log-Likelihood = -8.875; Test that all slopes are zero: G = 92.797, DF = 3, P-Value = 0.000. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.*

An interactions analysis was completed among the three remaining explanatory variables (x_1, x_5, and x_7) and resulted in no valid interactions between any of the explanatory variables. Table 3 provides the results of the interaction analysis. For the interaction analysis three interactive independent variables were created and tested (x_8, x_9, and x_{10}). x_8 represented a possible interaction between x_1 and x_5, x_9 between x_1 and x_7, x_{10} between x_5 and x_7. The values for x_8, x_9, and x_{10} were calculated by multiplying the modified values of the two possible interacting independent variables. Based on the results of the logistic regression analysis in Table 3, variables x_8, x_9, and x_{10} will not be included in the logit model.

Table 3: Logistic Regression Table: y versus x_1, x_5, x_7, x_8, x_9, and x_{10}

Predictor	Coefficient	*SE* Coefficient	*Z*	*P*	Odds ratio	95% *CI*, Lower	95% *CI*, Upper
Constant	29.667**	3,044.4**	-0.01**	0.992**	—	—	—
x_1	402.66**	105,931**	0.00**	0.997**	<0.001**	0.00**	+
x_5	-17.798**	17,642**	0.00**	0.999**	0.00**	0.00**	+
x_7	-0.0000**	0.1810**	0.00**	1.000**	1.00**	0.70**	1.42**
x_8	-3,207.9**	1,115,610**	0.00**	0.998**	0.00**	0.00**	+
x_9	-0.0198**	8.569**	0.00**	0.998**	0.98**	0.00**	<0.0001**
x_{10}	0.0012**	0.8390**	0.00**	0.999**	1.00**	0.19**	5.18**

This table reflects the results of a logistics regression analysis completed on y versus x_1, x_5, x_7, x_8, x_9, and x_{10}. *Based on the results of the p values, x_8, x_9,* and x_{10} *will be rejected from the final model. SE = standard error; CI = confidence interval; + = Convergence has not been reached for the parameter estimates criterion; Log-Likelihood = -8.875; Test that all slopes are zero: G = 92.797, DF = 3, P-Value = 0.000. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.*

The next step in a regression analysis is the assessment of the overall goodness-of-fit test. The goodness-of-fit uses the deviance or residual deviance. A good fit will reference a smaller deviance. Table 4 reflects the goodness-of-fit analysis. Pearson (p = 1.00), Deviance (p = 1.00) and Hosmer-Lemeshow (p = 1.00) measures confirmed that this logit model was an effective predictor of hospital operational status of goodness-of-fit. The overall result of the goodness-of-fit tests also supports the rejection of the null hypothesis.

Table 4: Goodness-of-Fit Tests for y versus x_1, x_5, and x_7

Method	Chi-Square	*DF*	*P*
Pearson	60.972**	270**	1.00**
Deviance	17.749**	270**	1.00**
Hosmer-Lemeshow	0.0868**	8**	1.00**

This table shows the results of the three goodness-of-fit tests completed for y versus x_1, x_5, and x_7. *The Pearson, Deviance, and Hosmer-Lemeshow tests indicate that x_1, x_5, and x_7 were effective predictors of hospital operational status. ***, **, and * indicate significance at the 1, 5, and 10 percent levels respectively.*

The last assessment in the logistic regression model is validation of predicted probabilities. The probability model is expressed as:

$$P(y = 1) = \frac{e^{\beta 0 + \beta 1x1 + \beta 2x2 + \cdots + \beta ixi}}{1+e^{\beta 0 + \beta 1x1 + \beta 2x2 + \cdots + \beta ixi}} \quad (15)$$

By using the coefficients (β_0, β_1, β_5, and β_7) and explanatory variables (x_1, x_5, and x_7) in Table 3, a new logit model (hospital closure model) is developed and expressed as:

$$P(y = 1) = \frac{e^{\beta 0 + \beta 1x1 + \beta 5x5 + \beta 7x7}}{1+e^{\beta 0 + \beta 1x1 + \beta 5x5 + \beta 7x7}} \quad (16)$$

Where the coefficients are calculated as:

β_0 = 9.54663
β_1 = 109.081
β_5 = 14.3808
β_7 = 0.0001613.

To validate this model, we plugged in the values of the independent variables from the actual data to calculate y for each hospital in the sample. After plugging the data into the predictive model for the safety-net hospitals reported as open (y = 1), 259 out of 260 produced probabilities close to 1, indicating they were very likely to be open. The only exception was Mercy Medical Center Merced – Community Campus whose data yielded a probability of being open of 0.018 (indicating a high likelihood of being closed) but OSHPD (2010) reported the hospital as open in 2009. For safety-net hospitals that closed (y = 0), 13 of 14 hospitals had probability values indicating a high likelihood of being closed. As an exception, San Jose Medical Center had a probability value of 0.576; however, OSHPD (2010) showed the hospital to be closed in 2004. As an example of this validation of the model, Alameda County Medical Center had the following mean centered values for the independent variables

Unemployment (x_1) = 0.001
Operating Margin (x_5) = 0.112
Salary and Benefit Expenses per FTE (x_7) = 27,659.

When these values are placed into the hospital closure model we get the following result:

P = (e^(9.54663+(109.081*0.001)+(14.3808*0.112)+(0.0001613*27,659))) /
(1+((e^(9.54663+(109.081*0.001)+(14.3808*0.112)+(0.0001613*27,659))))) = 0.999.

Based on the results of the hospital closure model, the probability of the hospital being open is 99.9%. The operational status of Alameda County Medical Center at the end of the study was in fact, open (1). Another example that could be used is Orange County Community Hospital – Buena Park. The mean centered independent variables for Orange County Community Hospital – Buena Park were

Unemployment (x_1) = -0.049
Operating Margin (x_5) = -0.512
Salary and Benefit Expenses per FTE (x_7) = -37,701.

When these value were plugged into the hospital closure, the result was

P = (e^(9.54663+(109.081*-0.049)+(14.3808*-0.512)+(0.0001613*-37,701))) /
(1+((e^(9.54663+(109.081*-0.049)+(14.3808*-0.512)+(0.0001613*-37,701))))) = 0.000.

Using the hospital closure model we were able to determine that Orange County Community Hospital – Buena Park is closed (0). During the data collection process, it was noted that Orange County Community Hospital – Buena Park closed in 2003. Based on the results of the four assessments, it can be concluded that the hospital closure model contains significant coefficients. These coefficients (β_0, β_1, β_5, and β_7) can be used in the hospital closure model and give a good indication of the influence that the explanatory variables have on the response variable (y) or in other terms, the probability that y equals one. Using β_0, β_1, β_5, and β_7 in the hospital closure model enables a researcher to predict the probability of success for any combination of values for the explanatory variables (x_1, x_5, and x_7).

Each coefficient describes the size of the contribution of the independent (explanatory) variable. The unemployment coefficient, β_1, has a value of 109.081. This value indicates that this variable increases and strongly influences the probability of that outcome. The operating margin coefficient, β_5, has a value of 14.3808. This value indicates that this variable also increases and strongly influences the probability of that outcome. The salary and benefit expenses per FTE coefficient, β_7, had a value of 0.0001613, indicating that this variable increases and slightly influences the probability of that outcome.

CONCLUDING COMMENTS

The purpose of this research was to address two gaps and provide some answers as to why safety hospitals close. The first gap was the effect of increased uninsured patients on safety-net hospitals. The second gap was the effects of changing socioeconomic factors on safety-net hospitals. We were able to show the factors associated with safety-net hospitals closure, including unemployment. Although the uninsured population is growing, we did not find that it was a factor in safety-net hospital closures in California from 2002-2009. The hypotheses listed the following independent variables: unemployment, median household income, gross profit margin, efficiency ratio, operating margin, excess margin, and salary and benefit expenses per FTE. To develop a valid hospital model with the independent variables, a stepwise approach was used using MiniTab. As mentioned in chapter 4, every possible combination of explanatory variables was evaluated until three remained with p values less than 0.05.

All other combinations yielded at least one p value greater than 0.05. The stepwise model-building approach also looked at all factor interactions, and found none to be significant. The final hospital closure model includes unemployment, operating margin, and salary and benefit expenses per FTE based on the results of the stepwise approach. To validate the hospital closure model, the data for all 274 safety-net hospitals were plugged into the model. As noted in chapter 4, there were two exceptions between the actual operating status and hospital closure model probability result. In the first exception Mercy Medical Center Merced – Community Campus had a result of 0.018, indicating the probability of being open as 1.80%. In reality, the hospital remained open during the entire study. However, after this study was completed in 2009, OSHPD reported that Mercy Medical Center Merced – Community Campus closed the following year in 2010. This result suggests that other factors influenced that hospital to remain open for an additional year. The second exception was San Jose Medical Center, which resulted in a probability value of 0.576 or 57.6% probability of being open. In reality, San Jose Medical Center closed in 2004 (OSHPD, 2010). Looking at the data for San Jose Medical Center, there was roughly a 50-50 chance of this hospital being open. Although San Jose Medical Center had better performance measures, it closed because the city and county did not want the financial burden (City of San Jose, 2004). If it were not for a legislative action, the hospital would have remained opened.

Among the socioeconomic factors, x_1 (unemployment) was found to be the only significant influence of hospital closures. As noted in Table 6, all 14 safety-net hospitals that closed were located in counties where the unemployment rate change was well below the mean for all 274 safety-net hospitals. The 14 safety-net hospitals that closed had an unemployment rate change value between 0.017 to -0.020, and a mean of 0.005. When a safety-net hospital closed, they experienced a slight increase or slight decrease in the unemployment rate change over the last 3 years of operation. A decrease (negative value) in unemployment (3-year rate change) showed that the unemployment rate was higher 3 years prior to close then it was when the hospital closed. An increase (positive value) in unemployment (3-year rate change) shows that the unemployment rate was higher when the hospital closed.

The review of the data for unemployment (3-year rate change), indicates a correlation. As the unemployment (3-year rate change) increased, there was a strong probability that the hospital would remain in operation. A lower or negative rate change was indicative among hospitals that closed. There was nothing in the research that would give an indication about why unemployment rate change had a counter intuitive result. However, there is a possibly that a lower or negative rate change could lead to decreased government reimbursement in the areas of DSH finding. This effect would cause safety-net hospitals to rely more on third party payer, Medicare, and Medicaid claims. Unemployment is also discussed in the recommendations for future studies section of this chapter.

The two financial factors found to have a significant influence on hospital closure were x_5 (operating margin) and x_7 (salary and benefits expenses per FTE). As noted in Table 3, 13 out of the 14 safety-net hospitals that closed had negative operating margins (3-year average). In Table 3, 13 of the 14 safety-net hospitals that closed were losing money during the last 3 years of operation. In addition, these 13 hospitals also had values below the mean of all 274 safety-net hospitals. One hospital that did close, Lassen Community Hospital or Case 49, had an operating margin (3-year average) greater than the overall mean of all 274 safety-net hospitals. However, Lassen Community Hospital had the lowest salary and benefit expenses per FTE (3-year average) among all 274 safety-net hospitals.

The results of operating margin suggest that this explanatory variable is an overall symptom of hospital closure. Although a lack of money can close any business, other forces caused the operating margin to result in a negative value (increased costs and decreased revenue). The increased costs included costs for technology upgrades (including electronic medical records), unreimbursed costs to care for the uninsured, and rise in physician and nurse salaries. The Balance Budget Act, decreased DSH payments, and decreased reimbursement from insurance carriers would account for the decrease in revenue.

Thirteen out of 14 hospitals that closed experienced negative operating margins during their last three years of operation. Additionally, all 14 safety net hospitals that closed had operating margin values below the mean of all 274 safety-net hospitals. When hospitals lost money there was an increased probability that they closed. Operating margin will also be discussed in the recommendation for future studies section of this chapter. The second significant financial ratio included in the hospital closure model was salary and benefit expenses per FTE. In the 14 safety-net hospitals that closed, the salary and benefit expenses per FTE range was $28,047 to $77,517, whereas the mean of all 274 safety-net hospitals was $82,046. All 14 hospitals that closed had a salary and benefit expenses per FTE below the mean for all hospitals. There was nothing in the research that would give an indication about why salary and benefit expenses per FTE had a counter intuitive result. However, a lower salary and benefit expenses per FTE could indicate that safety-net hospitals were already making adjustments to save costs prior to closing. In this case salary and benefit expenses per FTE would be a symptom of the problem. Salary and benefit expenses per FTE will also be discussed in the recommendations for future studies section of this chapter.

During the course of this study, it was determined that some of the explanatory variables were not significant (did not affect hospital closures). The socioeconomic factor that was not significant was x2 (median household income). After evaluating the hospitals with an operating status of closed (mathematically reported as 0), it was found that 12 of the 14 hospitals were located in counties where the median household income increased during the last 3 years of the hospital's operation. In other words, people living in those counties where safety-net hospitals closed had an increase in the median household income (made more money than other counties). A decrease in the median household income would be an indicator that people would require more financial assistance and possibly lack basic needs such as health care. Two hundred forty eight hospitals out of 260 hospitals (95%) with an operating status of open (mathematically reported as 1), were located in counties where the median household income decreased from 2007 to 2009. This decrease meant that the hospitals that remained open were most likely in a position to support this change. Their position could be affected by increased government funding, efficiency, or other cost saving measure.

The financial factors that were found not significant were x_3 (gross profit margin), x_4 (efficiency ratio), and x_6 (excess margin). In reviewing the data for gross profit margin, no distinct pattern existed. The gross profit margin range for hospital closure was -0.490 to 0.900. There was an even distribution among open and closed hospitals. Efficiency ratio was also evenly distributed from 0.098 to 1.040 among hospitals that closed. There was no pattern for open or closed hospitals. Excess margin had a range of -0.762 to 0.428 with an even distribution among closed hospitals. Hospitals that remained open also had an even distribution on values for the excess ratio. No patterns were found for excess margin. The hospital closure model provided a predictive conclusion. Tripepi, Jager, Dekker, and Zoccali (2008) showed that analyses that contained categorical variables (hospital operational status) were best evaluated by a logit model based on probability. Since logistic regression theory was used to develop the hospital closure model, the hospital closure can only be used as a predictive model. Based on the final hospital closure model:

$$P(y=1) = \frac{}{e^{-(9.54663 + 109.081(unemployment) + 14.3808(operating\ margin) + 0.0001613(salary\ \&\ benefits\ expenses\ per\ FTE)}} \quad (17)$$

a negative unemployment rate change (rebound), negative operating margin (losing money), and negative salary and benefit expenses per FTE rate (decreased spending on salaries and benefits) increased the probability that a hospital will close. Based on the data collected on the 14 safety-net hospitals that closed, it would appear that many of the safety-net hospitals were experiencing trouble at least 3 years prior to closure. This trouble can be explained by the unemployment 3-year rate change decrease, a 3-year average negative operating margin, and a 3-year average salary and benefit expenses per FTE value that was much lower than other safety-net hospitals that remained opened. The probability of a hospital closing was the greatest when all three factors existed (low unemployment rate change, negative operating margin, and low salary and benefit expenses per FTE).

During the study period, there was a sharp increase (5.7% rate change) in the unemployment rate for the state of California from 2000 to 2009. The average median household income decreased by $1,765 (stated in real dollars) in the state from 2000 to 2009. The mean operating margin and mean excess margin of all 274 hospitals safety-net hospitals decreased. Additionally, the mean gross profit margin and mean efficiency ratios for all 274 safety-net hospitals increased. In the 8-year period covered in this study from 2002 to 2009, 5.1% of the safety-net hospitals closed. From 1996 to 2002, only 2.7% of the safety-net hospitals in the nation closed (Bazzoli et al., 2005). In this study, three explanatory variables influence hospital operational status: unemployment (x_1), Operating margin (x_5), and salary and benefit expenses per FTE (x_7). Upon further study, a hospital closure model was developed using a stepwise approach. The interaction analysis yielded no interactions among the explanatory variables. The goodness-of-fits test

also resulted in a good fit among x_1, x_5, and x_7. The logistic regression analysis yielded a hospital closure model that was predictive in nature to determine if a hospital remains open or closed.

During the course of this project, a couple of limitations were noted. First, a sample was collected using current governmental data. In areas where the data were not based on a survey or government requirements, estimations were made based on percentages of the population. The percentages that were used were estimated by the government agency that used the mathematical proportion method. Second, all research in this study was limited to the State of California and includes no data from outside the state. This limitation was based on the reporting requirements of safety-net hospitals in California.

The two significant variables covered in this study that needed further studies were unemployment and salary and benefit expenses per FTE. We were able to show that unemployment was a factor in safety-net hospitals closures. However, the results were contrary to what was expected. We found that a slight change (positive or negative) in the unemployment rate was significant to hospital closure. A high rate change was not significant to hospital closure. It is important to note, if the unemployment rate was high or low for three straight years, there could be little to no change in the rate. Further studies are needed to determine the exact unemployment rate that is significant to hospital closure. We found salary and benefit expenses per FTE (3-year average) was lower in the safety-net hospitals that closed compared to the mean of all 274 safety-net hospitals. Since salary and benefit expenses per FTE was significant in the hospital closure model, further studies are needed to determine the exact cause of lower salary and benefit expenses per FTE values. Some of the more likely causes could include that the hospitals were making short-term adjustments to save costs, located in lower cost of living areas, or taking other cost-savings measure. Although the hospital closure model identified which factors were associated with safety-net hospitals that closed, it did not explain what the hospital was doing wrong or how to make changes within the organization. Future studies could be conducted to determine what safety-net hospitals can do to change the outcome of each factor. Since many of the variables included in this study were financial ratios related to efficiency, the focus of future studies should be on which factors effect efficiency and what hospitals can do to reverse the negative factors that cause poor efficiency.

Another area of future study could include a study on the relationship between safety-net hospitals and efficiency measures or practices. A study that shows the most common efficiency measures used among safety-net hospitals would be beneficial for hospitals use. Since efficiency was identified as a contributor to hospital closure, future researchers should focus around the idea of providing the most efficient service and operation. Efficiency is one way a hospital can control money and resources.

Our last recommendation for future study is time delay. The amount of time it takes for a change to be realized is important. The hospital closure model outlined three variables that were present when the hospital closed. It would be important to investigate at what point a hospital starts down the road to closure. It is possible there is a delay between the explanatory variables and the actual time the hospital closed. This information would be helpful for hospital administrators in identifying the factors associated with closure at a much earlier time. The results of this study were used to yield a hospital closure model that can be used to predict hospital closure or identify hospitals nearing closure. In this model, unemployment, operating margin, and salary and benefit costs were directly related to hospital closure. When safety-net hospitals experienced a low unemployment rate change, negative operating margin (negative value or loss of profit), and decreased salary and benefit costs; the probability of hospital closure was significant. This information contributed to existing research already completed on safety-net hospitals. The results of this study are useful for public and hospital administrators when evaluating socioeconomic changes and hospital financial data. In order for change to occur, collaboration is necessary to address the causes of safety-net hospital closures and prevent health care disparities.

In this study, we found that 14 out of 274 (5.1%) California safety-net hospitals closed between 2002 and 2009. This closure is almost double the national rate from 1996 to 2002. Bazzoli et al. (2005) reported that 11 of 404 (2.7%) safety-net hospitals closed in the United States from 1996 to 2002. There is an increase in unemployment, an increase in uninsured patients, and a decrease in the number of safety-net hospitals to help this growing population. This change causes the vulnerable population to seek alternative care. Seeking alternate means that many uninsured patients living in the areas where these hospitals were located had to find alternative sources for medical care. As uninsured patients find alternative sources for treatment, non- safety-net hospitals are at risk of baring the burden for covering the cost of treating uninsured patients. The results of this study were used to yield a hospital closure model that can be used to predict hospital closure or identify hospitals nearing closure. In this model, unemployment, operating margin, and salary and benefit costs were directly related to hospital closure. When safety-net hospitals experienced a low unemployment rate change, negative operating margin (negative value or loss of profit), and decreased salary and benefit costs; the probability of hospital closure was significant. This information contributed to existing research already completed on safety-net hospitals. The results of this study are useful for public and hospital administrators when evaluating socioeconomic changes and hospital financial data. In order for change to occur, collaboration is necessary to address the causes of safety-net hospital closures and prevent health care disparities.

APPENDICES

Appendix A: Case Number Assignments

CASE #	HOSPITAL NAME (IF APPLICABLE, YEAR CLOSED)	CASE #	HOSPITAL NAME (IF APPLICABLE, YEAR CLOSED)
1	Alameda Hospital	138	Tahoe Forest Hospital
2	Eden Medical Center	139	Children's Hospital of Orange County
3	Alameda County Medical Center	140	Anaheim general Hospital
4	Alta Bates Summit Medical Center – Summit Campus – Hawthorne	141	AHMC Anaheim Regional Medical Center
5	St. Rose Hospital	142	Brea Community Hospital (2002)
6	Washington Hospital – Fremont	143	Chapman Medical Center
7	Sutter Amador Hospital	144	Fountain Valley Regional Hospital and Medical Center – Euclid
8	Biggs-Gridley Memorial Hospital	145	Western Medical Center – Anaheim
9	Feather River Hospital	146	Hoag memorial Hospital Presbyterian
10	Oroville Hospital	147	Huntington Beach Hospital
11	Enloe Medical Center – Esplanade Campus	148	La Palma Intercommunity Hospital
12	Mark Twain St. Joseph's Hospital	149	Orange County Community Hospital – Buena Park (2003)
13	Colusa Regional Medical center	150	Coastal Communities Hospital
14	Doctors Medical Center – San Pablo	151	Mission Hospital Regional Medical Center
15	Contra Costa Regional Medical Center	152	University of California Irvine Medical Center
16	Sutter Delta Medical Center	153	Garden Grove Hospital and Medical Center
17	John Muir Medical Center – Concord Campus	154	Placentia-Linda Community Hospital
18	San Ramon Regional Medical Center	155	St. Joseph Hospital – Orange
19	Sutter Coast Hospital	156	St. Jude Medical Center
20	Barton Memorial Hospital	157	West Anaheim Medical Center
21	Marshall Medical Center	158	Western Medical Center – Santa Ana
22	Coalinga Regional Medical Center	159	Sutter Auburn Faith Hospital
23	Community Regional Medical Center	160	Sutter Roseville Medical Center
24	Sierra Kings District Hospital	161	Eastern Plumas Healthcare
25	St. Agnes Medical Center	162	Plumas District Hospital
26	Glenn Medical Center	163	Seneca Healthcare District
27	Mad River Community Hospital	164	Corona Regional Medical Center – Main Campus
28	Jerold Phelps Community Hospital	165	Desert Regional Medical Center
29	Redwood Memorial Hospital	166	Eisenhower Medical Center
30	St. Joseph Hospital – Eureka	167	Hemet Valley Medical Center
31	El Centro Regional Medical Center	168	John F. Kennedy Memorial Hospital
32	Pioneers Memorial Hospital	169	Palo Verde Hospital
33	Northern Inyo Hospital	170	Parkview Community Hospital
34	Southern Inyo Hospital	171	Riverside Community Hospital
35	Delano Regional Medical Center	172	San Gorgonio Memorial Hospital

36	Bakersfield Memorial Hospital	173	Menifee Valley Medical Center
37	Kern Medical Center	174	Southern Healthcare System – Murrieta
38	Kern Valley Healthcare District	175	Riverside County Regional Medical Center
39	Mercy Hospital – Bakersfield	176	Mercy General Hospital
40	Ridgecrest Regional Hospital	177	Mercy San Juan Hospital
41	San Joaquin Community Hospital	178	Methodist Hospital of Sacramento
42	Tehachapi Hospital	179	Sutter Medical Center – Sacramento
43	Mercy Westside Hospital (2003)	180	Mercy Hospital – Folsom
44	Corcoran District Hospital	181	Hazel Hawkins Memorial Hospital
45	Hanford Community Hospital	182	Barstow Community Hospital
46	Central Valley General Hospital	183	Bear Valley Community Hospital
47	St. Helena Hospital – Clearlake	184	Chino Valley Medical Center
48	Sutter Lakeside Hospital	185	Montclair Hospital Medical Center
49	Lassen Community Hospital (2002)	186	Mountains Community Hospital
50	Banner Lassen Medical Center	187	Redlands Community Hospital
51	Alhambra Hospital	188	San Antonio Community Hospital
52	Antelope Valley Hospital	189	Community Hospital of San Bernardino
53	Catalina Island Medical Center	190	St. Bernardine Medical Center
54	St. Mary Medical Center	191	St. Mary Medical Center
55	Bellflower Medical Center	192	Victor Valley Community Hospital
56	Beverly Hospital	193	Colorado River Medical Center
57	Brotman Medical Center	194	Hi-Desert Medical Center
58	California Hospital Medical Center	195	Desert Valley Hospital
59	Centinela Hospital Medical Center	196	Arrowhead Regional Medical Center
60	Tri-City Regional Medical Center	197	Alvarado Hospital
61	Community and Mission Hospitals of Huntington Park	198	Sharp Coronado Hospital and Healthcare Center
62	Los Angeles Community Hospital	199	Sharp Memorial Hospital
63	San Gabriel Valley Medical Center	200	Fallbrook Hospital District
64	Lakewood Regional Medical Center	201	Sharp Grossmont Hospital
65	Downey Regional Medical Center	202	Scripps Mercy Hospital
66	East Los Angeles Doctor's Hospital	203	Palomar Medical Center
67	Foothill Presbyterian Hospital	204	Paradise Valley Hospital
68	Garfield Medical Center	205	Scripps memorial Hospital – La Jolla
69	East Valley Hospital Medical Center	206	Tri-City Medical Center
70	Granada Hills Community Hospital (2002)	207	University of California – San Diego Medical Center
71	Greater El Monte Community Hospital	208	Sharp Chula Vista Medical Center
72	Robert F. Kennedy Medical Center (2004)	209	Pomerado Hospital
73	Hollywood Presbyterian Medical Center	210	Scripps Memorial Hospital - Encinitas
74	Providence Holy Cross Medical Center	211	California Pacific Medical Center
75	Good Samaritan Hospital – Los Angeles	212	San Francisco General Hospital Medical Center
76	Huntington Memorial Hospital	213	St. Francis Memorial Hospital
77	Lancaster Community Hospital	214	California Pacific Medical Center – St. Lukes Campus
78	Providence Little Company of Mary – Torrance	215	St. Mary's Medical Center – San Francisco
79	Community Hospital of Long Beach	216	Chinese Hospital
80	Marina Del Rey Hospital	217	Dameron Hospital
81	Providence Tarzana Medical Center	218	Lodi Memorial Hospital
82	Memorial Hospital of Gardena	219	San Joaquin General Hospital
83	Glendale Memorial Hospital and Health Center	220	St. Joseph's Medical Center of Stockton
84	Mission Community Hospital – Panorama Campus	221	Sutter Tracy Community Hospital
85	Long Beach Memorial Medical Center	222	Doctor's Hospital of Manteca
86	Methodist Hospital of Southern California	223	Arroyo Grande Community Hospital
87	Olympia Medical Center	224	French Hospital Medical Center
88	Monterey Park Hospital	225	San Luis Obispo General Hospital (2003)
89	Cedars-Sinai Medical Center	226	Twin Cities Community Hospital
90	Northridge Hospital Medical Center	227	San Mateo Medical Center
91	Pacific Hospital of Long Beach	228	Goleta Valley Cottage Hospital
92	Pomona Valley Hospital Medical Center	229	Lompoc Valley Medical Center
93	Presbyterian Intercommunity Hospital	230	Marian Medical Center
94	Citrus Valley Medical Center – Queen of the Valley Campus	231	Santa Barbara Cottage Hospital
95	San Dimas Community Hospital	232	Santa Ynez Valley Cottage Hospital
96	Providence Little Company of Mary – San Pedro	233	St. Francis Medical Center – Santa Barbara (2003)
97	Elaster Community Hospital (2003)	234	Regional Medical Center of San Jose
98	Santa Monica-UCLA Medical Center and Orthopaedic Hospital	235	El Camino Hospital
99	Santa Teresita Hospital (2003)	236	San Jose Medical Center (2004)
100	Pacifica Hospital of the Valley	237	Santa Clara Valley Medical Center
101	Sherman Oaks Hospital and Health Center	238	St. Louise Regional Hospital

102	St. Francis Medical Center	239	Dominican Santa Cruz Hospital – Soquel
103	St. John's Health Center	240	Watsonville Community Hospital
104	Providence Saint Joseph Medical Center	241	Mayers Memorial Hospital
105	St. Vincent Medical Center	242	Shasta Regional Medical Center
106	Coast Plaza Doctors Hospital	243	Mercy Medical Center
107	Ronald Reagan-UCLA Medical Center	244	Mercy Hospital of Mt. Shasta
108	Northridge Hospital Medical Center – Sherman Way Campus (2004)	245	Fairchild Medical Center
109	Valley Presbyterian Hospital	246	Sutter Solano Medical Center
110	Verdugo Hills Hospital	247	North Bay Medical Center
111	Los Angeles Metropolitan Medical Center	248	Vaca Valley Hospital
112	West Hills Hospital and Medical Center	249	Sutter Medical Center of Santa Rosa
113	White Memorial Medical Center	250	Healdsburg District Hospital
114	Whittier Hospital medical Center	251	Santa Rosa Memorial Hospital
115	Henry Mayo Newhall Memorial Hospital	252	Sonoma Valley Hospital
116	Los Angeles County/Harbor-UCLA Medical Center	253	Sutter Warrack Hospital (2004)
117	Los Angeles County/USC Medical Center	254	Palm Drive Hospital
118	Los Angeles County/Martin Luther King Junior Medical Center (2007)	255	Doctors Medical Center
119	Los Angeles County/Olive View-UCLA Medical Center	256	Emanuel Medical Center
120	Madera Community Hospital	257	Memorial Hospital Modesto
121	Marin General Hospital	258	Oak Valley District Hospital
122	Novato Community Hospital	259	St. Elizabeth Community Hospital
123	John C. Fremont Healthcare District	260	Trinity Hospital
124	Frank R. Howard memorial Hospital	261	Kaweah Delta Medical Center
125	Mendocino Coast District Hospital	262	Sierra View District Hospital
126	Ukiah Valley Medical center – Hospital Drive	263	Tulare District Hospital
127	Memorial Hospital of Los Banos	264	Sonora Regional Medical Center – Green ley
128	Mercy Medical Center Merced – Community Campus	265	Community Memorial Hospital – San Buenaventura
129	Surprise Valley Community Hospital	266	Ventura County Medical Center
130	Modoc Medical Center	267	Los Robles Hospital and Medical Center
131	Mammoth Hospital	268	Ojai Valley Community Hospital
132	Community Hospital of the Monterey Peninsula	269	St. John's Pleasant Valley Hospital
133	Salinas Valley Memorial Hospital	270	Simi Valley Hospital and Healthcare Services - Sycamore
134	Natividad Medical Center	271	St. John's Regional Medical Center
135	Queen of the Valley Hospital	272	Woodland Memorial Hospital
136	St. Helena Hospital	273	Sutter Davis Hospital
137	Sierra Nevada Memorial Hospital	274	Rideout Memorial Hospital

This table shows the case numbers assigned to each safety-net hospital included in the study. These case numbers are used again in Appendix B.

Appendix B: Hospital Data for Baseline Year of 2000 in U.S. Real Dollars

Case	Unemployment X_1	Median Household Income X_2	Gross Profit Margin X_3	Efficiency Ratio X_4	Operating Margin X_5	Excess Margin X_6	Salary & Benefit Expense/Full-time Equivalent X_7	Hospital Status (Open = 1, Closed = 0) Y
1	0.058	-$2,183.52	0.750	0.250	-0.132	0.050	$75,403	1
2	0.058	-$2,183.52	0.735	0.262	0.058	-0.018	$101,947	1
3	0.058	-$2,183.52	0.431	0.560	0.093	0.001	$94,169	1
4	0.058	-$2,183.52	0.773	0.224	0.033	0.059	$102,557	1
5	0.058	-$2,183.52	0.784	0.213	0.001	0.007	$78,932	1
6	0.058	-$2,183.52	0.763	0.235	0.045	0.084	$106,600	1
7	0.059	-$1,884.00	0.652	0.340	0.087	-0.072	$72,259	1
8	0.060	$710.59	0.567	0.433	-0.018	-0.035	$48,126	1
9	0.060	$710.59	0.821	0.177	0.008	0.000	$68,779	1
10	0.060	$710.59	0.724	0.272	0.023	0.032	$60,036	1
11	0.060	$710.59	0.749	0.248	0.036	-0.039	$70,322	1
12	0.075	-$1,339.05	0.631	0.365	0.044	0.004	$62,920	1
13	0.063	$1,659.29	0.648	0.346	-0.028	-0.038	$54,111	1
14	0.055	-$3,170.03	0.796	0.201	-0.186	0.222	$109,191	1
15	0.055	-$3,170.03	0.280	0.700	-0.418	-0.004	$102,094	1
16	0.055	-$3,170.03	0.721	0.273	-0.014	-0.073	$98,495	1
17	0.055	-$3,170.03	0.795	0.203	0.015	-0.080	$106,234	1
18	0.055	-$3,170.03	0.798	0.202	0.071	0.016	$91,337	1
19	0.046	$879.62	0.664	0.332	0.033	-0.071	$64,141	1
20	0.059	$3,237.61	0.567	0.429	0.108	0.007	$56,839	1

21	0.059	$3,237.61	0.735	0.261	0.010	0.014	$64,347	1
22	0.065	-$2,631.35	0.466	0.509	0.055	-0.138	$30,010	1
23	0.065	-$2,631.35	0.688	0.306	0.011	0.067	$59,481	1
24	0.065	-$2,631.35	0.546	0.446	-0.097	-0.072	$44,754	1
25	0.065	-$2,631.35	0.723	0.273	0.042	-0.387	$65,324	1
26	0.057	$1,642.46	0.541	0.456	-0.035	-0.005	$44,081	1
27	0.051	-$1,929.94	0.651	0.344	-0.084	-0.115	$44,590	1
28	0.051	-$1,929.94	0.139	0.854	-0.240	0.004	$46,665	1
29	0.051	-$1,929.94	0.728	0.271	0.102	-0.164	$58,894	1
30	0.051	-$1,929.94	0.735	0.262	0.024	-0.026	$50,910	1
31	0.082	$4,474.51	0.761	0.234	0.023	0.030	$40,998	1
32	0.082	$4,474.51	0.660	0.334	-0.013	0.014	$52,272	1
33	0.043	-$3,532.72	0.457	0.533	0.084	-0.010	$67,769	1
34	0.043	-$3,532.72	0.213	0.787	-0.176	0.048	$39,402	1
35	0.063	-$2,818.42	0.655	0.331	0.031	-0.035	$43,329	1
36	0.063	-$2,818.42	0.790	0.206	0.115	-0.065	$66,644	1
37	0.063	-$2,818.42	0.519	0.471	-0.248	0.078	$73,032	1
38	0.063	-$2,818.42	0.673	0.316	-0.055	-0.058	$41,126	1
39	0.063	-$2,818.42	0.768	0.229	0.149	-0.040	$68,761	1
40	0.063	-$2,818.42	0.612	0.387	0.063	-0.019	$56,378	1
41	0.063	-$2,818.42	0.811	0.186	0.054	0.035	$63,433	1
42	0.063	-$2,818.42	0.535	0.464	-0.030	0.140	$46,628	1
43	0.017	$2,811.00	0.193	0.686	-0.427	-0.438	$36,805	0
44	0.060	-$4,489.43	0.374	0.618	0.001	-0.014	$30,290	1
45	0.060	-$4,489.43	0.776	0.222	0.056	-0.005	$63,577	1
46	0.060	-$4,489.43	0.562	0.436	0.079	-0.009	$52,189	1
47	0.070	-$3,569.92	0.680	0.310	-0.027	0.043	$69,749	1
48	0.070	-$3,569.92	0.622	0.370	-0.059	-0.075	$80,570	1
49	0.004	-$2,103.00	0.245	0.477	0.083	-0.074	$28,047	0
50	0.045	-$2,370.58	0.618	0.370	0.196	0.065	$58,286	1
51	0.064	-$2,272.84	0.722	0.278	0.020	0.031	$51,919	1
52	0.064	-$2,272.84	0.706	0.288	-0.028	0.062	$66,974	1
53	0.064	-$2,272.84	0.260	0.739	-0.070	0.038	$52,648	1
54	0.064	-$2,272.84	0.769	0.228	0.022	0.048	$67,751	1
55	0.064	-$2,272.84	0.779	0.221	-0.081	0.064	$50,678	1
56	0.064	-$2,272.84	0.539	0.453	-0.079	0.116	$68,470	1
57	0.064	-$2,272.84	0.814	0.175	-0.104	0.302	$70,616	1
58	0.064	-$2,272.84	0.716	0.275	-0.032	0.255	$70,257	1
59	0.064	-$2,272.84	0.854	0.144	-0.055	0.313	$70,249	1
60	0.064	-$2,272.84	0.739	0.254	-0.116	0.422	$61,387	1
61	0.064	-$2,272.84	0.817	0.183	-0.014	0.076	$55,418	1
62	0.064	-$2,272.84	0.829	0.169	0.217	0.136	$47,864	1
63	0.064	-$2,272.84	0.794	0.204	-0.004	0.034	$55,821	1
64	0.064	-$2,272.84	0.832	0.168	-0.008	0.057	$79,144	1
65	0.064	-$2,272.84	0.782	0.215	-0.024	0.073	$60,723	1
66	0.064	-$2,272.84	0.713	0.279	-0.004	0.262	$53,052	1
67	0.064	-$2,272.84	0.740	0.260	0.017	0.014	$65,262	1
68	0.064	-$2,272.84	0.841	0.157	0.065	0.026	$62,293	1
69	0.064	-$2,272.84	0.795	0.200	-0.016	0.038	$54,744	1
70	0.014	-$233.00	0.346	0.630	-0.212	-0.354	$38,561	0
71	0.064	-$2,272.84	0.807	0.190	-0.070	0.056	$67,237	1
72	-0.003	$83.00	0.631	0.345	-0.263	-0.355	$44,827	0
73	0.064	-$2,272.84	0.813	0.186	-0.007	-0.003	$58,805	1
74	0.064	-$2,272.84	0.846	0.152	0.113	0.000	$72,317	1
75	0.064	-$2,272.84	0.781	0.214	-0.060	-0.120	$70,876	1
76	0.064	-$2,272.84	0.735	0.261	-0.027	0.092	$68,310	1
77	0.064	-$2,272.84	0.801	0.189	-0.081	-0.027	$57,944	1
78	0.064	-$2,272.84	0.807	0.189	0.030	-0.004	$65,157	1
79	0.064	-$2,272.84	0.814	0.183	-0.009	-0.019	$56,617	1
80	0.064	-$2,272.84	0.815	0.185	0.050	-0.063	$69,515	1
81	0.064	-$2,272.84	0.805	0.193	-0.107	0.110	$66,830	1
82	0.064	-$2,272.84	0.756	0.238	0.020	0.160	$50,302	1
83	0.064	-$2,272.84	0.801	0.198	-0.044	-0.122	$72,593	1
84	0.064	-$2,272.84	0.647	0.339	-0.045	0.146	$53,450	1
85	0.064	-$2,272.84	0.749	0.251	0.123	-0.044	$63,336	1
86	0.064	-$2,272.84	0.725	0.273	0.018	-0.002	$64,046	1
87	0.064	-$2,272.84	0.900	0.098	0.044	0.060	$71,327	1
88	0.064	-$2,272.84	0.844	0.154	0.028	0.056	$63,515	1
89	0.064	-$2,272.84	0.744	0.251	0.073	-0.002	$79,254	1

90	0.064	-$2,272.84	0.788	0.210	0.108	-0.030	$72,577	1
91	0.064	-$2,272.84	0.717	0.278	-0.019	-0.046	$62,897	1
92	0.064	-$2,272.84	0.810	0.188	0.030	-0.055	$68,029	1
93	0.064	-$2,272.84	0.808	0.189	0.076	-0.064	$61,664	1
94	0.064	-$2,272.84	0.730	0.267	-0.003	-0.008	$70,461	1
95	0.064	-$2,272.84	0.838	0.159	0.117	0.125	$52,979	1
96	0.064	-$2,272.84	0.820	0.178	0.044	-0.099	$63,015	1
97	0.013	$1,386.00	0.584	0.412	-0.134	0.095	$44,944	0
98	0.064	-$2,272.84	0.704	0.294	-0.004	0.051	$67,133	1
99	0.013	-$3.00	0.514	0.481	-0.255	-0.090	$29,801	0
100	0.064	-$2,272.84	0.615	0.365	-0.163	0.073	$61,874	1
101	0.064	-$2,272.84	0.742	0.255	0.061	0.043	$62,347	1
102	0.064	-$2,272.84	0.725	0.268	0.021	-0.095	$68,787	1
103	0.064	-$2,272.84	0.722	0.278	-0.060	-0.030	$62,502	1
104	0.064	-$2,272.84	0.817	0.182	0.019	-0.042	$70,340	1
105	0.064	-$2,272.84	0.761	0.234	-0.066	0.011	$61,450	1
106	0.064	-$2,272.84	0.689	0.304	-0.075	-0.078	$41,108	1
107	0.064	-$2,272.84	0.650	0.345	0.058	0.039	$70,558	1
108	-0.003	$83.00	0.728	0.271	-0.108	-0.018	$53,249	0
109	0.064	-$2,272.84	0.765	0.233	-0.024	0.014	$60,498	1
110	0.064	-$2,272.84	0.760	0.237	0.001	0.019	$56,526	1
111	0.064	-$2,272.84	0.785	0.215	-0.048	-0.222	$53,036	1
112	0.064	-$2,272.84	0.815	0.185	0.117	0.059	$88,006	1
113	0.064	-$2,272.84	0.797	0.203	0.001	0.046	$66,578	1
114	0.064	-$2,272.84	0.845	0.155	0.029	0.008	$62,047	1
115	0.064	-$2,272.84	0.818	0.175	0.027	-0.001	$61,843	1
116	0.064	-$2,272.84	0.547	0.446	-0.507	-0.084	$74,184	1
117	0.064	-$2,272.84	0.369	0.622	-0.685	-0.166	$71,590	1
118	-0.003	$3,450.00	0.442	0.543	-0.268	-0.267	$62,548	0
119	0.064	-$2,272.84	0.494	0.506	-0.495	-0.104	$74,603	1
120	0.062	-$3,087.99	0.623	0.376	0.015	-0.006	$48,023	1
121	0.041	-$568.45	0.755	0.242	0.098	-0.038	$97,715	1
122	0.041	-$568.45	0.728	0.266	0.082	-0.117	$98,908	1
123	0.045	-$1,176.47	0.265	0.717	-0.114	-0.068	$37,402	1
124	0.048	-$3,026.48	0.668	0.332	0.114	-0.017	$71,732	1
125	0.048	-$3,026.48	0.564	0.429	0.000	-0.009	$64,960	1
126	0.048	-$3,026.48	0.698	0.299	0.021	-0.046	$62,952	1
127	0.070	-$6,484.55	0.738	0.261	0.013	0.245	$65,661	1
128	-0.083	-$6,484.55	0.757	0.239	0.073	0.004	$68,652	1
129	0.044	-$475.88	-0.049	1.040	-0.116	0.038	$33,085	1
130	0.044	-$475.88	0.196	0.788	-0.278	0.111	$40,905	1
131	0.042	-$1,670.25	0.265	0.720	-0.076	0.038	$65,818	1
132	0.047	-$2,020.79	0.596	0.399	0.085	0.048	$102,346	1
133	0.047	-$2,020.79	0.592	0.408	0.042	-0.054	$95,827	1
134	0.047	-$2,020.79	0.690	0.300	-0.043	-0.001	$87,101	1
135	0.046	$1,444.52	0.736	0.261	0.042	-0.127	$88,178	1
136	0.046	$1,444.52	0.749	0.249	-0.063	0.001	$80,521	1
137	0.057	-$4,574.69	0.692	0.305	0.039	-0.184	$81,180	1
138	0.057	-$4,574.69	0.398	0.580	0.011	0.032	$65,223	1
139	0.050	-$5,263.09	0.640	0.359	0.018	-0.011	$64,600	1
140	0.050	-$5,263.09	0.746	0.252	-0.163	-0.338	$58,337	1
141	0.050	-$5,263.09	0.783	0.217	0.006	-0.047	$66,277	1
142	0.015	-$299.00	0.147	0.671	-0.531	0.134	$40,562	0
143	0.050	-$5,263.09	0.764	0.230	-0.133	0.080	$63,329	1
144	0.050	-$5,263.09	0.810	0.190	0.023	0.023	$76,917	1
145	0.050	-$5,263.09	0.763	0.234	-0.027	0.033	$69,486	1
146	0.050	-$5,263.09	0.600	0.384	0.049	-0.120	$71,396	1
147	0.050	-$5,263.09	0.742	0.256	0.068	0.001	$59,193	1
148	0.050	-$5,263.09	0.705	0.294	0.072	-0.007	$60,830	1
149	0.008	$1,818.00	0.395	0.604	-0.531	-0.762	$29,439	0
150	0.050	-$5,263.09	0.816	0.183	0.051	0.048	$67,973	1
151	0.050	-$5,263.09	0.732	0.261	0.087	-0.051	$73,656	1
152	0.050	-$5,263.09	0.756	0.244	0.116	-0.008	$62,470	1
153	0.050	-$5,263.09	0.807	0.193	0.009	0.132	$55,875	1
154	0.050	-$5,263.09	0.814	0.186	0.075	0.087	$69,065	1
155	0.050	-$5,263.09	0.697	0.296	0.054	-0.107	$70,550	1
156	0.050	-$5,263.09	0.724	0.271	0.088	-0.112	$68,304	1
157	0.050	-$5,263.09	0.750	0.247	0.082	-0.032	$61,060	1
158	0.050	-$5,263.09	0.792	0.206	0.050	0.058	$61,174	1
159	0.056	-$2,766.16	0.712	0.282	0.046	-0.105	$86,067	1

160	0.056	-$2,766.16	0.737	0.255	0.151	0.037	$84,654	1
161	0.072	-$3,540.89	0.442	0.544	-0.054	0.046	$39,699	1
162	0.072	-$3,540.89	0.448	0.549	0.004	-0.003	$55,743	1
163	0.072	-$3,540.89	0.458	0.534	-0.055	0.011	$44,226	1
164	0.074	-$5,485.00	0.736	0.264	-0.065	-0.016	$59,637	1
165	0.074	-$5,485.00	0.833	0.167	0.092	0.044	$70,068	1
166	0.074	-$5,485.00	0.796	0.200	-0.012	-0.062	$62,640	1
167	0.074	-$5,485.00	0.676	0.319	-0.049	-0.015	$56,417	1
168	0.074	-$5,485.00	0.829	0.171	-0.101	0.007	$73,909	1
169	0.074	-$5,485.00	0.643	0.356	-0.023	-0.013	$64,525	1
170	0.074	-$5,485.00	0.772	0.220	-0.017	0.010	$58,712	1
171	0.074	-$5,485.00	0.802	0.198	0.119	0.037	$75,647	1
172	0.074	-$5,485.00	0.687	0.310	-0.160	0.122	$52,564	1
173	0.074	-$5,485.00	0.747	0.245	-0.110	0.008	$60,937	1
174	0.074	-$5,485.00	0.702	0.288	0.036	0.083	$58,677	1
175	0.074	-$5,485.00	0.703	0.286	-0.183	-0.042	$63,763	1
176	0.059	-$6,936.31	0.798	0.201	0.089	-0.108	$91,879	1
177	0.059	-$6,936.31	0.779	0.220	0.087	-0.134	$90,978	1
178	0.059	-$6,936.31	0.742	0.257	0.020	-0.072	$82,183	1
179	0.059	-$6,936.31	0.761	0.236	0.087	0.007	$87,165	1
180	0.059	-$6,936.31	0.740	0.257	0.168	-0.090	$89,351	1
181	0.071	-$5,852.79	0.606	0.387	-0.035	-0.054	$75,543	1
182	0.074	-$6,425.40	0.849	0.147	0.213	-0.163	$44,650	1
183	0.074	-$6,425.40	0.405	0.595	-0.116	0.201	$52,454	1
184	0.074	-$6,425.40	0.712	0.288	0.148	0.003	$50,834	1
185	0.074	-$6,425.40	0.765	0.231	-0.013	0.180	$51,789	1
186	0.074	-$6,425.40	0.318	0.659	-0.441	-0.044	$48,732	1
187	0.074	-$6,425.40	0.649	0.347	0.000	-0.022	$62,975	1
188	0.074	-$6,425.40	0.762	0.236	0.038	-0.054	$67,533	1
189	0.074	-$6,425.40	0.788	0.209	-0.028	-0.035	$60,077	1
190	0.074	-$6,425.40	0.784	0.214	0.028	-0.050	$68,985	1
191	0.074	-$6,425.40	0.735	0.262	0.042	-0.055	$67,487	1
192	0.074	-$6,425.40	0.761	0.234	0.011	0.026	$49,657	1
193	0.074	-$6,425.40	0.616	0.387	0.054	0.428	$40,446	1
194	0.074	-$6,425.40	0.681	0.313	-0.014	0.145	$47,608	1
195	0.074	-$6,425.40	0.763	0.232	0.062	-0.041	$46,520	1
196	0.074	-$6,425.40	0.639	0.337	0.031	0.076	$59,598	1
197	0.051	-$4,802.84	0.789	0.211	-0.010	0.078	$74,492	1
198	0.051	-$4,802.84	0.695	0.305	-0.038	-0.009	$58,727	1
199	0.051	-$4,802.84	0.755	0.241	0.024	-0.023	$67,811	1
200	0.051	-$4,802.84	0.751	0.247	0.006	-0.052	$55,050	1
201	0.051	-$4,802.84	0.778	0.220	0.012	-0.001	$65,617	1
202	0.051	-$4,802.84	0.732	0.265	0.013	0.012	$62,547	1
203	0.051	-$4,802.84	0.716	0.277	-0.065	-0.128	$68,518	1
204	0.051	-$4,802.84	0.758	0.236	-0.020	0.164	$53,552	1
205	0.051	-$4,802.84	0.703	0.294	0.083	0.167	$62,687	1
206	0.051	-$4,802.84	0.703	0.291	-0.040	0.021	$65,936	1
207	0.051	-$4,802.84	0.565	0.433	0.136	0.004	$79,756	1
208	0.051	-$4,802.84	0.795	0.202	0.021	-0.056	$66,073	1
209	0.051	-$4,802.84	0.682	0.315	-0.018	0.000	$62,627	1
210	0.051	-$4,802.84	0.683	0.313	0.076	0.032	$64,844	1
211	0.047	-$1,587.47	0.711	0.283	0.145	-0.001	$93,212	1
212	0.047	-$1,587.47	0.559	0.441	-0.185	0.077	$89,991	1
213	0.047	-$1,587.47	0.752	0.244	-0.049	-0.053	$87,179	1
214	0.047	-$1,587.47	0.739	0.261	-0.291	-0.009	$85,252	1
215	0.047	-$1,587.47	0.758	0.240	-0.012	-0.053	$95,005	1
216	0.047	-$1,587.47	0.525	0.475	0.109	-0.027	$90,372	1
217	0.072	-$2,792.52	0.819	0.180	0.053	0.041	$67,417	1
218	0.072	-$2,792.52	0.850	0.150	0.054	-0.066	$63,303	1
219	0.072	-$2,792.52	0.371	0.611	-0.090	0.061	$68,293	1
220	0.072	-$2,792.52	0.801	0.197	0.055	-0.045	$78,619	1
221	0.072	-$2,792.52	0.745	0.251	0.174	-0.055	$78,931	1
222	0.072	-$2,792.52	0.893	0.107	0.250	-0.023	$81,438	1
223	0.047	-$3,248.35	0.810	0.184	-0.015	-0.043	$66,100	1
224	0.047	-$3,248.35	0.843	0.153	0.056	0.066	$85,342	1
225	0.007	$1,637.00	0.064	0.936	-0.536	-0.060	$46,907	0
226	0.047	-$3,248.35	0.861	0.139	0.122	0.017	$77,778	1
227	0.046	-$2,145.89	0.315	0.685	-0.007	0.049	$84,513	1
228	0.041	-$2,967.76	0.707	0.293	0.145	0.060	$70,400	1

229	0.041	-$2,967.76	0.463	0.534	-0.036	0.050	$49,906	1
230	0.041	-$2,967.76	0.765	0.231	0.057	-0.028	$61,951	1
231	0.041	-$2,967.76	0.693	0.304	0.104	0.035	$74,408	1
232	0.041	-$2,967.76	0.653	0.347	0.032	0.114	$78,994	1
233	0.007	$87.00	0.645	0.355	-0.223	-0.297	$40,701	0
234	0.061	-$4,850.93	0.812	0.174	-0.064	0.052	$116,077	1
235	0.061	-$4,850.93	0.781	0.218	0.107	-0.063	$96,608	1
236	-0.020	-$8,205.00	0.674	0.309	-0.204	-0.305	$77,517	0
237	0.061	-$4,850.93	0.564	0.429	-0.245	-0.057	$105,518	1
238	0.061	-$4,850.93	0.778	0.215	0.002	-0.006	$100,555	1
239	0.054	-$5,928.43	0.775	0.223	0.092	-0.003	$99,792	1
240	0.054	-$5,928.43	0.830	0.160	-0.031	0.047	$94,455	1
241	0.072	-$1,651.38	0.359	0.621	-0.105	0.083	$36,870	1
242	0.072	-$1,651.38	0.856	0.141	-0.664	0.148	$68,150	1
243	0.072	-$1,651.38	0.744	0.255	0.076	-0.099	$86,446	1
244	0.061	$1,844.34	0.512	0.484	0.046	-0.060	$80,855	1
245	0.061	$1,844.34	0.538	0.457	0.048	0.006	$60,913	1
246	0.054	-$4,700.02	0.736	0.260	-0.043	0.025	$102,971	1
247	0.054	-$4,700.02	0.790	0.208	-0.033	-0.066	$89,077	1
248	0.054	-$4,700.02	0.829	0.169	0.156	0.039	$86,753	1
249	0.053	-$3,732.87	0.599	0.397	-0.093	0.090	$88,299	1
250	0.053	-$3,732.87	0.580	0.416	-0.125	0.089	$62,506	1
251	0.053	-$3,732.87	0.770	0.226	0.036	-0.035	$100,515	1
252	0.053	-$3,732.87	0.683	0.315	-0.067	0.009	$71,374	1
253	-0.001	$1,839.00	0.569	0.431	-0.216	0.303	$60,509	0
254	0.053	-$3,732.87	0.599	0.387	-0.319	0.160	$66,617	1
255	0.073	-$4,688.08	0.877	0.123	0.039	-0.030	$83,016	1
256	0.073	-$4,688.08	0.784	0.212	-0.005	-0.020	$59,075	1
257	0.073	-$4,688.08	0.798	0.199	0.150	-0.018	$68,169	1
258	0.073	-$4,688.08	0.699	0.301	0.039	-0.059	$57,126	1
259	0.068	$12.11	0.703	0.296	0.137	-0.077	$84,407	1
260	0.068	-$2,506.52	0.355	0.645	-0.057	0.033	$39,285	1
261	0.060	-$2,498.51	0.712	0.284	0.020	-0.050	$57,362	1
262	0.060	-$2,498.51	0.769	0.227	0.066	-0.047	$55,156	1
263	0.060	-$2,498.51	0.633	0.363	-0.040	0.093	$51,626	1
264	0.063	$779.27	0.743	0.252	0.015	0.052	$60,700	1
265	0.050	-$5,362.95	0.816	0.183	0.021	0.015	$65,586	1
266	0.050	-$5,362.95	0.604	0.393	-0.428	0.024	$68,110	1
267	0.050	-$5,362.95	0.762	0.244	0.129	-0.032	$87,139	1
268	0.050	-$5,362.95	0.748	0.252	-0.012	-0.042	$55,776	1
269	0.050	-$5,362.95	0.772	0.226	0.039	-0.065	$74,008	1
270	0.050	-$5,362.95	0.736	0.254	-0.087	0.042	$52,722	1
271	0.050	-$5,362.95	0.744	0.252	-0.026	-0.019	$77,486	1
272	0.056	-$4,541.15	0.753	0.245	0.070	-0.048	$77,798	1
273	0.056	-$4,541.15	0.717	0.280	0.151	0.042	$85,692	1
274	0.080	-$99.75	0.628	0.367	0.000	-0.129	$65,892	1

This table shows the values of each variable used in the study. The first row is the description of each variable used in this study. The second row is the variable symbol assigned to each variable. The first column is the case number taken from Appendix A. The data for each variable was the result of the formula used.

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